

## NEW METHODS FOR NEW TASKS

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*Ill fares the land, to hast'ning ills a prey,  
Where wealth accumulates and men decay.*

It is useful for any research organization to periodically review and evaluate its activities, priorities, and interests. The older the institution, the greater the need might be. The National Bureau, founded in 1920, is nearing its 50th Anniversary. It is, therefore, probably appropriate that we are now very much involved in reviewing what our research commitments should be. A prime focus of our discussion today will be on research plans for the future. In particular, we shall discuss the proposals of staff committees who have been actively reviewing our efforts in three traditional fields of National Bureau interest: finance, taxation, and international studies.<sup>1</sup>

In my report to this board last year I discussed the "broad framework" within which any program review must proceed. Specifically, I shared with you some speculations about research priorities for economists in the light of the current economic and social environment in North America. I suggested then that the people of the United States seem to be groping for a new consensus on economic policy. Over the past thirty years national priorities have been allotted to the solution of problems created by World War II, the Cold War, and the extreme economic malaise associated with the Great Depression. For economic policy, the underlying assumption in dealing with these problems seems to have been that if we could eliminate serious business recessions and push the rate of growth in aggregate economic activity to a respectable level, say, over 3.5 per cent per year, other economic and social problems would more or less solve themselves. In the vernacular, the size of the pie was deemed more important, or at least of higher priority, than how it was divided.

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<sup>1</sup>Summaries of these reports immediately follow.

Today, those priorities do not seem so imperative, nor do the underlying assumptions seem so valid. New economic problems have come to the fore — many, to be sure, that were there all along, but that were obscured by the seemingly more urgent demands of winning a war or eliminating large-scale unemployment or meeting an aggressive external threat. As I stressed in my report to you of last year, the more obvious of these lingering or submerged problems in the United States are those of poverty, racism, and urban decay. A new urgency has also been assigned to many environmental problems, such as those of air and water pollution, inadequate recreational facilities, the aesthetics of public structures and urban planning, congestion of transport facilities, levels of urban noise, and so forth.

To a considerable degree, some of the new problems have been created by our very successes in solving older problems. Indeed, in retrospect, it would seem naive of us to have ever thought that it would be otherwise. Economic growth almost by definition generates dislocations and social trauma. After all, it was quite some while ago that Oliver Goldsmith penned the warning quoted at the start of this paper. Even if one rejects Goldsmith's romanticism (as I suspect most economists would) it is rather difficult to deny that many of our current environmental difficulties, for example, those of air and water pollution and congestion and noise, reflect and are created to a considerable extent by a high level of economic growth and activity. We observe today that people can be called upon to leave their homes as well as their livelihoods by such diverse things as automation, reduction of trade barriers, shifts of taste engendered by the introduction of new products, the creation of new high-performance urban transportation facilities, urban renewal, and numerous other private and public acts associated with economic growth.

Another and very important problem generated by our recent economic success is, of course, that of inflation. Pressures on prices and wages are widely deemed to be correlated with a high level of economic growth. Attempts to measure relationships between unemployment levels and wage increases are therefore major concerns of a considerable portion of the economics profession today. Indeed, price-employment-productivity relationships are the most urgent preoccupation of macroeconomists. Quite intriguingly, they are increasingly joined in those interests by microeconomists interested in the theory of the firm.

Inflation is also a dominant consideration for those studying financial markets and institutions. It is becoming increasingly important to know how financial markets adapt to a circumstance of *continuous*, even though perhaps relatively limited, price inflation.<sup>2</sup> For example, in such circumstances, will fixed-value debt cease to exist as a viable financial alternative? If so, what will supplant it? And to what extent are worries about conglomerates and new patterns of institutional investment traceable fundamentally to adjustments and anxieties generated by inflation?

In short, with reasonable intelligence, the goals of cyclical stabilization and growth can be achieved. Though we may falter at times and temporarily mismanage our affairs, the requisite factual bases and theories for achieving growth and stability objectives are specified and largely in hand. What we do *not* know is how to deal expeditiously with the new policy problems, either created

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<sup>2</sup>Cf. the report of the staff review committee on financial studies.

or thrust to the fore by the presence of a cyclically stable, rapidly growing, and potentially inflationary economy. It is to these new problems that economic research must increasingly, though not exclusively, turn in the 1970's.

In my report to this Board last year I somewhat cautiously guessed that this change in policy and research priorities would lead economists to place new emphasis on what might be termed "social measurement." On reflection, I suspect that in some ways social measurement may be a euphemism for a renewed discussion of a very old topic in economics: namely, the distribution of national product or income among various groups in society. To at least some extent, concern about social measurement may express a renewed awareness that it not only matters how large the economic pie might be but also how it is divided. Certainly the interest in social measurement is symptomatic of an increasing awareness that economic growth does not automatically solve all problems.

To adequately meet these new policy interests and related research priorities, we clearly need considerably more information about several aspects of economic behavior. Two aspects, though, stand out. These are: (1) patterns of migration and closely related processes by which populations adjust to change; and (2) evaluation of the extent and character of so-called nonmarket economic activities.

The mobility question arises in several contexts. Interregional migration of labor and capital are perhaps the best-known and most obvious. The processes by which upward mobility within the economic structure is achieved are probably as important, and it seems reasonably clear that education and access to education is of fairly major importance in determining such mobility. The processes by which new technologies and skills are diffused or concentrated — the technological "gap," brain drain, and all that — are similarly of great interest and relevance. In short, understanding of these processes of mobility, diffusion, concentration, and evolution is essential to understanding the key questions of change and growth in our society. It implies more concentration by economists on the human as contrasted with the purely physical aspects of economic activity: education, labor force development and participation, demographic trends, the service industries, and so forth.

As I discussed in my report of last year, economists are increasingly interested in nonmarket sectors of economic activity. To some considerable extent (though that extent is all too often overestimated), such newly important areas of public and research interest as the economics of medicine, education, transportation, and urban development are all activities wherein market tests or evaluations are either lacking or are difficult to achieve. We have seen a remarkable proliferation of efforts by economists and systems analysts, and operations researchers as well, to measure so-called nonmarket benefits or values. This new interest has been expressed in several forms: in governmental efforts to implement so-called program budgeting; in studies to measure the value of educational investment or, more broadly, investment in human capital; in attempts to measure the output of the medical industry; in efforts to determine the external and broader social and economic effects of urban renewal, highway, and depollution programs; and finally, and perhaps most importantly, in attempts to broaden the basis on which we do fundamental national income and wealth accounting so as to measure the value of such economic activity as that conducted *within* the household or firm and therefore not subject to market tests or valuations.

I would speculate that much, though certainly not all, of the need now expressed for establishing better "social statistics" or "social indicators" would be met if economists did a more thorough job of evaluating nonmarket activities. But, of course, to achieve better "social measures" one may first need some clearer concept of why these measures are sought; that is, we may need some better theories of social change and behavior and a better sense of our social and political priorities. In any case, to even begin to cope with these problems at all well, we shall need to undertake new research. In so doing, moreover, economists as a profession may have to reconsider some traditional ways of proceeding. Typically, a revised set of research priorities has meant that some economic theory and method have needed revision as well.

I suspect, for example, that we will need to adopt a more comprehensive analytical approach if we are to adequately research these new problems. This new approach could be called "systems analysis" or "general equilibrium analysis" or "microanalytic modeling." But almost any of the proposed names have deficiencies. "Systems analysis" may suggest too much of the suboptimization that characterizes the approach of operations researchers when solving the well-defined problems of an industrial concern. "General equilibrium analysis" is perhaps misleading because continuous disequilibrium may be more the rule than the exception in these new studies. But in spite of these problems of nomenclature, the stress in this new analytical approach is reasonably obvious: it increasingly must involve the modeling of the interdependencies, nonlinearities, and other complications evident in the highly complex processes by which different economic groups and institutions adjust to changes in their external circumstances and policy environments as well as to one another.

By way of illustration, consider the research status of either urban economics or public finance. There have been many excellent studies of particular taxes, e.g., the personal income tax, the corporate income tax, and local real estate taxes. Similarly, certain aspects of urban adjustment and development, such as the extent of the total national housing market or the conversion of rural land to urban land, have been investigated reasonably extensively and well.

Nevertheless, something is lacking in our understanding of both urban economics and public finance. Specifically, it is a better sense of how the different parts relate to one another. In urban areas, for example, we need to know more about how new job locations interact with householders' choices of residential sites. In turn, we need to know more about how residential location choices affect or condition the way in which we use the stock of housing available to us. While we know quite a bit about how we may add to the stock of housing in any one year in an urban area, we know relatively little about how we adjust the existing stock of housing to new uses as these emerge over time. We need to know more about how the density of utilization of housing changes over time, how conversions occur from commercial to residential uses or vice versa, how new ghettos are formed or possibly old ghettos are broken down, and so forth. We need to know, in short, more about the "ecology" of our urban areas.

In public finance, the needs are conceptually similar. Specifically, we need to know more about how various taxes and fiscal arrangements interact with one another. For example, our staff committee reviewing the Bureau's role in public finance studies is of the opinion that there are at least two sets of fiscal and tax arrangements which should be studied in general equilibrium terms. First, the

committee proposes analyzing the relationships, complementarities, or trade-offs between the value-added tax, the corporate tax, payroll taxes, and perhaps certain groups or classes of excise taxes. Second, they recommend analyzing the interrelationships between levels of various local and state taxes and proposed or possible forms of transfer arrangements between federal, state, and local governments, such as block grants or transfers of certain kinds of responsibilities (e.g., welfare) from one level of government to another. The point in each proposed study is that, while we know a good deal about individual taxes in isolation, we know little about what the effects would be of changing the mix of taxes and fiscal arrangements in highly interrelated sets. What would be the implications of such changes for the incidence on different groups in society? What would be the implications for our external balance of payments?

These more comprehensive analytical approaches, whether we call them "systems analysis" or "general equilibrium" or "microanalyses," will require considerably more complex and larger models than economists have been in the habit of using in the past. Moreover, the computer will almost certainly be a potentially important tool in constructing these models. Only the computer would seem to have the capability of handling the details of data bookkeeping, the nonlinearities, the feed-backs, the interdependencies required for understanding the phenomena. Somewhat inelegantly, researchers have called this kind of modeling "computer simulation." These models are quite a bit more complex and detailed than their predecessors, the aggregate or macromodels that have been relied upon as the primary analytical tools of the profession in the past decade or so.

This shift from macro- to micromodels will also generate a shift in data requirements, away from aggregative data toward individual behavioral unit data, usually of a cross-section character. It is hoped that these new data will be richer in experimental content and therefore more satisfactory for testing behavioral hypotheses. Examples of these new data sources are the one-in-a-thousand Census samples, the 2.8-million-establishment data files developed by Dun and Bradstreet, the Compustat Tapes of Standard and Poor, various consumer cross-section samples and surveys, special surveys by the Office of Economic Opportunity and other new government agencies, the origin and destination surveys being done in various American cities as part of urban planning and transportation studies, and so forth. As Wassily Leontief has aptly put it:

The progress of economics will have to be paced in the coming years by an increased flow of basic factual information. In economics, and eventually in the other social sciences, it has to be a running cadastre of population, labor force, production, consumption, investment, inter-regional flows of goods, and all this is not in aggregated figures but in great, not to say, minute, detail.

With any shift from macrodata to micro concepts, we economists may also need quite different statistical tools than we now use. On the basis of our limited experience to date with microdata, it is quite possible that we will shortly be challenging standard notions about the distributions economic data follow or might assume. In particular, there are many reasons for believing that microeconomic data do not always follow simple Gaussian or normal "bell" patterns.

Personal and corporate income data, for example, may well be generated by a mixture of different underlying distributions, some of which are normal or at least symmetric and some of which are decidedly not. Similarly, the time series behavior of certain interest rates may follow a pattern more consistent with generation by a combination of normal and certain more diffuse distributions. It has even been suggested that some of these nonnormal distributions may have infinite variances, which is a most disturbing property for statistical work. Furthermore, even if the errors are generated by different distributions with finite variances, it may pay to proceed as if the error distribution in composite is generated by a distribution with an infinite variance.

If these suspicions are correct, and I suspect that they are not too far from the truth, then the implications are most interesting. Although it is perhaps an overstatement to say, as one observer has, that, if true, then "most of the usual procedures of statistics must be revised,"<sup>3</sup> nevertheless, if these speculations are even remotely correct, many of the estimation procedures we conventionally use will have to be re-evaluated. Since the Bureau's principal activity is economic measurement, we have a need to be involved in such re-evaluations. Some of our first steps toward such an involvement are summarized later in this report under a new program heading, *Econometrics and Measurement Methods*.

Another methodological problem when using microdata, again quite underexplored, revolves around the issues of aggregation. While formally perfect methods of aggregation have been defined,<sup>4</sup> very little has been done to empirically implement these concepts. Formally perfect methods of aggregation depend upon identifying behaviorally homogeneous subgroups, estimating parameter values for them, and then properly weighting these particular parameter values in order to obtain a better aggregate for macroanalysis. The problem, of course, is identifying a homogeneous subgroup.

Much the same observation can be made about attempts to aggregate microrelationships into totals useful for policy purposes by using the simulation capabilities of the electronic computer. Again, much depends upon identifying individual behavioral or decision units that are reasonably homogeneous in character.

But to define groups with behavioral homogeneity, we must learn how to stratify large cross-section samples by behavioral characteristics or categories. Unfortunately, there is really very little known about how to do this. One way might be to use some sort of variance or covariance analysis. An alternative approach is to use component or factor analysis for this purpose. In general, solutions to these stratification problems have been sought by applying multivariate statistical analyses prior to performing regressions. I suspect that this may be symptomatic of a more general phenomenon: Economists will come to use a broader range of multivariate statistical tools and to rely relatively less on regression techniques as they become more and more involved with microdata. In the section on *Econometrics and Measurement Methods*, some ideas are reported about how to apply multivariate statistical tools to solve

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<sup>3</sup>Benoit Mandelbrot, "The Pareto-Levy Law and the Distribution of Income," *International Economic Review*, May, 1960; Vol. 1, No. 2, page 103.

<sup>4</sup>Henri Theil, *Linear Aggregations of Economic Relations*, Amsterdam, Holland, 1954.

certain problems commonly encountered with cross-section and other micro-economic data.

As already suggested, these large new bodies of data and complex modeling efforts will also involve the economic researcher increasingly with the computer and all its attendant problems. At the moment, for example, there is a crying need to coordinate the efforts of university researchers to develop better data sources, computer data banks, and computer software for processing data and manipulating large-scale economic models. The redundancy today in data and computer software development is staggering.

To illustrate, a university economics department of any size and reputation is involved in developing its own regression routines, multivariate statistical packages, time series analyzers, seasonal adjustment routines, data plotters, and so forth. Certain cooperative or sharing organizations do exist, of course, but their impact is rather limited. As anyone who has had any experience with a computer knows, there is always some small difference between one computer and another even if they carry the same brand name and same series number. Moreover, every computer programmer has his own idiosyncracies. Being the creative people that they usually are, programmers desire to impose some of their own notions about how to improve the program or modify it in some "slight way" to improve the efficiency or the scope of the "packaged program" received from other organizations. These efforts are sometimes quite constructive and do add something to our general fund of knowledge. On balance, though, I would guess that they represent some waste of the limited research resources available to the economics profession.

The situation with respect to the development of data banks and data sources is even more chaotic. For econometric models, for example, 150 to 200 basic time series usually constitute the core data sources. As matters now stand, each individual developer or user of such models has more or less to develop his own data sources or tapes — though some cooperation in exchange of data tapes has now developed on a limited basis. But within modern technology there are probably better ways of meeting these needs. Today, we observe some highly interesting experiments with the use of remote terminals and computer time sharing for disseminating the basic data requirements; one good example is the so-called "project economics" in which we at the National Bureau are involved with several banks and insurance companies and others within the greater New York area. Currently, a major obstacle to expanding the computer utility concept is to find someone to assume the central coordination and data maintenance responsibility. The kinds of institutions that would seem most able to fill this void have tended to be either central banks (e.g., The Federal Reserve or Bank of Canada) or independent research organizations, such as the National Bureau or the Brookings Institution.

Our concern at the National Bureau about data and computer problems has led us to undertake two initiatives this year. First, as discussed under the program heading of Research Information Processing Project (RIPP), we are computerizing our time series data banks and thereby facilitating their dissemination to all interested parties. Second, we hope to organize a new conference series, dealing with computer problems, to add to the two we already sponsor.

The two existing conference activities, those of the Universities-National Bureau Committee and the Conference on Income and Wealth, provide a means

of coordinating efforts between individuals located at many different universities and within different government agencies. The Universities-National Bureau Committee has specialized in organizing conferences to focus professional attention on rapidly developing or new areas of economic research. The Conference on Income and Wealth provides what amounts to a continuing seminar at which specialists involved in income and wealth measurement can trade their experiences and compare notes on the techniques involved in their rather specialized but highly important area of interest. Our proposed new third conference series would be an Interinstitutional Conference on the Application of the Computer to Economic Research. Our present (quite tentative) plan is to organize it somewhat along the lines of the Conference on Income and Wealth. Roughly 50 to 100 people from various universities, government organizations, and other non-profit organizations would be members of the conference. They would meet periodically to exchange information and to otherwise keep one another apprised of developments that are occurring so rapidly in this field.

We look upon this possible new conference as one more way in which the Bureau can be of unique or special service to economics and to the public. It seems consonant to us with trends in economic research that place an increasing emphasis upon large-scale empirical and quantitative research of a systems or general-equilibrium character which, to be done effectively, require a fairly large organization devoted exclusively to research purposes.

As for this matter of scale, next year at the National Bureau we will have essentially seven full-time professionals working on the problems associated with measuring the benefits of higher education. We should have three or four working on problems of medical economics, six or seven on urban economics, and, perhaps, four or five working on problems of labor force participation and the development of human capital. By the standards of the physical sciences these are not large-scale efforts but they are, I think, fairly large-scale by the conventions of economics. In comparison, only very recently have most universities even considered the possibility of having one economist who is primarily interested in medical economics or urban economics or educational economics. Because of diverse educational responsibilities, universities face limitations on how many people they can properly afford in these relatively new and specialized fields.

In sum, a number of important and challenging problems, some quite practical, some theoretical, and some methodological, will need to be solved as economists become involved with the new issues and hypotheses of our changing economic environment. The aggregative analyses and data that have served the profession so well in dealing with the problems of cyclical stabilization and growth will have to be augmented. We shall need new, far more detailed hypotheses and data richer in experimental content. For this research, independent research organizations such as the Bureau would seem to have certain special functions to perform — ones that might not otherwise be readily fulfilled. As this process unfolds, economists will probably become more involved in collaborative efforts with other disciplines, particularly engineering, medicine, education, and the other social sciences. As a profession this means reallocating some of our intellectual resources. But this is also exactly the type of challenge that, if met, maintains the vitality and progress of any discipline.

## **ANALYZING THE EFFECTS OF LARGE-SCALE CHANGES IN FISCAL STRUCTURE: A PROPOSED SYSTEMS APPROACH**

**John Bossons  
Carl S. Shoup**

The purpose of this report is to summarize a proposed program of research on two important problems in tax policy: (1) measuring the effects of changes in the United States tax system brought about by substitutions of one tax for another, and (2) evaluating the effects of alternative fiscal programs aimed at solving some of the critical problems faced by urban governments. The two problems are to a large extent independent, but require a sufficient amount of common analysis to make it useful to consider them together.

The research outlined in this proposal is concerned with the effects of policy changes that could significantly alter the structure of taxation in the United States. Because such structural changes could have important effects on a number of social objectives, it is essential in evaluating any proposed change to examine how the achievement of all of these social objectives is affected. To put it differently, it is necessary to be able to measure all of the important costs and benefits of a policy change in order to assess its desirability. Such evaluation requires a more integrated, goal-oriented set of analyses than has typified most previous research in public finance. It is to symbolize the importance of such analysis that emphasis is placed in the title on the "systems" approach.

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Note: Parts of the proposed research program – notably, a proposal that the Bureau engage in research on substituting a value-added tax for the corporate profits tax – were first suggested to the National Bureau in the fall of 1968. A staff committee was appointed to consider these and other proposals; the committee consisted of John Bossons, Douglas H. Eldridge, David Kresge, Hal B. Lary, John R. Meyer, Seija Naya, Bruce L. Petersen, Carl S. Shoup, Raymond J. Struyk, and Neil Wallace. This report summarizes the present conclusions of this committee. The authors are grateful to Robert J. Gordon, Alfred C. Neal, Frank W. Schiff, and Dan Throop Smith, as well as to the committee, for their comments and suggestions.

## 1. INTRODUCTION

This proposal is grounded in the premise that the next major step in tax research should depart from the traditional analysis of one tax at a time and should instead study the differential effects of changes in fiscal structure resulting from substituting one tax for another. The substitution may take a number of forms. The most direct is the substitution of one tax for another at one level of government; an example of such a substitution at the federal level would be the introduction of a value-added tax as a replacement for the corporation income tax or for the social security payroll taxes. Alternatively, such a tax substitution might take the form of an increase of a set of tax rates in one region to finance a decrease in the rates of the same taxes in another region, as would happen if a city raised the effective rate of property tax in its wealthier areas and used the increased revenues to finance a reduction in the effective rate of the same tax in its poorer areas. A more complex tax substitution would result from an increase in one tax at one level of government which would offset a decrease in another tax at a different level of government. Such a substitution may be facilitated by, or may require, the use of intergovernmental grants. For example, a reduction in local property taxes may be financed through federal grants to municipalities of funds raised through an increase in federal income taxes.

Assessing the effects of a change in the tax mix, whether achieved by substituting one tax for another at one level of government or by accomplishing the same thing in the aggregate through intergovernmental transfers, is one of the most important, yet least analyzed, questions in public finance. Such tax substitutions or intergovernmental transfers can have important effects on the distribution of income and on the rate of economic growth, as well as on interregional and international trade, capital flows, and migration.

The desired effects of a particular tax substitution on one social objective, say, the rate of economic growth, may in general be achieved only at the cost of a retreat from some other social objective, if the fiscal system is left otherwise unaltered. As an example, a tax substitution that increases the rate of economic growth may well involve a shifting of some of the burden of taxation from the rich to the poor; in this sense, redistributive objectives may be (and often are) in conflict with the objective of a faster rate of economic growth. The differential analysis of the research project proposed here would aim at quantifying these gains and losses, thus ascertaining the terms of the trade-offs of social benefits against social costs. The analysis may also point the way to an additional simultaneous tax substitution that would reduce the social costs of the first substitution. Indeed, it may be possible to design a package of such substitutions that would allow a significant increase in economic growth with little or no increase in tax burden on low-income groups. Such possibilities can be explored only through differential analyses, not by studying one tax at a time in isolation from other taxes.

The outline of this report is as follows. In the next two sections, we discuss the defects in present tax analyses that have stimulated our proposal and review the policy importance of the problems to be analyzed. Some of the problems that arise in analyzing specific changes in fiscal structure are then discussed in subsequent sections. In Section 4, we discuss the substitution of a value-added tax for taxes on corporate profits. Some other possible tax substitutions at the

federal level are discussed in Section 5. In Section 6, we discuss a number of tax substitutions that can be achieved through changing the mix of taxes imposed at different levels of government; typically, such changes in the tax mix would be achieved either through transferring the responsibility for given expenditures from one level of government to another or through transferring funds from one level of government to another. In Section 7, we discuss a number of tax substitutions within urban areas that can have important effects on urban fiscal problems and on intergovernmental fiscal relations. Finally, in Section 8, we append a brief discussion of the timing of the proposed research.

## 2. OMISSIONS IN PAST TAX RESEARCH

Research on the economic effects of public finance measures has, in recent years, expanded more and more into analyses of broad-based, economy-wide instruments exemplified by a general sales tax, a general income tax, or a tax on value added. A significant proportion of this research has been undertaken through the recent tax research programs of the National Bureau and of the Brookings Institution.<sup>1</sup>

This research on economy-wide policy instruments, though typically confined to partial-equilibrium analyses, has prepared the ground for the next step in public finance research, a change in technique from partial-equilibrium studies to general-equilibrium analyses.<sup>2</sup> The purpose of this section is to demonstrate the necessity of general-equilibrium analyses in examining the effect of broad-based taxes, and the analytic importance in this context of dealing with tax substitutions.

The effects of imposing a narrowly based tax, such as a cigarette tax, can largely be analyzed using demand and supply functions for the taxed product,

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<sup>1</sup>The National Bureau studies, supported by grants from the Rockefeller Brothers Fund and from the Life Insurance Association of America, include twelve monographs published in the Fiscal Studies Series, two conference volumes, and a number of occasional papers. The National Bureau research includes a number of studies on the personal income tax under the general direction of Lawrence Seltzer, all of which have now been completed, together with a number of studies on taxation and economic growth under the direction of Norman Ture, a few of which are still in process. The almost-completed Brookings Institution program, financed by a grant from the Ford Foundation, resulted in a number of conference volumes and numerous studies of the effect of particular taxes and expenditure programs.

<sup>2</sup>Some studies within a general-equilibrium framework have already been undertaken. Harberger, in his analysis of the incidence of the corporation income tax and of the efficiency effects of direct vs. indirect taxes, explicitly estimated the effect of tax changes in a general equilibrium context. Cf. Arnold C. Harberger, "The Incidence of the Corporation Income Tax," *Journal of Political Economy*, June 1962, pp. 215-240; "Taxation, Resource Allocation, and Welfare," in *The Role of Direct and Indirect Taxes in The Federal Revenue System*, Princeton University Press for NBER, 1964, pp. 27-70. More recently, a general-equilibrium capital flows model has been constructed to predict the effects on Canadian economic growth of the tax reform proposals of the Carter Royal Commission on Taxation. Cf. A.R. Dobell and Thomas A. Wilson, "Overall Effects of the Proposed Tax Reforms: Savings, Investment, and the Balance of Payments," Working Paper 6806, University of Toronto, Institute for the Quantitative Analysis of Social and Economic Policy, 1968, multilith.

which are formulated on the conventional assumption that money income and all other prices remain unchanged and which ignore the uses of the revenue yielded by the tax. This statement is based on the supposition that the uses to which the tax revenue is put and the income and substitution effects of the tax in other markets are spread widely and thinly throughout the rest of the economy, with the taxed industry being but a very small part of the entire economy. Prices and supply conditions thus remain essentially unchanged for a large set of untaxed products which producers or consumers can substitute for the taxed product. This potential substitution is of course reflected in the supply and demand functions for the taxed industry. It is just because prices or supply conditions elsewhere, as well as the incomes of consumers (expressed *both* in real and in monetary terms), do remain essentially unchanged under a narrowly based tax that it is possible to say that the underlying general-equilibrium demand and supply functions for the industry to be taxed are approximated by the ex-tax conventionally defined functions of the industry when the tax is applied.<sup>3</sup> The use of the tax revenue is assumed not to alter prices or supply conditions elsewhere because it is spread so thinly over other sectors of the economy.

But if a tax strikes a large subset of goods traded in the economy (as is the case with a tax on a widely used factor), the demand and cost functions utilized in the partial-equilibrium analysis are no longer applicable. Under a broad-based tax, the number of commodities for which prices or supply conditions remain unchanged is virtually nil. Moreover, the distribution of income of consumers (both in real and in monetary terms) and hence of any one industry's demand or cost functions, will be affected appreciably by the use made by the government of the tax revenue, either in buying factors or goods, and so providing free services, or in reducing other taxes or increasing transfer payments.

A question such as "What are the effects of a corporate income tax?" is incomplete unless modified to specify what is done with the revenue from the tax. Questions of tax incidence have in the past sometimes been studied under the assumption that the tax revenue is returned to the private sector through

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<sup>3</sup>The general-equilibrium demand and supply functions for an industry, which are approximated by conventionally defined functions, should, under these circumstances, be specified as functions of the level of prices in the industry, holding other prices and aggregate real income constant, with the latter defined as a base-weighted quantity index. Cf., e.g., Martin J. Bailey, "The Marshallian Demand Curve," *Journal of Political Economy*, June 1954, pp. 255-261. There is confusion on this point in the literature on applied welfare economies, in which Slutsky real income is often assumed to be held constant rather than a base-weighted quantity index; cf., Sir John R. Hicks, *Value and Capital*, Oxford, 2nd edition, 1946, p. 331. The assumption of a base-weighted quantity index measure of real income is a proxy for an assumption of fixed factor endowments in the private sector and hence a fixed after-tax consumption possibility frontier. The Marshall-Bailey demand curve may be used to analyze the allocative effects of tax-induced distortions provided that it is possible to assume that an increment in tax revenue resulting from a specific tax is returned to the private sector through a transfer that is allocatively and redistributively neutral. This is the approach taken by Harberger, *supra*, footnote 3. As is noted below, however, it is difficult to conceive of actual expenditures which have the properties of these counterbalancing transfers.

neutral transfers or spending.<sup>4</sup> However, even this assumption is difficult to deal with. It is virtually impossible to define neutral transfers in operationally meaningful terms.<sup>5</sup> Similarly, it is difficult to define a form of tax-financed government spending which has no effect on industry demand functions without reducing the problem to the trivial case of a tax-financed expenditure program that leaves each individual taxpaying entity with the same combination of goods and services that it would have had in the absence of the tax. Moreover, to stipulate such close correspondence between the pattern of government spending financed by the tax and the tax itself means that what is being analyzed is obviously not the effects of the tax itself. For all these reasons, it is more useful to analyze the differential incidence resulting from the substitution of the corporation income tax for some other tax. The compensating income transfers thus assumed, while not neutral, are at least identifiable.

Partial-equilibrium analysis is, to be sure, useful in considering aspects of broad-based taxes where only partial derivatives are of interest, and where such partial derivatives can be identified from observable relationships. Thus a cascade turnover tax does, and a value-added tax does not, tend to induce business firms to integrate vertically, *ceteris paribus*. This is a useful kind of statement, but it does not serve even to indicate by how much a cascade tax of a given amount will increase vertical integration. To answer this latter question, it is necessary to measure the net combined effect of the cascade tax and of whatever other accompanying public finance measures are enacted or are allowed to occur. This net effect can only be estimated through a general-equilibrium approach.<sup>6</sup>

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<sup>4</sup>A convenient and often used device is to postulate a set of allocatively neutral lump-sum transfers of amounts chosen so as to be distributionally neutral, or, alternatively, to postulate that the government expenditures financed by a tax duplicate the pattern of aggregate spending foregone by the private sector because of the tax. Cf., e.g., Harberger, "The Incidence of the Corporation Income Tax," *op. cit.*, p. 224. The latter assumption is incomplete unless extended to specify the effect of the combined tax and expenditure program on the distribution of real disposable income plus free government services. Harberger avoids this problem by examining only the efficiency aspects of the fiscal change and by assuming the pattern of private demand to be independent of the distribution of income and services.

<sup>5</sup>The real-world counterpart of lump-sum transfers is difficult to discover. To be distributionally neutral, such transfers need to be defined as functions of individuals' income, potential income, or expenditures. However, if these transfers are to be of significant size and also to be administratively feasible, they cannot be established as functions of such variables without introducing distorting "announcement" effects and so ceasing to be "lump-sum." If distributional effects were ignored (a politically untenable assumption), uniform lump-sum transfers could be considered. However, uniform lump-sum taxes of any significant size are not enforceable if expressed in money terms.

<sup>6</sup>These points are discussed in somewhat more detail in Shoup, *Public Finance*, Chicago, 1969, Chapter 1. Greater recognition is currently being given to the principle that distributive aspects of broad-based taxes can be discussed only in differential terms; see, for example, Alan T. Peacock and J.R. Shannon, "The Welfare State and Redistribution of Income," *Westminster Bank Review*, August, 1968; Alan R. Prest, "The Budget and Interpersonal Distribution," International Institute of Public Finance, *Prague Congress, 1967* (I.I.P.F., Saarbrücken, 1968); Benjamin Bridges, Jr., "Current Redistributive Effects of Old-Age Income Assurance Programs," U.S. Congress, Joint Economic Committee, *Old Age Income Assurance* (Compendium), Part II, December 1967, 90th Congress, 1st Session, pp. 97-176.

This approach is commonly implemented by an equal-yield assumption: one tax is replaced by another tax which yields the same total revenue. A more sophisticated approach stipulates equal aggregate resource use by the government.<sup>7</sup> But even this may be inadequate in a system of interdependent instruments and goals. It may be appropriate not only to maintain equal resource use in the public sector but also to maintain unchanged the already achieved values of other goals. This can be accomplished only by making compensating adjustments in the values of other policy instruments in the system.

These considerations indicate how important it is to start with a fairly specific, consistent, closed, general-equilibrium model, even though it be of the crudest type. To be sure, an instruments-goals system of relations need not be fully interdependent, and some goals can be quantified only with difficulty. But at the present early stage of the exploration of tax substitutions in public finance, it does not matter so much which technique of analyzing trade-offs among objectives is employed as that the problem be specified in consistent general-equilibrium terms so that such trade-offs among goals can be analyzed.

### 3. THE POLICY IMPORTANCE OF TAX SUBSTITUTIONS

Up to this point, the need for research on tax substitutions has been discussed primarily in terms of its value as a means of correcting some important omissions in current public finance research. Quite beyond this, however, a number of tax substitution questions are the object of substantial current policy interest. In this section, some recently proposed tax substitutions are discussed. Virtually all of the proposals are distinguished by the potential importance of their effects.

One such change would entail the replacement of part or all of the corporation income tax by a value-added tax. This proposal has been made by a number of individuals and organizations, notably by the Committee for Economic Development.<sup>8</sup> The proposal has been advanced chiefly for two reasons: (1) A number of analysts have assumed that such a substitution should help maintain the United States international balance of payments or, to put it in other terms, should help reduce the domestic cost of maintaining a stable United States balance of payments at existing exchange rates. (2) Other advocates of the proposal believe that such a substitution would increase incentives for saving and investment.

The extent to which a value-added/corporate profits tax substitution would have these effects is of course an empirical question which can only be answered through quantitative analysis. In addition, such a tax substitution could have important redistributive effects both among individuals with different incomes and among different industries. Through imposing the equivalent of a flat-rate tax on all retail sales to consumers in place of a tax on a form of capital owned more heavily by higher-income groups, the proposed substitution might increase

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<sup>7</sup>Cf., for example, Richard A. Musgrave, *Theory of Public Finance*, New York, 1959, pp. 211-212; Harberger, "Taxation, Resource Allocation, and Welfare," *op. cit.*, pp. 31-33.

<sup>8</sup>National Policy Statement, *A Better Balance in Federal Taxes on Business*, Committee for Economic Development, April 1966.

the relative proportion of taxes borne by lower-income classes. Through imposing a uniform tax on value added in production in place of a tax on equity capital, the tax substitution would increase taxes paid by industries with high capital-output ratios. Moreover, the value-added tax would exempt exports while taxing imports, on the "destination principle," in contrast to the corporate profits tax which employs the "origin principle." As a result, such a substitution could have an important effect on the composition of industrial output and of international trade. It is clearly desirable to be able to quantify the importance of these effects in order to determine the costs and benefits of such a tax substitution.

A number of other tax substitutions at the federal level have been proposed which would be interesting to examine; notably, substitution of a value-added tax or increase-in-income taxes for the present set of payroll taxes in the United States, or substitution of a value-added tax for specific excise taxes and/or for part of the personal income tax. In addition, there exist the relatively complex proposals of the Carter Royal Commission on Taxation in Canada to adopt a uniform tax on all forms of income and so to substitute the personal income tax for the corporate income tax and for taxes on gifts and estates. While most of these tax substitutions would have effects that would not be as dramatic as those of the substitution of a value-added tax for the corporate income tax, they would nevertheless result in significant changes in redistribution and incentives for industrial growth that would be important to quantify and to analyze.

A number of individuals and organizations have similarly suggested the use of intergovernmental transfers partly in order to change the aggregate mix of taxes. The main force of most of these proposals is to suggest a substitution of general federal taxes for local income or property taxes. Among these proposals are (1) the Heller-Pechman plan for unconditional per capita federal grants to the states designed in part to substitute federal taxes for taxes otherwise raised at the state and local levels, (2) the Rockefeller proposal to transfer the burden of financing welfare payments, now financed through state and local taxes, to the federal government — the federal welfare payment plan to be financed through increased income taxes and applied on a uniform basis in different states, and (3) the proposals of the Advisory Committee on Inter-Government Relations for a tax credit against federal income taxes for a percentage of state income taxes paid. Because these proposals would result in an increase in federal taxes which are applied uniformly to different regions while reducing the impact of state or local taxes that vary widely from region to region, they would affect the distribution of income among different regions, and would tend to engender changes in the movements of capital and labor among regions. As a result, there would be significant effects on growth patterns in different regions of the country.

As just indicated, solutions to the urban fiscal problem have been sought through intergovernmental transfers that would result in a change in the weight of different taxes, taking all tax jurisdictions into account. In addition to this approach, however, it would be useful to explore alternative urban fiscal program, leaving the existing grant structure unchanged, in order to ascertain the degree to which the cities can take care of themselves through novel approaches to urban fiscal planning.

The need for research in the urban finance area is evident from the strong pressure that large central cities are putting upon the states and the federal

government for assistance, as well as from rising tax rates and adoption of new forms of taxation by the cities, coupled with widespread complaints within the cities about the inadequacy of service levels. While these signs of distress are commonly taken as evidence that the cities must have more federal or state aid, the residents and business firms of some cities might conceivably be worse off under federal or state taxes levied to finance such aid than they would be under city taxes. The task of research in this field is to explore the effects of alternative solutions to the urban fiscal problem, of which only one is increased federal aid.

#### 4. *SUBSTITUTION OF A VALUE-ADDED TAX FOR THE CORPORATE PROFITS TAX*

The purpose of this section is to discuss in somewhat greater detail the problems that need to be analyzed in order to evaluate the effects of substituting a value-added tax for part or all of the corporation income tax. It will be assumed throughout that a value-added tax would be of the consumption type and would incorporate all border tax adjustments permitted under the General Agreement on Tariffs and Trade. Such a tax is equivalent to a proportional tax on the retail value of all consumer goods and services sold to U.S. households.

The substitution would replace a tax levied on one factor of production in one sector by a general tax on consumption. Moreover, it would replace a tax based on the origin principle (which taxes products originating in the United States) by one based on the destination principle (which taxes products consumed in the United States, whether produced there or abroad). The substitution could, if permitted by monetary policy and not offset by other macroeconomic policy changes, result in higher prices of imports to United States consumers and/or lower prices of United States exports to foreign buyers, which would be analogous to an incomplete devaluation on the United States trade account. However, because domestic price reactions to the tax substitution will, in the aggregate, depend on monetary and fiscal policy, the analysis of domestic and international effects of the tax substitutions is complicated by the necessity of taking macroeconomic policy into account.

Among the policy questions of an international nature that are relevant in evaluating the substitution of a value-added tax for the corporate profits tax, the following are among the more important: (1) How will a country's balance of payments be affected by such a substitution? Alternatively, how is the cost of maintaining a stable balance of payments under a fixed exchange rate (measured in terms of other social objectives less fulfilled as a result) affected by such a tax substitution? (2) How would the proposed tax substitution affect the efficiency with which the world's resources are allocated? (3) How would the rate of development of less developed countries be affected by changes in the composition and terms of international trade resulting from the tax substitution? These and related questions will not be explored here.<sup>9</sup>

On the domestic front, the possible effects of this substitution on the distribution of real after-tax income could be substantial. If (to simplify the problem)

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<sup>9</sup>Some of these questions are explored in greater detail in an earlier (multilith) version of this report.

we were to assume that the initial differential incidence of this substitution would be to increase corporate disposal profits by the full amount of the repealed tax and to increase prices of consumer goods by the rate of the value-added tax, then the effect of the substitution would be to increase the real disposable incomes of those families whose ownership of corporate common stock was in a relatively high ratio to their consumption spending and to decrease the real disposable incomes of those for whom this ratio was low.<sup>10</sup> Since this ratio is positively correlated with income, the tax substitution could (in this oversimplified case) result in a redistribution of income from low-income families to high-income families.

The extent to which redistribution of real income would result from the tax substitution is not easily measurable, either in terms of the initial impact of the tax substitution while the allocation of real capital is essentially unchanged or in terms of the eventual effects on redistribution as capital stocks are adjusted through the effects of the tax substitution on capital flows. The initial differential incidence of the tax substitution is one of the critical empirical questions of this study.

Additional redistributive effects need to be examined, such as shifts of real income among households of differing family sizes at given income levels or shifts of real income among regions. To the extent that a value-added/profits tax substitution results in a redistribution on the average from low-income to high-income families, the substitution will tend to reduce the relative importance of the allowances for differences in family circumstances that are built into the personal income tax.

Allocative efficiency is another important domestic issue. Presumably, by replacing a factor-specific tax like the corporate profits tax with a relatively general tax like a consumption-type value-added tax, distortions should be reduced and a welfare gain should result. Assuming that current tax-induced distortions do not nicely offset distortions resulting from externalities or other sources, allocative distortions should be reduced in two ways: (1) by eliminating the distortions in the corporate sector caused by the favorable treatment of certain industries, such as the extractive industries, under the present United States corporation income tax and (2) by removing the special tax on capital employed in the corporate form which is imposed by even the fairest of corporation income taxes. Even ignoring the effect of the industry-specific reductions in effective tax rates which are built into the present corporate profits tax, the distorting effects of the corporation income tax are substantial. It subsidizes firms that borrow heavily, and thus discriminates against the more venturesome and risk-taking firms for whom access to debt capital is limited. In addition, it induces firms to substitute labor for capital, and so tends to reduce the marginal

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<sup>10</sup>The initial differential incidence assumed for the purposes of this statement would be questioned by a number of analysts; for a different viewpoint suggesting that the initial differential incidence of the substitution would result in offsetting changes in prices and a net reduction in corporate disposable profits, cf. Marian Krzyzaniak and Richard A. Musgrave, *The Shifting of the Corporation Income Tax*, Baltimore, 1963. Because of the uncertainty with which price adjustments can currently be predicted, it will be necessary both to do further empirical research in this area and to test the sensitivity of policy conclusions to alternative plausible assumptions.

productivity of labor and hence wages. The welfare gains resulting from the elimination of these distortions should be measured in order to estimate the benefit of the gain in allocative efficiency effected by the tax substitution.

Beyond increases in economic growth resulting from greater allocative efficiency, the rate of growth of real per capita GNP may be increased either through increases in the over-all savings ratio or through increases in labor participation rates. Increases in the aggregate rate of saving may be anticipated in the case of the value-added/profits tax substitution to the extent that the substitution redistributes income from households with low savings ratios to households that save more, or to the extent that savings are increased in response to changes in after-tax rates of return. Increases in labor participation rates might also be expected: stacking a value-added tax on top of the present personal income tax would both redistribute income from low- to high-income families and increase the marginal tax rate on spending out of labor income for all families; the first would provide incentives to increase time spent at work at the expense of leisure, while the second would have the opposite tendency.

To measure these effects it is necessary to specify a general-equilibrium model which incorporates both the direct effects of the tax substitution and the indirect effects on capital flows and labor participation rates of the many behavioral adjustments likely to occur. These adjustments would result not only from the tax substitution but also from the compensatory changes in macro-economic fiscal and monetary policy that would accompany it.<sup>11</sup> The model having been specified, it is then possible to estimate the net effects of the compensated tax substitution upon the equilibrium supply of capital and labor. The effects of these changes in equilibrium factor supplies upon economic growth are, in turn, dependent upon the long-term production function assumed for the economy and upon the extent to which technological progress can be assumed to be endogenous.<sup>12</sup>

In addition to examining changes in economic growth induced by changes in the over-all levels of factor inputs, it is necessary to analyze the effect of changes in the composition of such inputs. In particular, it is necessary to examine the effects of the tax substitution upon the extent to which savings are invested in risky enterprises and upon the ways in which entrepreneurial, innovative, and managerial activities are affected.

While aggregate growth rates are of great importance, significant political weight is also often given to the extent to which growth in specific regions lags

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<sup>11</sup>An adequate description of the general-equilibrium model required is not possible within the space available for this report. A description is presented in Bossons, "Evaluating the Effects of a Value-Added/Corporate Profits Tax Substitution," Working Paper 6906. University of Toronto, Institute for the Quantitative Analysis of Social and Economic Policies, 1968, mimeograph.

<sup>12</sup>The sensitivity of the estimated change in the rate of growth of real GNP to the nature of the long-term production function for the economy is, of course, dependent upon the horizon over which growth rates are being analyzed. Over a horizon of ten to fifteen years, the rate of growth of real GNP can safely be assumed to be a monotonic function of the savings ratio and the supply of other factors, assuming the allocation of savings to be independent of the level of aggregate savings. The importance of assumptions regarding the long-term production function is in deciding whether an increase in economic growth within a middle-term horizon resulting from increased factor supplies can be extrapolated over long horizons.

behind national growth rates. Because changes in the industry composition of output can lead to changes in growth rates of regions which are not widely diversified, it is of some importance to be able to assess whether the proposed tax substitution might change regional disparities. Changes in the industrial composition of output will result not only because of interindustry differences in capital-output ratios but also because the proposed tax substitution, by eliminating the corporate profits tax, will at the same time abolish for corporations all the industry-specific tax preferences (such as oil depletion allowances) which are built into the present corporation income tax.

Finally, some analysis of the effects of the tax substitution on the stabilizing properties of the tax system will be required in order to permit examination of the effects of the substitution on macroeconomic stability. It is tentatively assumed that it will be possible to examine both regional effects and changes in the built-in stability of the tax system by relatively simple analyses, once the general-equilibrium model needed to estimate the differential incidence of the tax substitution and its impact on economic growth has been specified and solved.

## 5. OTHER TAX SUBSTITUTIONS AT THE FEDERAL LEVEL

In the previous section, one possible tax substitution was examined in some detail, primarily in order to describe more correctly the types of analysis that would be required in evaluating the quantitative effects of any tax substitution on the achievement of relevant social objectives. The substitution of the value-added tax for the corporate profits tax was chosen because of its great current interest; moreover, it is expected that research will initially be concentrated on this particular substitution. However, the analytic models needed to analyze this substitution can and should be specified so as to be easily generalized for other tax substitutions, some of which are discussed in this section.

### *Alternative Value-Added Taxes*

It would be useful to analyze the effect of substituting alternative forms of value-added taxes for the value-added tax discussed in the previous section. Alternatives may consist either of variants of the consumption-type value-added tax (under which all purchases of capital goods are deductible), or of different types of value-added tax, such as the income or product types.

Some variants of the consumption-type value-added tax might be designed to reduce the redistributive impact on low-income groups of a universal value-added tax; such variants might consist either of allowing refundable tax credits to be claimed through a household's filing an income tax return or of exempting commodities, such as food, which are proportionately a more important part of consumption for low-income families. Other variants might be designed to change the treatment of investments in intangible assets.

More analytic problems would be raised by substituting income-type or product-type value-added taxes for the consumption-type value-added tax. The consumption-type value-added levy differs from the other two mainly in that investments in capital assets would be fully deductible from the base of the tax. The principal effect of this difference would be that, under a product or income-type tax, an adjustment in the demand for capital goods would result

from the increase in price effected by the tax; the adjustment would be greatest under the product-type tax. This would result both in changes in the inter-industry incidence of the tax change and in changes in the level and composition of investment.

#### *Substitution of Value-Added Taxes for Payroll Taxes*

A different tax substitution of some policy interest consists of replacing the present social security taxes on employers and employees (along with other payroll taxes) by a value-added tax. If coupled with a value-added/profits tax substitution, the combined substitution could be thought of as a substitution of a general sales tax for all special taxes at the federal level on specific factors. Like the value-added/profits tax substitution, the value-added/payroll taxes substitution could yield an increase in over-all economic efficiency. To examine this and other policy implications of this substitution it will be necessary to examine the extent to which changes in payroll taxes result in offsetting adjustments in wages and to adapt the general-equilibrium model specified for the value-added/profits tax substitution so as to be able to examine the indirect effects of substituting a value-added tax for payroll taxes.

#### *Substitution of Personal Income Taxes for Payroll Taxes*

One of the major effects of payroll taxes is to tax employees who are not taxable under the personal income tax. As a result, increasing personal income taxes to allow for the elimination of payroll taxes could have a substantial redistributive impact. The analytic problems associated with such a substitution are essentially those already discussed with respect to the value-added/payroll tax substitution; the major additional problem is to analyze the extent and effects of increases in personal income tax rates that would be necessary to provide revenues to replace those now raised by payroll taxes.

#### *Substitution of Personal Income Taxes for the Corporate Income Tax*

Given that models have been developed to permit the evaluation of the tax substitutions thus far discussed, these same models can be used to evaluate the effects either of replacing the corporation income tax by an increase in the present personal income tax or of integrating the corporation income tax into a broadened personal income tax. While a number of variants of these alternatives could be devised, one variant of the latter (integration) alternative would involve implementation of the relevant proposals of the Carter Royal Commission on Taxation.<sup>13</sup> One of the important effects of integrating the corporate profits tax into the personal income tax, rather than simply eliminating it, would be that the rate of taxation on foreign investments in United States corporate equities would not be reduced, as it would with elimination of the corporate tax; as a result, international capital flows resulting from changes in foreign investments in United States equities would not be as sharply affected. This and other effects of tax substitutions of this type could be evaluated within the context of the models previously discussed in this proposal.

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<sup>13</sup> Cf. Report of the *Royal Commission on Taxation*, Ottawa, Canada, 1966, Volume 4, Chapter 19.

## **6. TAX SUBSTITUTIONS ACHIEVED THROUGH FISCAL TRANSFERS BETWEEN FEDERAL AND STATE AND LOCAL GOVERNMENTS**

Because of the growing political interest in fiscal transfers, it would be useful to extend the models discussed thus far so as to permit evaluation of effects of the tax substitutions implied by such transfers. These effects are of two types: (1) the effects of changes in the United States aggregate tax mix, and (2) the effects of changes in the interregional dispersion of taxes and transfer payments to individuals. The more microeconomic implications of fiscal transfers for urban policy objectives will be discussed in the next section.

Some tax substitutions achieved through fiscal transfers may take the form of substituting federal income taxes for state and local sales taxes or of accomplishing other substitutions of the types already discussed in Sections 4 and 5. However, the more interesting fiscal transfers are those which would have the effect of reducing property taxes in the following ways: through allowing credits against federal income taxes for municipal property taxes; through fiscal transfers to municipalities; or through transfers of responsibility for expenditure programs (such as welfare) from the states and municipalities to the federal government. Evaluation of the effects of changes in property taxation on capital allocation would require a considerably more detailed model, showing the response of different classes of investment in real estate, than would be included within the capital-flows model needed to analyze tax substitutions at the federal level.

While most of the general policy problems associated with tax substitutions have already been outlined, the relative importance of several would be substantially enhanced in the case of fiscal transfers. In particular, effects on regional growth rates may be substantial.

Under the Rockefeller proposal to transfer responsibility for welfare to the federal government, for instance, a number of region-specific effects would occur. Welfare payments would be standardized, presumably by bringing payments in poorer states up to the levels existing in the wealthier states. This standardization could result in a change in wage rates (especially for unskilled labor) in the poorer states, which could, in turn, have important implications for interstate migration and for the movement of capital into the poorer states. Such effects could be noticeable for other fiscal transfers in which significant interregional variations in the resultant tax changes would occur.

The most difficult additional analysis required in evaluating the effect of fiscal transfers is the specification of the effects on regional growth that would result from the fact that net tax changes (or changes in transfer payments) would vary among regions. It will not be sufficient merely to project the changes in regional growth rates that may be implied by changes in the industrial composition of output. Instead, it will be necessary to construct explicit models of interregional factor investments. The required analysis is consequently more complex than in the case of federal-level tax substitutions.

## **7. EVALUATING URBAN FISCAL PROBLEMS**

This part of the proposed research program would be centered on fiscal problems of United States metropolitan areas, and would touch on almost all aspects of federal-state-local fiscal relations. It would also consider direct federal

payments to households as a possible substitute for certain types of federal grants-in-aid.

The justification for this work is the comparative scarcity of research findings to date on (1) the ability of cities to improve their fiscal position by resort to novel methods of intracity taxation and transfer payments, and (2) the pattern of burden that would be imposed if state and federal grants to the urban areas were increased. These two aspects of the urban fiscal problems have been largely overlooked or neglected in recent discussion.

As with the problems discussed earlier in this proposal, these questions can be answered only in the context of a general-equilibrium model. Above all, the sources of the funds to be transferred must be stipulated in enough detail to determine the net transfers among urban areas and between urban areas and other areas (such as depressed rural areas) resulting from both the transfer payments and the taxes which pay for them.

In addition to being oriented to such distributional questions, the research should also evaluate the effects of urban fiscal changes on the rate of over-all economic growth.

The most promising research approach would start with the cities and work outward. First, a forecast should be made of the degree and type of fiscal difficulties cities would face over the next decade or two with no change in the present structure of federal and state aid programs. This no-change-in-aid hypothesis requires that we stipulate what is done with whatever federal "fiscal dividend" results from the end of the Viet Nam War. Without such stipulation it would be impossible to estimate what the degree of poverty and resultant fiscal situation in the central cities will be.

This research subproject would need first of all to forecast, for each of a few large cities and under assumed macroeconomic conditions, the revenues to be expected under present city tax rates and present grant-in-aid formulas, the expenditures needed to maintain existing levels of services and welfare payments, and the resulting surplus or deficit.<sup>14</sup> Many assumptions would have to be made: for example, the degree of migration of low-income families to urban areas likely to occur, given the elements of the no-change hypothesis, and the degree of response of real-estate tax revenues to forecast increases in gross national product. Some of these assumptions may be based on the analysis of data for recent years, but it seems likely that this first stage will draw heavily on intuition and will have to be satisfied with very rough estimates. The primary aim of this stage is simply to get a sense of the magnitude of projected urban fiscal difficulties.

The second stage of this project would consider the possibility that some cities might help themselves through novel intracity distributive devices (such as grants from richer areas within a city to poorer areas), through annexation of suburbs, through the use of metropolitan-wide taxing and transfer payment authorities in an area containing more than one central city, or through increased taxation of commuters.

Virtually no research has been done on this problem, especially with respect to equalization grants within a given city. The extent of inequality of income or

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<sup>14</sup> The estimates made by Lyle Fitch for the Haig-Shoup report, *The Finances of the City of New York*, New York, privately printed, 1952, illustrate some of the techniques that can be used.

wealth within a given metropolitan area would have to be measured in order to evaluate the feasibility of such equalization payments. It would also be necessary to estimate the extent to which anticipated revenue from the heavily taxed parts of a city might be obviated by a fall in land values (and what the consequences of such a decline would be for the city's tax revenues).

A third stage in the research project, depending in part on what was found for the no-change-in-aid-case, would be a study of the degree to which state governments could meet the fiscal problems of their cities without federal assistance, through a restructuring of their own tax systems or through establishment of new grants to localities. A primary purpose of this study would be to indicate which nonurban sectors would be disadvantaged by a particular method of aiding the cities.

A fourth stage of the urban fiscal problems study is an appraisal of plans for federal aid to the cities. Such aid might either take the form of direct transfers, or occur indirectly through aid to the states, or federal financing of total welfare costs, a negative income tax, family allowances, or a social dividend of the Rhys-Williams type. For several of these possibilities, this fourth stage merges with the general analysis of tax substitutions achieved through intergovernmental transfers, which was described in Section 6.

#### *8. PROPOSED TIMING OF RESEARCH*

The research proposed in this report may be organized initially as two independent but related tasks. The primary research task underlying the analyses to be made of the federal-level tax substitution, described in Sections 4 and 5, is the construction of a general-equilibrium model of the effects on the United States as a whole of changes in fiscal structure. In contrast, the primary tasks to be undertaken initially in the urban fiscal studies, described in Section 7, are essentially concerned with equilibrium adjustments to changes in the fiscal structure of a single large city or metropolitan area.

The initial work to be done on urban fiscal problems is unrelated to the tasks involved in constructing the nationwide general-equilibrium model needed for analyses of tax substitutions at the federal level. But such work still requires the general-equilibrium approach (albeit for a smaller, more open economy) that differentiates the more macroeconomic analyses of federal-level tax substitutions from most previous public finance research.

Moreover, as noted above, the analyses needed in these two projects become merged when we consider the effects of nationwide changes in the aggregate tax mix, introduced through intergovernmental transfers aimed at resolving some of the fiscal problems of urban governments. For the analysis of such intergovernmental transfers, three research tasks must be faced: (1) an extension of the general-equilibrium tax policy model to incorporate adjustments to changes in state and local taxes, especially taxes on real estate, (2) specification of the fiscal impact of tax substitutions on urban areas and particularly on the intrametropolitan area incidence of the over-all fiscal structure, and (3) specification of changes in interregional flows of labor and capital, and hence in regional growth rates induced by such substitutions. Clearly, therefore, while research on the effects of changes in taxes and transfer payments upon interregional factor movements may usefully be begun soon, the analysis of intergovernmental transfers can necessarily be pursued in detail only after substantial work has been

done on tax substitutions at the federal level and on the intrametropolitan effects of changes in urban fiscal structures.

It may prove feasible to construct relatively quickly a simple model that can be used to analyze the more immediate effects of a Heller-Pechman type of fiscal transfer, financed by foregoing a specified reduction of federal income tax. In particular, it would be useful to examine the extent to which some cities might be made worse off through such a transfer than through the federal tax reduction. For this purpose, it will be possible to use the results of research currently underway within the National Bureau. Since the Heller-Pechman or similar proposals may be dealt with by Congress in the next year or two, some preliminary findings of this nature might prove timely.

In summary, aside from the suggestion in the immediately preceding paragraph, what is proposed here is that research be initially focused on three areas: (1) the construction of a general-equilibrium model suitable for the analysis of the value-added/profits tax substitution, (2) the analysis of alternative means of changing urban fiscal structure so as to meet more effectively the financial needs of urban centers, and (3) the construction of models of the determinants of interregional factor movements within the United States. Given these three parallel lines of research, subsequent work may then turn to extending the general-equilibrium and urban incidence models so as to be able to analyze a richer variety of policy alternatives.

## INTERNATIONAL STUDIES: CHANGING PATTERNS OF INTERNATIONAL COMPARATIVE ADVANTAGE

Hal B. Lary

Following on the proposals worked out by the International Studies Committee<sup>1</sup> and discussed with the Board of Directors, the main elements of the National Bureau's research in the international area over the next several years are becoming clearer. It is contemplated that the program will relate, in the main, to the changing patterns of international comparative advantage. This theme commends itself because of the rapid changes that can be observed in international trade flows and in their underlying determinants and because of the considerable experience already acquired by National Bureau personnel in the study of these subjects.

### *Background: Sources and Consequences of Change*

Thinking of the way comparative advantage relates to the composition and growth of international trade, we may distinguish several main sources of change:

*Ability to exploit national endowments:* Differences from country to country in supplies of natural resources, capital, and labor go far to explain the composition of trade. The broadening of the concept of capital to include that invested in human beings sharpens the contrast between rich and poor countries and emphasizes the possibilities for mutually advantageous exchanges of capital-intensive for labor-intensive products. Many times the potentialities lie dormant because of lack of information, inertia, instability, competing policy goals, overvalued currencies, trade barriers, and other obstacles. Increasingly, however, new opportunities for trade can be exploited as these deterrents are overcome and as more countries reach the minimum levels of human resource development needed for economic growth.

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<sup>1</sup>Members of the Committee are: Hal B. Lary (chairman), Alfred H. Conrad, Gottfried Haberler, Irving B. Kravis, Robert E. Lipsey, Ilse Mintz, Geoffrey H. Moore, M. I. Nadiri, Seiji Naya, Donald S. Shoup, and Merle Yahr Weiss.

*Technological change in industry:* The development of technology yields more efficient processes and products, giving at least a temporary advantage to innovators and a spur to their competitors. Key questions concern the rate of innovation and the rate of diffusion.

*Technological change in transportation and communications:* Separate mention deserves to be made of technological developments in this sector, operating as they do over the whole gamut of trade. The effect is to reduce the distance between nations and to open new sources and outlets for goods hitherto regarded as “market-oriented” or “resource-oriented” in the location of production.

*Economies of scale:* This source of change, varying in importance according to the industry or product, helps to explain the comparative advantage attained in some lines by countries with large home markets or, occasionally, by smaller countries able to expand their scale of production via exports. The hope of gaining by economies of scale also underlies current efforts, by both developed and less developed countries, to combine national units into larger economic groupings.

*Factor mobility:* Alongside the foregoing changes, and partly in response to them, factor endowments of different countries are less predetermined than heretofore. Capital – including managerial talents, technical and scientific skills and other forms of human capital – becomes increasingly mobile internationally, and business enterprises respond to opportunities for siting production and procurement wherever the factor requirements for any given output can be most productively combined.

The consequences of these shifts are many. One of the most important, in terms of the relative urgency of problems requiring solution, is the expansion in export possibilities of the less developed countries and, therewith, in their ability to acquire the capital goods and material imports needed for economic growth. There has already been, in recent years, a rapid rise in exports of labor-intensive manufactures by certain of these countries that have succeeded in translating their abundant manpower into effective low labor costs per unit of output. Some of them are also beginning to assimilate new technologies appropriate to their circumstances and, with expanding production for export, to realize scale economies.

Another result, much larger than the first in the volume of trade achieved, is the increasing interchange of sophisticated goods among developed countries, made possible by differential rates of technological innovation, scale economies, and the expanding horizons of producers, traders, and consumers. Trade among the developed nations is also marked by the rapid growth of exports of labor-intensive products by countries whose labor costs are lower than in other, higher-income members of the group (e.g., exports of handmade shoes by Italy to the United States).

Along with these results have come strains requiring adjustments in the existing patterns of production and trade. Internally, the strain is seen in the relative displacement of some domestic production by imports. This effect tends to be most marked – and most strongly resisted – in the more labor-intensive production sectors of high-income countries: textiles and clothing in particular and numerous other items as well.

Externally, the strain is sometimes reflected in balances of international payments. To be sure, other sources of payments disturbance are also important,

notably differential rates of inflation. But certainly in U.S. experience of the past decade much of the strain has resulted from the swift rise of imports and capital outflows associated with the changing world pattern of comparative advantage.

There is little reason to suppose that the forces producing these changes will diminish in strength. Thinking first of the more developed countries, we see that their economic interdependence is growing, perhaps rarely in dramatic fashion but with cumulative effect. Technological innovations seem to spread with increasing speed and with visible effects on comparative advantage and the location of industry. The activities of the multinational corporation in this regard arouse at one and the same time favor and criticism both in "home" countries and in "host" countries. A new era of technological progress in water and air transportation seems to be at hand, again with potentially powerful effects on the location of industry and the flow of trade.

As we turn once more to the less developed countries, the striking thing is the weakness of the ties just mentioned — the absence of any strong reciprocity of interests among these countries and of any real dependence of the advanced countries on them. In the relations of the LDC's with each other, we see a strange conflict of purposes: on the one hand, the espousal of plans for building larger economic blocs through regional cooperation and integration and, on the other, the assertion of new national sovereignties frequently accompanied by growing internal strains and further fragmentation within countries. As to their relations with the more developed countries, we are reminded of the moody reflection of a distinguished foreign visitor to the National Bureau that, so great is the separation, India could sink beneath the surface with only passing effects on the rest of us. Yet changes in comparative advantage are creating new opportunities for the international division of labor, except where thwarted by the commercial policies of the wealthier countries or by the policies of the less developed countries themselves. Whether the motivation is humanitarian, or self-preservation, or simply the pursuit of profit, a key question for the advanced countries is whether they are prepared to accept a fuller participation in their markets by newly developing countries.

#### *Main Elements of a Program of Studies*

In an area as broad and dynamic as international comparative advantage, a program of studies must be, in considerable measure, experimental and evolutionary. Some topics will disappear as research is completed, at least within the limits of what now seems possible and rewarding, while others will be added as new insights are gained and new tools of analysis developed. The National Bureau is therefore inclined to take a fairly long-term view of its research efforts in this area, building on the experience already acquired and adding to its capacities for further work.

For these reasons, the particular topics outlined below should be regarded as indicative rather than as exhaustive and definitive. They are all thought of, however, as promising useful results in the near term as well as strengthening the foundations for future research. Some of the topics are an outgrowth of work already done or now under way. Several others are selected because of their importance, and because of the availability of qualified personnel either already on the staff or ready to be associated with it. In addition to the specific subjects

of research discussed below, the International Studies Committee has devoted attention to cooperation with foreign research institutes as a technique of investigation and mutual assistance.

### 1. *Factor Proportions by Industries and by Countries*

The National Bureau's interest in this topic is in keeping with some recent remarks by Jan Tinbergen on the question of determining which types of goods may be most advantageously produced by developed countries and which by less developed countries.<sup>2</sup> He finds the usual trade models of little use for this purpose and stresses "... the importance of collecting statistical material which will enable us to arrange both the products or production processes and the geographical areas of the world according to rising capital-labour ratios, including in the concept of capital also educational capital, so as to indicate the optimal correspondence between these two series."

Concurrently with these comments, my study on *Imports of Manufactures from Less Developed Countries*<sup>3</sup> provided a simple and readily available tool of analysis relevant to Tinbergen's purpose, particularly that part concerned with the detailed identification of products according to capital-labor ratios. This was the concept of "value added by manufacture per employee," a measure derived from data on value added in the Census of Manufactures. It is divisible into its wage and nonwage components, the former including returns to human capital and the latter returns to physical capital.

Tinbergen's remarks suggest the usefulness of further work with the value-added tool along lines already contemplated and now being elaborated in cooperation with Seiji Naya.<sup>4</sup> One purpose will be to provide a fuller and more rigorous answer to the question posed by Tinbergen than was possible within the limits of my study, which relied mainly on manufacturing data for the United States. Thanks to the widespread 1963 censuses of manufactures, it is now possible to make more detailed comparisons with a number of other countries, both developed and less developed, and to arrive at a more definitive ranking of manufacturing industries and products.

Differences from country to country in the relative size of value added per employee as one moves from the lowest to the highest industries need to be explored. To what extent can they be explained by economic dualism in the LDC's, expressed in the prevalence of handicraft production in some industries and "modern" capital-intensive methods in others? And does a relative increase over time, either in total value added or in value added per employee, in industries of the "modern" type compared with others represent "progress" in the LDC's? Or does it reflect policies of protection and import-substitution for capital-intensive industries that may, in the worst case, weaken comparative

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<sup>2</sup>"The Optimal International Division of Labour," Netherlands Economic Institute, Rotterdam, March-April 1968 (mimeographed).

<sup>3</sup>New York, NBER, 1968. See especially page 14 for a description indicating how the value-added measure corresponds to Tinbergen's desiderata.

<sup>4</sup>After spending 1968-69 as a Research Fellow at the National Bureau, Naya is joining the faculty of the University of Hawaii and the East-West Center connected with it, but intends to maintain a close research association with the National Bureau.

advantage, handicap growth, and benefit the few at the expense of the population at large?<sup>5</sup>

Industries and products not conforming to a common hierarchy of value added per employee in the intercountry comparisons should be singled out for attention. Do they represent true cases of "factor intensity reversals," or special influences, or is the output so different as to invalidate intercountry comparisons?

The assumption underlying the analysis is, of course, that wealthy countries have their comparative advantage in capital-intensive products and poor countries in labor-intensive products. A principal purpose of the study described here will therefore be to see how well the value-added variable performs in explaining trade flows, account being taken as far as possible of the natural resource factor and the differential effects of trade barriers.

As the work progresses, other applications of this new analytical tool will be considered, including its relation to the "neotechnology" factors, its relevance to Leontief's paradoxical finding that United States imports embodied more capital and less labor on the average than its exports, the evolution of the interindustry pattern through time, and intercountry differences in the wage and nonwage components of value added per employee.

## *2. Trade Policies and Trade Outlets of the LDC's*

A logical extension of the research outlined above is a comparative study of those policies of the LDC's that affect the growth and diversification of their exports. It is a striking fact that these countries differ widely in their export performance, whether one thinks of manufactures only or of both manufactures and primary products. And there is a fair measure of agreement that the results depend importantly on how "outward" or "inward" these countries are in the orientation of their economic policies. This view, however, is largely derived from theoretical reasoning or from general impressions, and more empirical investigation is needed. As one step, Naya has begun research on comparative patterns of exports and export growth and of import substitution, and on the role of trade policies and other measures affecting these patterns. The focus of his research is on Southeast Asian countries.

The case for import substitution as a development strategy for the LDC's is generally buttressed by the argument that initial comparative cost disadvantages will give way as output expands and capacity is more fully utilized. Little study seems to have been given to actual results. It would be useful to look at countries where this strategy has been applied and to try to see how costs per unit of output have, in fact, changed over time in the major import-substitution sectors.

A related issue is whether or not the less developed countries have been able to achieve economies of scale in products and industries where these economies are important. In development literature and in national economic plans calling

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<sup>5</sup>Richard R. Nelson, in an interesting analysis of value-added differentials between Colombia and the United States ("A 'Diffusion' Model of International Productivity Differences in Manufacturing Industries," *American Economic Review*, December 1968), seems to equate such a change with economic progress, but acknowledges the protectionist interpretation in a footnote.

for heavy investments in steel and other capital goods industries, it seems to be frequently assumed that, though production costs are bound to be high initially, they will gradually be reduced and eventually fall to competitive levels as the scale of output is expanded in these and complementary industries. This assumption needs to be critically examined in the light of actual experience.

The Bureau's work on exports of the LDC's may extend to still other problems, including the role of nonprice factors in international competition and the potential markets in developed countries for LDC manufactures.

### 3. *Foreign Exchange Policy in Less Developed Countries*

At various times since World War II a number of less developed countries (as well as some developed ones) have found themselves with overvalued currencies and serious strains in their trade and payments positions. A frequent consequence has been the adoption of a system of controls. It is a fairly general opinion of economists that such systems have proved to be highly undesirable in their economic, social, and political effects. These effects include, in particular, the distortion of comparative advantage and the misallocation of resources, the conferral of special benefits in the distribution of supplies accompanied by favoritism and corruption and, more broadly, the retardation of economic growth. A good deal of empirical evidence has been assembled bearing on these adverse results, and more remains to be analyzed.

There is also a fair amount of experience attesting to the difficulties, both economic and political, of moving away from these regimes, once they have been instituted. Some attempts have succeeded, at least for a time, and others have failed. The problem is not one of reducing total expenditures in real terms, as is required where a country is running an open deficit. It is rather the reallocation of resources. This adjustment can be brought about only gradually, and in the face of strong resistance by those whose business pursuits or official functions would suffer from the relaxation of controls.

Under these circumstances a comparative analysis is needed of the problems associated with currency overvaluation and of the conditions for successful devaluation and liberalization. Such an analysis would seek to build on existing knowledge and expertise in the field and search for synthesis. Professors Jagdish Bhagwati (MIT) and Anne Krueger (Minnesota) have proposed to organize such an investigation, and the National Bureau has undertaken to sponsor it. They will first formulate a statement of the conditions believed to be important in influencing the outcome of devaluation/liberalization efforts. This statement will then be discussed with other participants and reworked as a guideline for the country studies. The participants will also include economists and political scientists invited to prepare papers on specific aspects of these problems running across countries. Bhagwati and Krueger will complete the drafting sequence with a final paper of summary and conclusions, after which a larger conference with other invited discussants will be held, and a conference volume issued.

It is expected that this experience of cooperation in analysis and evaluation will contribute significantly to an understanding of the problems and disadvantages of currency overvaluation in less developed countries and of the conditions for successful remedies through devaluation and liberalization. The experience of developed countries in this regard also deserves to be studied, and it is envisaged that this might later be undertaken if the proposal described herein is successfully carried out.

#### 4. *U.S. Manufacturing Abroad and U.S. Exports*

A timely topic to which the Bureau has already devoted considerable research effort is the relation between United States investment in manufacturing abroad and its own exports. One of the main underlying issues is in what directions, and to what extent, such manufacturing alters this country's comparative advantage in international trade. The importance of this question has increased since the study began in the summer of 1967, as controls on direct investment, first thought to be temporary, have been extended. The research design for this project is set out in some detail by Robert Lipsey and Merle Weiss in Part II of this report. As indicated there, a great deal of work has been accomplished in bringing together the relevant data from various sources, but much remains to be done. Consideration must also be given to the need to investigate related issues, notably the effect on U.S. imports and on the invisible items in the U.S. balance of payments. In all cases, one of the most difficult questions, as noted by Lipsey and Weiss, concerns what would have happened if the investment in U.S. manufacturing abroad had not been made.

Exploration of this topic offers certain obvious complementarities to the technological issues discussed under the next heading. Over a third of U.S. exports of manufactured and semimanufactured products (other than civilian aircraft and a few other items) takes the form of shipments by U.S. parent companies to their foreign affiliates. At the same time, these affiliates become a direct channel for the rapid transmission of American technology to other countries, and in many cases also a channel for the importation of the products of that technology to the United States. Given the size of the American market, the large sums devoted to research, and the inducement of high wages to labor-saving innovations, American firms will no doubt continue to lead in the development and application of new technology. But foreign investment gives increased mobility to the technological factor and increased facility for introducing it wherever it can most advantageously be combined with other factors of production, whether at home or in other countries. The latter include less developed as well as developed countries, and one may expect that American technological advances will henceforth include not only labor-saving devices, as suits its own factor proportions, but increasingly also capital-saving innovations calculated to benefit by the comparative advantages of the LDC's. An interesting related question for possible future investigation concerns the extent to which the wide "multinational" network of U.S. parent-affiliate relations may play a role in expanding the sales of manufactures by the LDC's in other advanced countries as well as in the American market.

#### 5. *Technology and Comparative Advantages*

The National Bureau's interest in the international aspects of technological change has recently been expressed in two major undertakings. One was the Conference on Technology and Competition in International Trade held in October last year under the auspices of the Universities-National Bureau Committee for Economic Research. The conference served both to appraise the present state of theory and to adduce new empirical evidence on the technological factor and other determinants of the composition of trade. The conference also served, as was one of its purposes, to provide a helpful basis for the future development of the National Bureau's work in this area.

Another expression of the National Bureau's interest in the technological factor is its participation in a research venture initiated by several European research institutes. The initial aim of this project, more fully described by Alfred H. Conrad in Part II of this report, was to measure comparative rates of diffusion of certain major technological innovations in the participating countries. As the work has progressed, the objectives have been refined and extended. They include an effort to assess technical and economic factors that would set different optimal rates of technological change in different countries and to weigh managerial or other influences that may explain divergences from these optimal rates. Another purpose is to see how regional economic groupings or corporate affiliations may affect the spread of new technologies among countries.

Progress in carrying out this collaborative project suggests the usefulness of further comparative work on technological diffusion and levels. The project itself could be extended to other processes and countries. It would be particularly desirable to orient some of this work toward determining, for whole industries, the optimal levels of technology appropriate to the conditions of different countries, especially the less developed countries, and to consider the implications for trade. It would also be desirable to look at the mechanisms for the transfer of technology to the LDC's – for instance, the role of trade in machine tools and other types of machinery as carriers of technology and, as suggested earlier, the role of multinational firms in planning and equipping their foreign subsidiaries.

#### 6. *International Transportation and Technological Change*

Studies of technological innovation and diffusion in transportation deserve separate emphasis because of the pervasive role of transportation costs in international trade.<sup>6</sup> The present is a propitious time to inaugurate studies in this area. The introduction of container ships and large aircraft, plus the movement toward single bills of lading for intermodal shipments from origin to destination, is having significant effects upon freight competition. The North Atlantic will undoubtedly be the first to experience the full effects of these changes and is intended as the first area for study. It is also a good case for study because of the importance of the traffic, because U.S. companies are engaged in all aspects of the trade (making availability of information more likely), and because international cooperation in data collection can probably be counted on, thanks to the National Bureau's good working relations with European research institutions.

A similar study dealing with flows between the United States and Europe, on the one hand, and the Pacific area, on the other, could be potentially even more interesting, given the distances involved and the routing alternatives offered.

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<sup>6</sup>As part of the project reported on by Lipsey and Weiss in Part II, some work has been started on estimating transportation costs and their effects on trade flows, using data on shipping costs from the Kravis-Lipsey price study and from the Census Bureau. Earlier work conducted by the National Bureau included Carmellah Moneta's paper on "The Estimation of Transportation Cost in International Trade Accounts," *Journal of Political Economy*, February 1959, and Herman F. Karreman's Technical Paper on "Methods for Improving World Transportation Accounts, Applied to 1950-53," NBER, 1961.

Information collection would probably be far more difficult, however, and it is planned to undertake such a study only after its feasibility is supported by experience on the North Atlantic project.

In addition to such forward-looking studies as those just suggested, an historical study of the decline in freight rates over the past half-century is contemplated. The purpose would be to establish the facts, to examine the technological and other factors accounting for the decline, and to trace the trade effects. Such an inquiry would constitute a continuation of Douglass C. North's studies of the productivity gains in ocean shipping over the three centuries up to the first World War.<sup>7</sup>

### 7. *The Role of Prices in International Trade*

Though other influences, such as income levels, institutional ties, technological leads, transport costs, and delivery periods are also important, prices are assigned a key role in international trade theory. Differences in price levels and movements among countries are presumed to reflect patterns and shifts of comparative advantage as well as divergencies in monetary and cyclical conditions. Hence they affect market shares and, depending on the initial position with respect to international equilibrium, operate sometimes as disturbances and sometimes as adjustments in international payments. Knowledge of the way demand responds to changes in relative supply prices is therefore of basic importance to an understanding of the international trade and payments mechanism and to policy formation.

Admittedly, even if one had the most relevant and most accurate data on prices and on trade flows, the effect of the first on the second would be difficult to disentangle from other forces, such as the structural instabilities that followed both world wars, cyclical variations in capacity utilization, and changes in incomes. Failure to take account of these other forces may explain the erratic and even perverse findings sometimes arrived at in empirical investigations of the price elasticity of demand in international trade. But certainly the price data usually employed, *faute de mieux*, are also suspect, consisting as they do either of national wholesale price series or export and import unit value series of questionable accuracy and relevance for the purpose in question. Frequently also these series have been employed in excessively aggregative form, making their movements unduly influenced by certain components characterized by high price variability and low demand elasticity.

The materials collected and appraised by Irving Kravis and Robert Lipsey for their international price comparison study provide, really for the first time, a rich body of data well suited to the purpose of examining the role of prices in international trade. These data exist in considerable detail, appropriate for relating to international trade flows at the three- and four-digit level of the SITC for different origins and destinations and susceptible of being combined into

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<sup>7</sup>North's research indicates that, over the long period 1600 to 1850, new technological developments made only a minor contribution to the growth in productivity and the decline in costs, and that the main contribution came from the wider application of existing knowledge made possible by the decline in piracy and the increase in size of markets. After 1850, however, the major contribution was the further development of technology, as in the size of ships.

larger aggregates on a comparable basis. They are limited in product coverage to metals, metal products, machinery, electrical apparatus, and transport equipment, but nevertheless include therein many of the items of chief importance in studying the response of demand to price changes. It is therefore almost obligatory that this unique body of data should be thoroughly exploited for the purpose of improving knowledge of this question.

Kravis and Lipsey have made a start on this analysis in the recently completed draft of their study, and their note in Part II of this report indicates the further work now contemplated.

The National Bureau considers that, in addition, a broad appraisal is needed of the state of knowledge and the opportunities for new research on the role of prices in international trade and payments. New proposals for work in this area are received from time to time, and the need for reliable results is bound to increase as efforts are continued to elaborate models for explaining and projecting world economic developments. For one thing, it seems certain that scholars will continue to use existing national wholesale price series and export and import unit value series until such time as the need is met for more pertinent and accurate foreign trade price data along the Kravis-Lipsey lines.

Should these efforts be encouraged, or are the results bound to be suspect because of deficiencies in the data? We believe that a useful purpose would be served by a comprehensive survey evaluating the methodologies followed and the results achieved and recommending the most important avenues for future research. This might take the form either of a review article or, if more fully developed, a separate publication by the National Bureau. Consideration should also be given to the usefulness of a conference on the role of prices in international trade, either as part of the review process or afterward, but that would remain for determination after a preliminary survey of the subject.

#### *Relation to Other Bureau Studies*

In addition to the topics discussed above, some of the other main research interests of the National Bureau provide a valuable support to studies focused on changes in international comparative advantage. Work on the human resources aspect of this question, for instance, would benefit by the research, under Gary Becker's direction, on the economics of education, and by that headed by Victor Fuchs on the economics of health. Similarly, the relation between national tax structures and international comparative advantage would gain from the National Bureau's previous tax studies and from others now under consideration.

Work on still other topics less closely related to questions of comparative advantage frequently also extends beyond the domestic sphere into the experience of other countries, offering useful comparisons and insights as well as opportunities for collaboration with foreign scholars. These topics include urban, regional, and environmental problems, among those more recently undertaken or contemplated, as well as the more traditional subjects of economic growth, national accounting, business cycles, and financial institutions and processes. In its entirety, therefore, the National Bureau's research activity in the international area is broader than, and affords useful complementarities to, the program of studies discussed here on changing patterns of international comparative advantage.

## OPPORTUNITIES FOR RESEARCH ON NATIONAL BALANCE SHEETS, FLOW-OF-FUNDS MODELS, AND OTHER FINANCIAL TOPICS

Raymond W. Goldsmith

This is an interim report on the work of a committee set up in the fall of 1968 to consider the National Bureau's future activities in the field of financial research.<sup>1</sup> Continued, and possibly intensified, activity in this field was taken for granted by the members, given the Bureau's previous experience in financial research, the relatively limited resources devoted to this area by other research institutions, its importance for economic policy, and, especially, the great advances that have been made during the last decade in providing a more adequate theoretical structure for financial research and for its linkage with general economic theory. So far, the committee has discussed each of a number of projects individually and without cost estimates. It has not yet considered the projects together or ranked them by their importance or scientific promise. For this reason, the brief discussion that follows represents only the Chairman's views.

In the domestic field, two projects stand out because of their importance and because of the relatively substantial amount of funds that would be required to finance them. One would be an extension to more recent years of the estimates of national balance sheets that have been published for 1945 through 1958 and a few earlier benchmark years (1900, 1912, 1929, 1933, 1939) in *Studies in the National Balance Sheet of the United States* by Goldsmith and Lipsey. Before the committee had an opportunity to explore this project in detail, an opportunity arose to do part of the work envisaged in connection with the Securities and Exchange Commission's study of institutional investors in the stock market.

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<sup>1</sup>Members of the Financial Research Committee are Raymond W. Goldsmith (Chairman), Phillip Cagan, Robert J. Gordon, Jack M. Guttentag, David T. Kresge, Geoffrey H. Moore, Thomas Sargent, Anna J. Schwartz, Richard T. Selden, Neil Wallace.

The Bureau has now undertaken to prepare for that study national and sectoral balance sheets, on approximately the previous basis, for the years 1953 to 1968.

In connection with the SEC study, the Bureau has also undertaken to collaborate with the Federal Reserve Board to make some additions to the Board's flow-of-funds statistics for the period 1953-68. The additions include subsectors for personal trust funds and funds managed by investment counsel firms and a separate main sector and several subsectors for nonprofit institutions, all of which are undistinguished in the household sector in the existing statistics.

These refinements will be valuable for the second major project discussed by the committee, namely, the utilization of the Federal Reserve Board's flow-of-funds statistics for a systematic analysis of the behavioral relationships determining demand for and supply of financial assets. For this project, improvements in the basic flow-of-funds and balance-sheet data, beyond those the National Bureau will undertake for the SEC, may be needed. Among such improvements would be a further breakdown of the nonfinancial corporations sector and, most important but also most difficult, a breakdown of the nonfarm household sector into a small number of subsectors, distinguishing households of low-, middle-, and upper-income levels and separating owners of unincorporated business enterprises from other households (mainly employees, renters, and pensioners).

Another difficulty for this project is the lack of yield series (interest rates on claims and yields on equity securities) to accompany each of the flows being distinguished in the flow-of-funds statistics. Considerable data on this topic have, of course, been developed by the National Bureau's interest rate study, but so far no systematic effort has been made to match each of the flows in the flow-of-funds statistics with the pertinent yield series. Explorations of the many problems that arise in attempting such a match may be regarded as a necessary preparatory step towards a systematic analysis of the demand for and supply of financial assets. Thus far, attempts to develop an analytic model describing the financial relationships encompassed in the flow-of-funds statistics have not been too successful, even in the eyes of the authors. Considerable further experimentation must therefore be expected.

Apart from the work the Bureau will do for the SEC study, that study will produce a substantial body of additional information on the stock portfolios and transactions of various types of financial institutions. It will thus provide material for a much more intensive analysis of structural changes in the stock market and of the portfolios of different groups of institutional investors than has previously been possible. Although the SEC study staff will undertake some of this analysis, the limitation of time under which the SEC works – the study is due for submission to the Congress early in the fall of 1970 – will probably leave a good deal of scope for analysis by others. Formulation of research projects in this field will necessarily have to wait until the SEC's report is published.

A third major project, straddling the line between purely domestic and purely foreign subjects, centers around the effects on securities and capital markets produced by continuous, slow inflation, like that experienced over most of the postwar period by most countries. Certain aspects of this problem were discussed in connection with various proposals before the committee, and a

broader research proposal has now been drafted envisaging a study of experience in both the United States and a representative sample of developed foreign countries. Such a project would include the development of a theory of rational portfolio management in inflationary conditions of different types; a statistical analysis of actual portfolio changes during inflations and of the relationship between movements of commodity prices, stock prices, and interest rates during inflations for as many countries and as extended periods as the material available permits; and case studies, for about half-a-dozen representative countries, ascertaining and analyzing the effects of inflation on financial institutions, important nonfinancial investor groups, financial techniques, and international financial relations.

Among projects dealing primarily with foreign countries, one stands out because of the broad compass of the problem and the amount of funds likely to be needed. This would be a systematic comparative study of the financial development of underdeveloped countries in relation to their economic growth. This study would have two main parts, one primarily statistical based on the data available for as many underdeveloped countries as possible, but limited to the postwar period. This part of the study would seek to establish relationships between the main features of these countries' financial structure and development and important characteristics of their economic growth processes. The second part is envisaged as an intensive study of a small number of representative underdeveloped countries going back to the beginning of the century and using both existing published data and field work. This research would yield, as the basis for a synthesis, a series of brief country monographs written according to a uniform plan but with due regard for the institutional and other distinctive features of individual countries.





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