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Concluding Remarks

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1. THE PROBLEMS

To summarize the long and complex papers presented and the lively discussion to which they gave rise is a task beyond my capacity; and may not provide a useful substitute for a careful study of the full record. My choice is rather to reflect on the broad issues that are central to most of the papers and much of the discussion. These issues relate to significant and meaningful measurement of economic performance and change—excluding here the measurement of *social* performance, as distinct from economic. Measuring social performance raises many additional, and somewhat different, problems. Except for Dan Usher's interesting treatment of the economic value of the long-term gain in life and health, a gain too wide to be comprised under economic, all papers dwelt on measuring economic performance—and even so perhaps too narrowly: little attention was paid to distributive aspects of economic performance, and to questions of international comparability of economic aggregates and of their significant components—a point to be touched upon below.

The various issues, many of them covered in the Juster paper, but discussed also, separately and with more emphasis and detailed analysis, in most of the other papers, stem from the difficulties of attaining a measure of net output of the economy that would reflect properly the full range of returns and costs—both viewed not merely as monetary receipts and outlays in a defined institutional setting, but as positive and negative entries with respect to what may be regarded as final goals of, and constraints on, economic activity. For the present purpose, we may agree that the final goals are provision of goods to ultimate consumers, the living members of society, and net additions to capital stock relevant to ultimate consumption, current and future; and that the major basic constraints are the limited time and knowledge at the disposal of the current generation, with responsibility to both the current and the future

generations. It is with reference to these goals and constraints that the problems in the measurement of net product arise, reflecting the limitations of the current measures. These limitations should not be viewed as a matter of intellectual willfulness, but as results of deeply rooted measurement problems, and of the difficulty of agreement on underlying concepts and on assumed analytical relations.

If we start with the measurement of "pure" consumption, implicit in the definition of final goals of economic activity, the major issues relating to presently included components can be listed as follows: (i) The separation of outlays, within the present totals of household purchases of commodities and services, that are the results of changed conditions of production and are required for the changed role of the consumer as producer, distinguishing them from those that are in response to needs not governed by the requirements of production. The illustration that easily comes to mind are the larger consumer expenditures in dense urban communities, the latter called for by the increasing scale of modern production, for satisfying the same level of wants that were so much more cheaply satisfied in the countryside. (ii) Another important category is the outlays on education, and possibly on other items relevant to raising the quality of individuals as workers, which suggests that there is a component of investment, in addition to pure consumption. (iii) When collective final consumption is examined, as now represented by government current outlays on goods, there is the possibility that much of the flow is a "regrettable necessity" and does not add directly to the flow of goods into consumption by the living members of society; nor does it add to the relevant stock of capital. These three sets of questions about the character of several important components now included under "final" consumption may be supplemented by a fourth (iv), relating to the difficulty of measuring the net output of some activities, whose product is clearly relevant either to final consumption or to net capital formation, but the market mechanism for which yields inadequate gauges of their appropriate value. This difficulty arises either because the activities may refer to public goods, or because the goods may have quality aspects which the market is not in a position to evaluate properly (or perhaps no one is now able to evaluate, say many educational services). The reference to these four questions in the papers and in the discussion is widespread, and the papers by Olson and Rivlin are particularly to be noted.

While the present estimates of final household and collective consumption may be viewed as including sizable components that are either off-

sets to production-induced costs, or intermediate products, being costs of running the machinery of society and the state, or investment in human capital, there are also omissions of components that are properly part of a pure consumption total. This refers not only to (i) tangible products of household activity which, for many comparative purposes, should be included, even though there is no orientation to the market or easily available market counterparts; and possibly (ii) returns on household capital (besides housing), with consequent modification of the treatment of purchases of durable consumer goods. There is, also, the major topic of (iii) greater leisure and other intangible benefits of the lesser demand that work and economic activity make upon the time and limited capacities of human beings—a topic conspicuously raised in the Nordhaus-Tobin paper and the discussion that followed. There is finally (iv) the problem of measuring negative correlates of both production and final consumption in the way of *current* injection of ill-elements into conditions of life—whether they be pollution of the air, congestion, and the like. These are to be distinguished from increases in negative capital stock, just as we distinguish positive returns from capital from the relevant positive capital stock.

The list of problems, or questions of inclusion and omission, for the second component of net product—net capital formation—is different from that just suggested with respect to household and collective consumption. In particular, the questions of inclusion of nonrelevant components are far more limited, while those of omission are many and weighty. This tilt of the problems when we deal with net capital formation, as compared with consumption, is significant: it suggests that, limited as the scope of net product in conventional accounting is, with emphasis on market-oriented activities for which proper weights can be secured, the tendency has been to define consumption widely, including a number of components whose inclusion is of doubtful legitimacy; and net capital formation too narrowly, limiting it to reproducible material capital. As will be suggested below, this reflected a theory of production and of economic growth in which the requirements for output and growth were far too narrowly defined.

To be sure, even net reproducible capital formation may include components (i) which, in their strict relevance to “regrettable necessities” and in their nontransferability to serve the ends of pure consumption, should not be viewed as adding to real net product (no matter how well they may reflect the capacity of society to produce more of real goods *if* the resources can be turned to alternative uses. The point is that

they cannot be so turned so long as regrettable necessities persist, and the reference to "*necessities*" is not accidental). But it is the omissions that are far more important. To begin with, there are (ii) stocks of consumer durable goods within the household (other than housing), the changes in which, on an alternative treatment of this component, would be recorded—to be combined with current returns from use, as part of current consumption. Then there are (iii) stocks of intangible capital representing the investment in education and other means of raising the quality of human beings as economic producers, these recorded for the given level of current useful knowledge that such education transmits. Of most interest, and indeed of importance dominating any concern with education as capital investment, are (iv) the intangible stock of knowledge, of material technology, and related processes and (v) the stock of social knowledge and institutions employed in translating the existing stock of technological and other useful knowledge into greater output and productivity. Considering that accretions to the stock of knowledge were the major dynamic element in modern economic growth in the developed countries, and that the succession of social inventions and institutional changes shaped the major channels for transforming the potential of growing knowledge into the reality of growth of output and productivity, it is frustrating to note that little effort or progress has been made toward measuring, or devising some reasonable gauge for, the changing volume of the stock of knowledge. Such approximations would have permitted us to observe the changing difference between movements in the stock of knowledge and those in output and in material reproducible capital formation. The same comments apply to the stock of social inventions and institutions—an even more complex problem of measurement. It is hardly a surprise that the relations between net capital formation, narrowly defined, and changes in output have been found so puzzlingly variable over time and different in space.

There is finally (vi) the exclusion of changes in the stock of natural, "irreproducible resources"—in quotes because both resources and reproducibility are functions of the existing state of knowledge and technology; and will change as the latter change. Indeed, it is this dependence that may explain the omission from national accounts of depletion of even observable natural resources. If the depletion were to be counted, so would additions to resources produced by new discovery and knowledge—and the latter measured not by the small inputs of labor and capital into the process but by the much bigger addition to capacity. Given the difficulties of estimating resource-significance of new tech-

nological knowledge and the omission of the latter in measuring net capital formation, it would have been illogical and misleading to deduct depletion of existing known resources. The same reasoning applies to depletion by pollution, etc. Since the original contribution of natural resources, and particularly of improvements in their use (of air, water, etc.), when represented by new technology, had not been included in the estimate of changes in stock, it is illogical and biased to enter a minus sign for pollution or deterioration. This does not preclude the value of undertaking a separate analysis of stocks and changes in stocks of natural resources, under conditions of a given technology—dealing with a range of problems raised in the Herfindahl-Kneese and Leontief papers—but they should not be included in net balances for estimating net capital formation. The point is simply that the propriety of doing the latter, i.e., including negative changes, is contingent upon including the positive changes in the stock of useful knowledge relating to material or social technology, which presently is not being done and probably cannot be done in the near future.

2. EFFECTS OF CONCERN WITH ECONOMIC GROWTH

The list of problems above may have omitted some of the issues raised in the papers and the discussion; or, what is more likely, may not have stated them in the form that seems most appropriate and revealing to the participants. But my hope is that, with some qualifications, the list formulates adequately the major issues that dominated most of the papers and much of the discussion.

The list suggests two reflections. The first is that the problems are numerous, and recalcitrant; and would require a variety of sustained experimental and imaginative research before acceptable answers and measures are established. Second, in their character and recalcitrance, these are all questions of long standing in the national income literature, belonging to the problems of inclusion or drawing the dividing line between economic and noneconomic, on the one hand, and productive and unproductive, on the other; of netness and grossness—of distinguishing between costs and returns, between intermediate and final products; and of valuation, i.e., of a meaningful weighting system by which to combine the diverse costs and net economic products into acceptable and articulated totals. These are the groups of questions that have occupied the Income and Wealth conference from its very start, some thirty-six years ago. And in somewhat different form and language, these questions were the foci of repeated discussions in the economic literature going back

now some two centuries, or longer. While I cannot document this statement by an adequate exercise in bibliography and history of doctrines, a reference to the long controversy about productive and unproductive services in the classical and Marxian schools (still affecting the national income accounting in the communist countries today) should remind us that the distinction between final and intermediate products, and that between economic transaction and economic production, were at issue then. In general, the problems under the three heads above are perennial, because they deal, essentially, with the separation between economic activity and life in general, and with theories of production and valuation which, however elaborated, would tend to lag behind rapidly changing reality and the rapidly shifting focus of observation of economic research; and thus always be present, if in changing variants.

If these be old questions, although in somewhat new guise, one may ask why the sudden rise in interest in them—a recent trend, of which this conference is only one illustration. The answer seems to me to lie in the effects of recent concern with, and an accelerated study of, economic growth, combined with some recent products of such growth—all of which raise questions about its quality as distinct from quantity—or better, questions about its real or *true* quantity as distinct from that yielded by conventional measures.

Thus, the quantitative study of economic growth, in which the *conventional* measures of gross and net product and its components, that are now subjected to various criticisms, were used to gauge the rate and reflect the structure of growth and the relations of growing output to the inputs, revealed the productivity gap. This was an unexplained residual, left after allowance for inputs of labor and capital, on the definitions of these inputs that were implicit in the conceptual framework of national product accounts. The gap suggested that either the production factors implied in the conventional national product framework were incompletely formulated; or that the relations between input and output were incorrectly perceived—and, in either case, more had to be learned about the characteristics of the factors or about the determinants of the shape of the relations between input and output. The singling out of quality of labor, reflective of differences in education and perhaps of other investments in quality of human beings as producers, was a clear response to this explanatory gap. While we may be uneasy about the emphasis placed on this source of quality differences in labor, and particularly bothered by the difficulty of establishing the specific component of outlays on education, etc., that represents investment rather than consumption, it is

clearly the emphasis on economic growth that resulted in the emergence of this concern with investment in human capital—and of a host of issues that would lead to fairly far-reaching modification of the current economic accounts if they were to be consistently followed through.

Likewise, the demonstration that the high rate of modern economic growth is necessarily accompanied by a high rate of shift among production sectors, in the scale of productive enterprise, and in conditions of life required by active participation in the production process, leads to emphasis on changes in conditions of the life of individuals, as both ultimate consumers and workers, that were *required* by the changes in the production system. This called attention to the components in the changing structure of household expenditures that were clearly imposed by the changing conditions of work, in addition to education and other investment in human capital; and raised questions about these components as regrettable necessities, this time within the household rather than within the government collective.

Furthermore, the increasing complexity of economic structure resulting from economic growth, the large monopolistic scale of some of the production units, and the necessity of controlling the continuous, incipient conflicts generated by structural shifts in the course of modern economic growth called for a greatly augmented governmental apparatus—for economic regulation, for responding to pressures for greater equality of economic opportunity, and later for greater economic equality, and finally for assuring the international position of an economic society organized under a sovereign state in an age of intensified nationalism. The relevance of the resulting government output to the final goals of economic activity was brought sharply into question by the great rise not merely in the absolute, but in the proportional, magnitudes of resources devoted to government consumption in the rapidly growing developed countries.

Finally, pollution, depletion, and other negative by-products of economic production were greatly accelerated because of the very rapid rise of total output, in the conventional measurement—the growth of both output and pollution reflecting the rapid rise in the technological power of the modern production system, particularly with rising population. Economic production, and the technology that it employs, may be viewed as interference with the natural course of events, in order to shape the outcome to provide economic goods to man. All such interference has potential negative ecological consequences—pollution and the like—the more lasting, the higher the level of production technology as measured by its capacity to produce goods. After all, wooden products decay and

plastic and rustless steel do not; and the economic advantage of salvaging the latter, once discarded, is, in many cases, absent. Likewise, the pollution potential of a modern power or chemical plant far exceeds anything observed with the more traditional technology of the ox and bullock. If one adds that modern economic growth feeds on a succession of technological innovations, the eventual consequences of the mass spread of which, positive and negative, cannot easily be forecast, then the inevitability of unexpected, unforeseen, negative consequences of economic growth is practically assured.

To put the arguments above simply, the concern with, and the process of rapid learning about, modern economic growth revealed that the production theory implicit in conventional national product measurement, based on simple relations between labor viewed as a kind of homogeneous substance and reproducible material capital, on the one hand, and output on the other, was too bare—overlooking many of the additional requirements of production, a variety of sources of productivity other than material reproducible capital, and the high probability that, in addition to positive output, increased production yielded also negative output, in the way of pollution, congestion, and the like. It suggested that the theory of valuation, in its reliance on prices observed in the markets, was also subject to severe limitations—in that the role of public goods was increasingly large, and the changing quality of goods not adequately reflected in the market because proper judgment of quality became increasingly difficult. This is not to deny the value of the conventional measures (with the theories implicit in them) as useful, if crude, approximations. One had to begin with those, as well-established in the conceptual structure of the discipline and as yielding articulated aggregates that would be relatively easily obtainable, and use them to derive the first approximations. Without the use of the latter, we could hardly have been able to learn as much as we did. But it is this learning that resulted in re-emphasizing the various questions of improper inclusion and omission, the large magnitudes of which were suggested in the course of applying conventional measures to the quantitative analysis of economic growth. It is clearly the long-term aspect of the latter, the use of a period long enough for productivity residuals, structural changes, changes in conditions of life, and the sources of the large advances in both positive output and negative by-products to be observed; with the observations serving to emphasize the gaps in the conventional measurement, gaps that would not look as large in dealing with the more limited perspective of short-term changes.

The shift to the long-term viewpoint of economic growth suggests other problematic aspects of the current measures of economic performance—aspects not covered in the papers and discussion here, and probably meriting a brief note. First, increased emphasis on investment in human capital, on the household, and, in general, on the human factor in economic growth—as distinct from material capital and impersonal-seeming organizations and institutions—calls also for much greater attention to the distributive aspects of economic performance than appears to have been paid in the recent past. With rapid structural changes and dependence of high levels of economic performance on continuous reconciliation of conflicts incipient in the shifts of economic position of various social and economic groups implicit in structural changes, the distributive questions—who gets how much of the growing product—emerge to key importance. It is curious that properly formulated allocations of total product among significantly distinct groups in the population are *not* an integral part of the dominant systems of national economic accounts. And the aggregation that takes place automatically treats total product as an undifferentiated mass in which the high product of the upper income groups and the low product of the poor form one pool—the divisions of which are by industrial origin, or type of factor return, or type of use, or by region, but not by meaningful class and other economic groups within the population. Yet the sharing of these groups in economic growth is an important prerequisite of maintenance of economic productivity and high level of economic performance. The increasing stress on the household, and on the human factor, suggests that distributive allocations will have to be integrated into the measurement of economic performance much more closely than they have been so far.

The second aspect relates to international comparability. Many of the issues raised in the papers and in the discussion would assume an even clearer form, and perhaps different weights, if discussed in the context of meaningful comparisons in the level, or changes in the level, of economic performance among countries at different levels of economic development, or characterized by different patterns of social and economic organization. Perhaps it was wise, in organizing the present conference, to limit the discussion to measurement of economic performance in a single country (or a group of countries similar in their level of development and character of their social and political organization). As it was, the authors and discussants had to grapple with a wide variety of far-reaching and difficult problems. But it should be recognized that however the issues are resolved for the case of a single country or a given group of

countries at specified levels of development and with a given sociopolitical structure, they will have to be reexamined when the goal is set of establishing comparability *beyond* the assumedly narrow range of differentials in levels of development or in the conditioning sociopolitical structure. There is a clear parallel in the effects on the various issues raised above between those of concern with the longer run of economic growth, and those resulting from attempts at international comparison of economic performance across a wide span of differences in levels of development and in the character of the social structure of the countries.

3. THE SHORT- AND THE LONG-TERM PERSPECTIVES

Every measure of economic performance, particularly an aggregate for a large entity like a country, reflects some basic assumptions and theories—assumptions about the distinction between economic activity and life in general, and about final goals of economic activity; and theories of production (inputs and outputs, and the relations between them) and of valuation (ways of combining inputs and outputs of different description). There are inevitably compromises in the extent to which the agreed-upon underlying assumptions and theoretically grounded concepts are faithfully and fully implemented in measurement—for the cost of complete conformity may be extremely high and yet yield only trivial adjustments as compared with a reasonable compromise. But the concepts and theories may differ depending upon the orientation and analytical uses that the measures are intended to serve—and they are relevant only to such uses. After all, we do not estimate, and use the national product estimate, of a country in order to measure its attainment in pure science, or in the arts, or in the increased supply of specimens of the New Communist Man; nor even to gauge levels of happiness, or changes therein, as reflected in responses of a representative sample of a country's population.

Clearly, the current set of measures of aggregative economic performance in the developed countries are better designed to reflect changes in the short rather than the long period, and may have been meant largely for that use. In the short run, structural changes and changes in conditions of life may be assumed to be small; changes in technology and pollution may be taken to be limited; and so would changes in quality of labor and capital, in the quality of complex goods, in the relative magnitude of public goods and in the duplication introduced by the intermediate character of much government activity. This assumption of relative fixity in the "questionable" components in the economic accounts is,

of course, with reference to the magnitude of the possible short-term changes in those inputs and outputs about which there is little question—and it is particularly plausible when we are concerned with the kind of fluctuation that is involved in business cycles. Furthermore, if we are guided by the Keynesian notion of the possible insufficiency of final demand as the major short-term problem, we may be justified in classifying all household purchases and all purchases of goods by government as final consumption, since they do represent demand not for resale in the near future (with or without fabrication or processing); and demand for business capital formation is classified as final because the resale through use is extended into the much longer future. In short, in the concern with short-term changes, particularly fluctuations, it is possible to set aside many of the issues raised so sharply by the long-term perspective, and derive measures that are tolerable, and agreed-upon, gauges of the short-term movements in the economy and in its major component parts—of the type provided by the U.S. Department of Commerce or embodied in the international set of accounts of the United Nations.

The value of such acceptable measures of short-term changes and fluctuations, for orientation and analysis of short-term policies, should not be underestimated. So long as it is clearly understood that they are not adequately meaningful measures of economic growth¹—not even of the short-term path of the long-term trend—and so long as they are used in full recognition that they are measures of total short-term change of which growth is one, but still to be determined, component, no harm and much gain can be derived. After all, a full record is provided of the outputs and inputs in many sectors of the economy; and the fact that there are elements of duplication and omission, when the change is viewed as

¹ A semantic confusion is introduced by the double connotation of the term "growth" and the verb "grows": they may mean merely an increase (and it is to be noted that a decline is rarely referred to as "decay" or "senescence" which would be the proper opposite of growth); or they may mean movement along the long-term secular path, which is the quantitative counterpart of a properly defined growth process, connoting much more than mere increase. When a statement is made in an economic report that the country *grew* in a given year, it is, literally taken, true only in the sense of an increase in some specific aggregative total; and much more analysis and knowledge would be required to establish that the country moved along the path of meaningful growth, involving backward and forward implications. The demands posed by a true measure of growth for resolution of the issues listed in the discussion lie in the reasonably assumed importance of the costs and returns defined differently from the conventional for both measuring and analyzing growth conceived as a movement along the secular growth path. In our discussion of economic growth here, it is the second of the two connotations of the term that is meant.

part of a growth trend, may be seen only as a partial qualification, still leaving the record useful as a gauge of current fluctuations, either in the absolute totals or in the apparent rate of change. Furthermore, considering the variety of conceptual and measurement problems that would have to be resolved before a fully adequate measure of growth is secured, and considering how much more will have to be learned about varying patterns of growth over time, one will have to wait long before reliable measures of the ongoing process of growth over short periods can be designed. Meanwhile, it may be useful to have crude measures of short-term movements, even if they are only uncertain approximations to current growth.

One should note that the remarkably rapid spread of the Department of Commerce gross national product estimates in this country into wide use in the recent two decades appears to have been accompanied by an effort to make these measures more timely, i.e., available for increasingly shorter intervals; to impound the major debatable and complex measurement problems, because of the danger that they would make the estimates less rather than more serviceable as acceptable gauges of short-term changes; and to strive to preserve and improve the accuracy of the estimates within the limits of the agreed-upon conventional concepts. The bias of the measures toward their use as short-term indicators has thus increased—and naturally so, since it is in this use that they found their increasingly widespread application, by business firms, by government, and for purposes of general orientation by the periodical press.

It would not be easy to argue that, given the limited resources (financial and intellectual), and the difficulty of establishing acceptable measures of economic growth that would take sufficient cognizance of still largely unknown aspects of the issues raised above, the choices in the development of national income accounting by the Department of Commerce over the last two decades were not optimal. This does not mean that more could not have been done, within a narrower scope than that suggested by the issues listed, to remove at least some of the limiting conventions. For example, possibly more could have been done in moving toward a replacement basis of fixed capital depreciation charges; or even in an attempt at adjustment for price changes, at least for household expenditures, that would reflect the changing weights of urban communities with their different price levels. But it would be improper to press even these points, without adequate knowledge of the constraints and of the alternatives that had to be weighed.

Two reflections are suggested by the comments just made. The first,

already noted, is that the magnitude and difficulty of the measurement problems raised in the papers and in the discussion in this conference are great; and that an extensive program of experimental work, using the present data, calling for further and different data, and then using the latter, is required, before some of the components can be so defined that approximations in quantitative terms would be derivable continuously in sufficiently acceptable form to assure their usefulness in some set of national accounts—perhaps a set geared to measurement of growth, although still linkable with, and translatable into, the short-term accounts. While exploratory forays may be, and should be, made within the proximate future, it will take a number of years before the results of continuous research will cumulate into an acceptable new measurement framework. Second, we cannot expect that such experimental work will be carried through within the government. The decisions of government with respect to economic measurement have to be based upon a sufficiently agreed-upon framework to warrant expectation of wide acceptance, a sufficient consensus of confidence, so as to provide an adequate basis for use in broad orientation and in policy decisions within the government. It remains to be seen whether the experimental and imaginative work by economists and other social science analysts will succeed in formulating the concepts and in devising acceptable measures of economic growth that could serve as proper guides to the government in its commitment, through various policy instruments, to assist and promote the desired economic growth as defined and measured.

The problems raised in the papers and discussion set the task largely for experimental, scholarly research, and are not fitted for coverage by the type of consensus reporting that is done so well under government auspices, with the use of large resources and adequate coverage—once the basic consensus on concepts and meaning is given. The work exemplified by the Nordhaus-Tobin paper is clearly in this experimental and imaginative category; and one looks forward with great expectations to the results of work at the National Bureau by Kendrick, Eisner, and the Ruggleses reported on in the *51st Annual Report*, September 1971 (pp. 77–81). Such work has been rather limited so far, and perhaps it is not surprising—given the emphasis on the major issue provided by concern with, and learning about, economic growth. After all, the outburst of work on economic growth is a matter of the last twenty-five years; and the time for the evaluation and absorption of the problems raised by it, in the way of limitations of the traditional framework of economic measurement, has been rather short.

It would not help to underestimate the difficulties of research which these problems call for, and cast our discussion in terms that might suggest that the conventional system of national product accounting could be easily modified to accommodate the issues. Nor would it help to underestimate the importance of systematic, exploratory, and continuous work on the issues just raised by scholars outside the constraints of government, within academic and research institutions, for gradually building up a set of concepts and measures more appropriate for gauging long-term changes in economic performance. No mere improvement in the conventional accounts is likely to be sufficient to provide adequate answers and solutions to the complex issues that the rapidly changing structure and pattern of modern economic growth raise in approximating meaningful measures of unduplicated net product for significant components and groups. But the cumulative contribution of the continuous and detailed conventional accounts do provide us with an invaluable quarry, a base from which the radical revisions, substitutions, and supplementation can start.