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Forecasting with the Index
of Leading Indicators

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Spending Through the Tax Structure: Are We Taxing the Revenue System?

by Robert H. DeFina*

“The taxing power of Government must be used to provide revenues for legitimate Government purposes. It must not be used to regulate the economy or bring about social change.”

—President Ronald Reagan, 1981.

Recent concern over the growth in Federal spending has led both politicians and bureaucrats to pore over the budget in search of ways to trim the fat. Thus far, their efforts have yielded unprecedented cuts. But large and growing numbers of government expenditures have managed to avoid the ax, if only because they never show up in the budget.

These phantom outlays are known as tax expenditures, and they represent spending accomplished through tax relief and tax subsidies embodied in our income tax laws.

Like some direct Federal payments, such as grants or loans, tax expenditures are used to encourage certain activities and favor specified groups through financial assistance. In fact, tax expenditures can be viewed as alternatives to direct subsidies. Most policy goals that are pursued with direct assistance could, in principle, be sought with tax spending as well.

Using the tax system to meet national objectives, however, may not be a good idea. Tax spending presents substantial difficulties that do not arise with direct spending and which can seriously impair the efficiency of

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the fiscal process. Moreover, tax spending offers little advantage over direct spending to make up for its drawbacks.

In the coming years, tax expenditures are expected to increase dramatically relative to direct outlays, continuing a trend begun in the recent past. Given the difficulties associated with the use of tax spending as compared to direct spending, policymakers might want to reconsider their growing reliance on the tax system to help cure society's ills.

SPENDING THROUGH THE TAX SYSTEM

The Budget Act of 1974, which established our current budget process, defines tax expenditures as "revenue losses attributable to provisions of the Federal [income] tax laws which allow a special exclusion, exemption, or deduction from gross income, or which provide a special credit, a preferential rate of tax, or a deferral of tax liability."¹ Loosely speaking, these are tax dollars that the government purposely does not collect in

order to further certain social goals (see HOW TAX EXPENDITURE PROGRAMS WORK).

In conferring the title 'tax expenditure', policymakers agree that these forgone revenues are really expenditures of Federal

¹Implicit in the definition of tax expenditures is the notion of a benchmark tax structure from which the special provisions depart. As detailed by fiscal specialists involved with tax expenditures, these benchmark provisions (commonly referred to as the "normal tax structure") include the overall rate schedules and exemption levels, general rules as to who is subject to tax and what accounting periods should be used, and the definition of income. It may also be noted that the legislative history of the Budget Act makes clear that the classification of an item as 'special' is to be made by employing techniques that had been used by Treasury and Congressional Staff technicians in developing tax expenditure lists prior to the enactment of the Act. For a comprehensive description of and discussion of issues related to the normal structure, see Stanley Surrey, *Pathways to Tax Reform* (Cambridge: Harvard University Press, 1973).

HOW TAX EXPENDITURE PROGRAMS WORK

There are six main types of tax expenditure programs and each can be used to provide individuals with tax breaks to encourage participation in particular activities or to relieve financial hardship.

Three of these, namely *exclusions*, *deductions*, and *exemptions*, allow taxpayers to reduce their taxable income by a specified amount. The value to taxpayers of the reduction depends upon their marginal income tax bracket: the higher the bracket, the more the reduction in taxable income is worth. For instance, a one-dollar deduction is worth fifty cents to a person in the 50-percent bracket (since that is how much tax would have been paid on that dollar), while it is worth seventeen cents to a person in the 17-percent bracket. In many cases, personal deductions must be offset against the zero bracket amount (formerly known as the standard deduction) prior to subtracting it from income.

A *tax credit* permits taxpayers to deduct a certain amount directly from their tax liability. Unlike exclusions, deductions, and exemptions, the value of a credit does not depend on the marginal tax bracket because the reduction comes after the tax bill is initially calculated; however, eligibility for the credit depends upon whether taxpayers have a sufficient initial tax liability to use the credit.

Preferential tax rates let taxpayers compute their tax liability using tax rates that are lower than those normally used. The value to taxpayers, in this case, is equal to the amount of taxable income subject to the preferential rate multiplied by the difference between the preferential and regular rates.

Finally, a *deferral of tax liability* permits taxpayers to put off paying their taxes for some period of time. This benefits individuals because they can invest the tax otherwise owed and earn interest up until the time the taxes are due.

monies channeled through the tax system.² By reducing the tax associated with a favored activity or otherwise owed by a targeted group, the government is spending its scarce budget dollars just as it does when it makes direct payments, such as grants and loans. Whether the government first collects a dollar of tax from an individual and then sends him a one dollar check, or whether it does not collect the money in the first place, the bottom line is the same. For both the beneficiary and the government, a dollar less paid in taxes has the same effect on budgets as a dollar more directly paid out by the Treasury. The only substantive difference is how this financial assistance is delivered.

A Profile of Tax Expenditures. At present, a substantial amount of Federal assistance is delivered through the tax system in pursuit of a variety of goals (see A SUBSTANTIAL AMOUNT. . . overleaf). All told, the government is estimated to have incurred almost \$254 billion in tax expenditures during fiscal year 1982—close to 35 percent of scheduled direct Federal outlays—for the operation of over 100 tax-based programs.

The lion's share of tax spending accrues to individuals, providing them with aid and incentives in their capacities as homeowners, donors, savers, and so on. For example: the tax exclusion of employer contributions to employee pension plans (\$25.8 billion) fosters saving by workers for their retirement; deductions of charitable contributions from taxable income (\$9.7 billion) reward people

who join the ranks of philanthropists; and deductions of mortgage interest on owner-occupied homes (\$23.0 billion) encourage citizens to pursue the American dream of owning a home. Tax expenditures are also used to nudge corporations toward socially desired activities: the investment tax credit (\$15.0 billion) defrays the costs of new capital purchases in order to stimulate investment, while the special treatment of oil and gas exploration and development costs (\$2.7 billion) promotes energy development.

In many cases, the objectives sought through tax expenditures are also pursued with direct spending programs. Designated groups in the labor force have been helped both with the CETA grant program (direct spending) and the jobs tax credit; individuals receive assistance with their medical expenses both through direct medicare payments and through medical expense deductions from taxable income; and business financing costs are lowered both with direct interest subsidies and through business use of tax-exempt bonds. Such instances of common purpose clearly show that tax expenditures and direct outlays are alternative policy instruments.

In principle, most policy objectives that require financial assistance can be addressed with either spending mechanism. As a recent study of tax expenditures by the Congressional Budget Office notes, almost any of the structural details included in direct assistance programs could conceivably be incorporated into tax-based programs:

Providing tax [expenditures] in the form of credits rather than deductions, and including the credit in taxable income can assure that the value of the tax subsidy is the same as that of an equivalent direct grant. Making the credit refundable . . . can extend the subsidy to non-taxpayers Providing the subsidy in the form of a deferral of tax liability makes it the equivalent of a loan pro-

²Some people have interpreted the concept of tax expenditures as implying that the Federal government is entitled to one hundred percent of everyone's income, and that any portion that taxpayers are allowed to keep is theirs only by special permission. This view is inaccurate. Tax expenditures are defined as special departures from a benchmark or normal tax structure. Thus, for the interpretation in question to be correct, the benchmark tax structure would have to tax one hundred percent of all income. However, the normal provisions of our income tax fall far short of such complete taxation.

A SUBSTANTIAL AMOUNT OF FEDERAL ASSISTANCE IS DELIVERED THROUGH THE TAX SYSTEM IN PURSUIT OF A VARIETY OF GOALS

Selected Special Provisions	Tax Expenditures (Fiscal year 1982, millions of dollars)		
	Individual	Corporate	Total
Exclusions			
Employer contribution to pension plans	\$25,765		\$25,765
Employer contributions for medical insurance premiums and medical care	15,330		15,330
Dividend and interest	2,185		2,185
Interest on general purpose state and local debt	1,925	\$3,905	5,830
OASI benefits for retired workers	9,980		9,980
Interest on state and local industrial development bonds	315	1,295	1,610
Deductions			
Interest on consumer credit	7,585		7,585
Mortgage interest on owner-occupied homes	23,030		23,030
Property tax on owner-occupied homes	10,065		10,065
Charitable contributions*	9,705	895	10,600
Medical expenses	3,925		3,925
Nonbusiness state and local taxes other than on owner-occupied homes	20,395		20,395
Exemptions			
Parental personal exemption for student age 19 or over	995		22,995
Additional exemption for elderly	2,355		2,355
Tax Credits			
Investment tax credit, other than Employee Stock Ownership Plans, rehabilitation, reforestation, and leasing	3,475	14,970	18,445
Credit for child care and dependent care expenses	1,350		1,350
Earned income credit	555		555
Energy conservation credit	415	315	730
Preferential Tax Rates			
Capital gains (other than agriculture, timber, iron ore, and coal)	18,315	1,495	19,810
Expensing of exploration and development cost for oil and gas	1,350	2,720	4,070
Tax Deferrals			
Deferral of income of domestic international sales corporations		1,560	1,560
Deferral of tax on shipping companies		65	65

*Represents the sum of the estimates of deductions of charitable contributions for education, health, and purposes other than education and health.

SOURCE: Estimates of Federal Tax Expenditures for Fiscal Years 1982-87, prepared by the Staff of the Joint Committee on Taxation (March 8, 1982).

gram. While no interest is normally charged on tax deferrals, it could be if Congress wished. . . . Congress can make tax subsidies look and work as much or as little like direct spending . . . as it chooses.³

Once it has been decided that a particular subsidy is desirable, both spending options—tax expenditures and direct outlays—are usually open to policymakers as a potential means of providing the assistance.

Reliance on Tax Spending Is Increasing. Although direct outlays have traditionally been the primary form of financial assistance from the Federal government, tax expenditures are growing in relative importance. In 1976, for instance, the ratio of tax spending to direct spending was about 1:4; by 1981 it had risen to 1:3. And while tax spending more than doubled since 1976, growing at a rate of about 18.6 percent annually, direct outlays grew by 12.5 percent a year. The differential was most pronounced over the past two fiscal years when tax spending increased at a 24-percent yearly rate, compared to the 15.7-percent annual growth of direct spending. The future promises a continuation of this trend: over the next five years, tax expenditures are expected to grow by three-quarters, while direct outlays are estimated to rise only by one-third. As a result, by fiscal year 1987, the ratio of tax spending to direct spending is expected to jump to about 1:2.

Despite the apparent popularity of tax expenditures, there are reasons why using the tax system to deliver financial assistance may not be the best idea. Tax spending has certain practical difficulties not shared by direct spending which can have adverse consequences for our fiscal process. Further-

more, tax spending offers little benefit over direct spending to compensate for its adverse effects.

TAX EXPENDITURES OFFER LITTLE ADVANTAGE OVER DIRECT ASSISTANCE

Those who applaud the use of tax spending see in it a major advantage over direct assistance—a greater compatibility with the philosophy of private decisionmaking and individual initiative. As Murray Weidenbaum, former Chairman of the Council of Economic Advisors, wrote:

The choice between tax incentives and direct Federal expenditures turns out to involve more than the selection among technical financing mechanisms. The choice involves altering the balance between public and private power in our society.⁴

Promoters of tax spending argue that, all too often, direct payment programs involve an endless maze of rules, regulations, and eligibility requirements that needlessly restrict individual choice. This government influence, they feel, hampers progress toward reaching a program's stated objective. In contrast, tax expenditures are viewed as placing most of the decisionmaking process with the beneficiary: the incentive is created, and the individual is left to respond. Tax expenditures, they allege, help get government off our backs.

There is not much validity, however, to the assertion that tax expenditures are necessarily more compatible with private choice

³Congressional Budget Office, *Tax Expenditures: Current Issues and Five-Year Budget Projections for Fiscal Years 1982-1986* (September 1981), pp. 46-47.

⁴Murray L. Weidenbaum, "The Case for Tax Loopholes," Center for the Study of American Business, *Reprint Series*, No. 21 (St. Louis: Washington University, September 1978), p. 12. For similar views, see the remarks of Senators Packwood, Roth, and Domenici in Joel Havemann, "Tax Expenditures — Spending Money Without Expenditures," *National Journal*, December 10, 1977, pp.1908-1911.

than is direct spending. The extent of any intrusion into the free market—that is, the amount of administrative control, bureaucracy, and red tape involved—is a matter of program design. And a program's design is determined by the preferences of policymakers, not by the particular policy instrument (in this case, tax spending or direct spending) chosen to implement the program. Indeed, the choice of direct spending or tax spending as the means of providing financial assistance comes after the determination of a program's eligibility requirements and regulations. If direct assistance programs are more complex, as proponents of tax spending lament, the reason lies not in the fact that direct payment mechanisms are used to provide the incentives; rather, it lies in the policymakers' decisions to structure the underlying programs in particular ways. And both tax spending and direct spending programs can be designed with as much or as little red tape as is desired.

The deduction for charitable contributions provides a useful illustration of this point about program design since it is frequently touted as an unrestrictive Federal program that enlists private support for the public interest.⁵ According to the guidelines of this deduction, individuals decide, free of government direction, both the recipient charity and the size of the donation. But the same objectives could be accomplished through a direct spending program as well. Private contributions could be matched, for instance, by Federal grants, with individuals determining both the beneficiary and the amount of the contribution. As this example shows, neither compatibility with private initiative nor the simplicity of a program's structure hinges on the choice between tax and direct spending. These are questions of program design, and they are independent of the expenditure mechanism.⁶

⁵This and other examples are discussed in Stanley Surrey, *Pathways to Tax Reform*.

Some observers of the fiscal policy process take a more cynical view concerning the benefits of using tax expenditures rather than direct payments. They note that the main attraction of tax spending may be that it does not show up on the expenditure side of the government's budget; that is, it allows spending without the appearance of spending.⁷ Whether or not this aspect of tax spending has contributed to the relative growth of tax expenditures in recent years is uncertain. What is clear, however, is that, from society's perspective, this feature does not provide any substantive benefits. A dollar spent through the tax system represents the same use of Federal monies as a dollar spent through a direct outlay, regardless of how it is accounted for. Some political gains well may result from using tax expenditures if the electorate does not recognize that funds are spent through the tax system; however, such benefits should not be an important consideration when choosing between tax and direct spending mechanisms.

Although tax expenditures do not appear to provide any meaningful advantages over direct spending, the choice between the two remains consequential. In particular, spending through the tax system complicates the workings of the fiscal process in ways that are not encountered with the direct provision of assistance.

TAX SPENDING HAS ADMINISTRATIVE PROBLEMS NOT SHARED BY DIRECT SPENDING. . .

Some of these complications occur at the administrative level. Tax expenditure pro-

⁶The same argument holds true against claims that direct spending programs force uniformity on the recipients of the aid while tax expenditures do not and that tax expenditures allow regional diversity while direct programs do not.

⁷For a representative view, see Charles Davenport, "Impact of the Congressional Budget Process on Tax Legislation," *National Tax Journal*, September 1979, pp. 262-269.

grams are administered by the Internal Revenue Service rather than by the executive agency normally involved with the policy objective being addressed. As a result, the knowledge, insight, and resources of that executive agency are neglected. And the IRS, despite its limited resources, is called upon to administer programs that it may be ill-equipped to handle and that are unrelated to revenue raising.

Administrative Responsibilities Are Inappropriately Assigned. Tax expenditures involve an inappropriate assignment of administrative responsibilities for spending programs. This issue was discussed by Jerome Kurtz, a former Commissioner of the IRS:

Each of the tax expenditure programs is, in effect, a non-revenue related expenditure program written into the tax law. Each entails its own special set of issues, definitions, and limitations . . . Because of these provisions, I find myself, a Commissioner of Internal Revenue, administering programs of many other agencies. If these programs were parceled out to those agencies, the concentration of programs would be diffused and the tax law and administration would be vastly simpler.⁸

Indeed, the staffs of the various executive agencies and other Federal departments have accumulated a large stock of expertise and experience in particular areas: the Department of Housing and Urban Development specializes in housing, the Department of the Interior in conservation and wildlife, the Department of Labor in employment and unemployment, and so forth. As a consequence, the trained personnel of

these departments are much more adept than IRS agents at gauging the effectiveness of particular spending programs or program features, and they are more skilled in making judgements regarding eligibility. Furthermore, the executive agencies are better positioned and equipped than the IRS to deal with program problems that might arise. Yet when spending programs are built into the tax system (and, hence, are administered by the IRS), the resources and detailed knowledge of the different government agencies are largely ignored. Such a division of responsibilities is counterproductive, and it needlessly diminishes the potential success and efficiency of these programs.

By the same token, this awkward arrangement also substantially compounds the problems of tax administration, impeding the smooth functioning of the tax system. Rather than concentrating on their primary job of efficiently collecting taxes, IRS agents must devote considerable time and effort to writing regulations, verifying eligibility, and pursuing litigation for over one hundred programs that are unrelated to revenue raising. The recent controversy over the legality of the tax-exempt status of racially discriminatory schools clearly illustrates how tax expenditures can embroil the IRS in issues that have nothing to do with revenue raising.

IRS administration of these spending programs also neglects the crucial role of objectives and incentives in program management. Direct spending programs involve their administering agencies from the standpoint of stated department goals: the particular program aims are assigned to be compatible with those agency objectives. In contrast, the IRS has aims that are separate from those of the spending programs it administers. The IRS's overriding concern is the efficient collection of revenue, and not, for instance, the stewardship of the country's natural resources or the caretaking of our nation's elderly. As such, IRS personnel have no institutional incentive to accomplish the goals

⁸Cited in Stanley Surrey and Paul McDaniel, "The Tax Expenditure Concept: Current Developments and Emerging Issues," *Boston College Law Review*, January 1979, pp. 278-279.

of the many tax-spending programs. They instead treat these programs like any other provision of the tax code: emphasis is placed on assuring technical compliance with the rules governing the special tax treatment, with no effort expended to publicize the program's availability, to promote its use, to monitor its effectiveness, and so on. Incompatibility between the overall objective of the IRS and the aim of individual tax expenditure efforts makes it more difficult for such programs to succeed.

Providing Aid and Incentives to Nontaxpayers Is Harder. Providing nontaxpayers with incentives and relief is harder to accomplish through the tax system than through direct payment schemes. Unlike direct outlay programs, tax expenditures cannot be extended directly to individuals and organizations that do not pay tax. Instead, some auxiliary arrangement used in conjunction with a tax spending program is required if nontaxpayers are to be reached.⁹

The complex leasing rules that have been written into the tax code exemplify such arrangements; they represent an effort to extend tax incentives for investment to firms without enough tax liability to take advantage of the subsidies. (According to the new leasing rules, a business with inadequate tax liability is permitted to lease equipment from another concern that has sufficient liability to be eligible for the tax breaks. In this way, the low-tax firm can receive some of the tax incentive indirectly through lower lease

payments to the high-tax firm).

Although schemes of this sort might ultimately channel program subsidies to nontaxpayers, they needlessly complicate the tax code and use the resources of the IRS inefficiently. To continue with the leasing example, tax administration efforts must be devoted to processing and verifying details of the transactions such as the term of the lease, the interval between the date property is leased and the date it is acquired, and the amount of investment the lessor risks throughout the term of the lease. All this has little to do with revenue raising. Furthermore, the time and money of the private sector are wasted in locating leasing partners, arranging meetings, negotiating the final agreements, and explaining it all to the IRS. Compared to the direct payment alternative, in which the appropriate government agency deals directly with the targeted beneficiaries, such make-shift tax spending arrangements seem inferior.¹⁰

In sum, the administration of spending programs will always entail costs, regardless of whether these programs are formulated as direct payments or tax expenditures. How-

⁹In the case of most tax spending programs, there is little reason why nontaxpayers should be excluded. If these schemes were recast as direct payment programs, it is very doubtful that individuals and organizations would be ineligible for incentives simply because of a lack of taxable income. The fact that many tax expenditure programs do not include nontaxpayers does not reflect a prudent policy decision; rather, it points to an inadequacy of the tax spending technique. Exclusion of nontaxpayers is automatic and largely arbitrary and, hence, limits the potential success of tax spending programs.

¹⁰There are other, more direct, tax approaches such as making tax credits refundable even to nontaxpayers, but these, too, are costly and burdensome and are very likely to be ineffective. This point is discussed in the Congressional Budget Office's tax expenditure study: "People whose incomes are so low they do not have to pay taxes usually do not have to file tax returns, so the IRS may have no record of their existence. It is thus hard to inform them of their possible eligibility for a subsidy. Once they learn about the subsidy, they may have difficulty with the forms and paperwork necessary to establish their eligibility, and the IRS has relatively few resources to provide them with assistance. Many low-income nontaxpayers also have considerable fear and skepticism about dealing with the IRS, and may thus be reluctant to apply for an IRS-administered subsidy. It may also be a hardship for them to have to wait until tax returns can be filed to obtain the subsidy. While attempts have been made to have the earned income tax credit reflected currently in withholding, there have been administrative problems with this approach." Congressional Budget Office, *Tax Expenditures*, p. 48.

ever, the administrative dollars are bound to be spent less efficiently when the tax expenditure route is traveled.

. . . AS WELL AS SOME LEGISLATIVE AND BUDGETARY DRAWBACKS

The shortcomings of the tax expenditure route are not restricted to the administrative level; rather, they arise at the legislative and budgetary levels as well. In particular, spending through the tax system results in an inefficient division of legislative responsibility, hinders budget planning, and makes control of the budget more difficult. Furthermore, placing spending programs in the tax structure can make for unintended shifts in the nature of the incentives provided by those programs.

An Inefficient Division of Legislative Responsibility Arises. Congress is comprised of many different committees, each of which has legislative responsibility for specified areas. For example, the House and Senate Veterans Affairs Committees oversee legislation dealing with veterans of the armed forces, while the banking committees of both houses are primarily concerned with laws affecting the country's financial system. Such division of labor permits the committees and their staffs to develop expertise in particular areas.

When tax spending is used, the purpose of the Congressional committee system is defeated and the benefits associated with that system are forgone. Because spending programs administered through the tax structure are legally part of the tax code, their legislative jurisdiction lies solely within the two Congressional tax-writing committees—the Senate Finance Committee and the House Ways and Means Committee. Thus, the tax committees have legislative responsibility for more than one hundred spending programs—not as a result of careful planning to insure that the most informed Congressional participants are involved in the programs' development and oversight, but only because

of the decision to operate those programs through the tax structure. Indeed, the expertise of the tax committees is not in dealing with the nation's housing problems or in overseeing interstate commerce; rather, it is in the handling of the technical revenue-raising aspects of the tax structure.¹¹ The tax committees' lack of familiarity with specific expenditure areas can only work to the detriment of the spending programs placed under their control.¹²

Tax Incentives Can Be Arbitrarily Changed. Placing spending programs in the tax structure also subjects the incentives they provide to arbitrary change. These changes will occur whenever the overall rate schedules or exemption levels are revised, regardless of intent. A modification of tax rates, for whatever reason, automatically alters the value of income deductions and exclusions to taxpayers. As a result, the ac-

¹¹Indeed, as Senator Edward Kennedy once remarked, "It is humanly impossible for the members of the Finance Committee and . . . Ways and Means Committee to be Renaissance men and women in employment, commerce, energy, health, education, housing, banking, state and local finance, transportation, investment, the cities, shipping, . . . , and all the other areas in which tax spending programs are now being used and in which expertise in the area is obviously required." 123 *Congressional Record* S11408, as cited in Surrey and McDaniel, "The Tax Expenditure Concept," p. 290.

¹²The tax committees might try to overcome, to some extent, their deficient knowledge and lack of insight regarding the spending programs placed under their jurisdiction, say, by consulting with appropriate legislative committees. But this sort of scheme is extremely cumbersome; it unnecessarily entangles the tax committees in deliberations with every other Congressional committee over matters that are substantively outside the tax committees' area of responsibility. And such onerous deliberations would be necessary on an ongoing basis, to handle both the continuing oversight of the more than one hundred existing programs, as well as the flow of proposed tax spending programs. Furthermore, the basic question would still remain as to why the inappropriate jurisdictional arrangement is used in the first place, given tax spending's lack of advantage over direct spending.

tivities fostered by these tax spending programs become either more or less attractive, depending upon the nature of the rate changes. Similarly, increases in the zero-bracket amount or in the level of the personal exemption can cause an unintended elimination of incentives by decreasing a taxpayer's liability below that necessary to make use of the special provisions.

A case in point is the recent Economic Recovery Tax Act of 1981 and its effect on the incentives provided by the tax deduction for charitable donations. Although the stated intention of the tax cuts embodied in the Act is to spur economic growth by enhancing work and investment incentives, those rate reductions have the inadvertent consequence of seriously diminishing the incentives offered by the charitable gift deduction. Consequently, charitable giving is expected to decline; the Urban Institute projects that the new tax law, by lowering the incentive provided by the deduction, will result in a drop of at least \$18 billion in donations during the period 1981 to 1984. All this happens despite the absence of an explicit decision to alter the program.¹³

These sorts of spontaneous program adjustments, which are associated with general revisions of the basic tax code, impede the success of the individual programs. Such adjustments reflect neither an evaluation of a program's effectiveness nor a reassessment of overall expenditure priorities; instead, they are haphazard and occur for reasons unrelated to the objectives of the tax spending.

¹³See "New Tax Law Is Said To Endanger Billions in Gifts to Private Groups," *New York Times*, August 27, 1981, p. A1. The remarks of Brian O'Connell, president of the Independent Sector (a coalition of 320 leading foundations, corporations, and nonprofit organizations) are particularly pertinent to the discussion. Speaking about the effect of the tax cuts on charitable giving, he noted, "The irony in these developments is that the Administration wants to strengthen the nonprofit sector but the tax cut inadvertently undercuts the very organizations the President is counting on."

Hence the incentives provided by the tax expenditure programs will no longer be appropriate for the goals being sought.¹⁴ No such unintended and detrimental changes would occur if the spending programs were framed as direct assistance schemes.

Budget Control Becomes More Difficult . . .

Tax expenditures make budget control more difficult because funds spent through the tax system are harder to monitor than those disbursed through direct assistance schemes. Direct spending, whether accomplished through programs with statutory ceilings or through open-ended entitlements, is highly visible. In each case, unplanned increases or decreases in expenditures for particular programs can be rapidly identified by the specific agency responsible for the payments. Desired program adjustments can then be quickly implemented.

By contrast, changes in individual tax expenditures are reflected only in fluctuations of total revenue collections. This makes such changes extremely difficult to identify. Forecasts of aggregate revenues can be wrong for a variety of reasons. It may take quite a while to associate, say, an unexpected shortfall in overall revenues with a greater-than-expected use of a particular tax expenditure program. As a result, legislators cannot respond effectively to unanticipated and undesired tax spending program developments.¹⁵

. . . And Coordination of Spending Plans Is Hindered.

The use of tax expenditures

¹⁴It might be possible, in principle, to restructure all affected tax expenditure programs after each tax code change; however, as a practical matter, such readjustments are not feasible.

¹⁵The use of tax-exempt bonds to finance single-family housing provides an example of the problems that can arise. Rapid and unforeseen increases went on for months, threatening multibillion dollar annual revenue losses, before Congress finally stepped in to impose limits. See Congressional Budget Office, *Tax Expenditures and Tax Exempt Bonds for Single-Family Housing* (April 1979).

impedes Congressional budget-planning efforts as well. When spending programs are placed in the tax structure, they are removed from the normal budgeting process that applies to all direct outlays.¹⁶ (For example, tax expenditures are not covered by the detailed spending targets that guide legislative consideration of direct spending options.) In this way, funds spent through the tax system are insulated, to a significant degree, from explicit competition with other spending priorities for scarce budget dollars. But this competition lies at the heart of effective budget design since it is the mechanism by which the relative values of alternative spending options are determined. Thus, running expenditure programs through the tax structure hinders Congress's ability accurately to assess the value of these pro-

grams relative to other social needs. Needless to say, this obstructs the formulation of a coordinated and consistent budget plan.¹⁷

TO SPEND, OR NOT TO TAX — THAT IS THE QUESTION

The practical shortcomings of tax spending bring into question the wisdom of the growing reliance on its use. At the administrative, legislative, and budgetary levels, spending through the tax system has drawbacks not shared by direct outlay mechanisms. And these drawbacks significantly encumber the efficient working of the fiscal process. Although some of these difficulties might be overcome, there seems to be little gain from trying; tax expenditures generally provide no substantive advantages over direct spending. In light of these considerations, policymakers would do well to shift emphasis away from using the tax system as a conduit for distributing Federal dollars.

¹⁶According to the Budget Act of 1974, outlays and revenues are subject to different budgeting procedures. Because they are considered revenue items in a legal sense, tax expenditures are treated as such for budgeting purposes despite their more appropriate substantive characterization as outlays. For a detailed description of the Congressional budget process, see Allen Schick, *Congress and Money* (Washington: The Urban Institute, 1980).

¹⁷The discussions of the Tax Reduction Act of 1976 in Allen Schick, *Congress and Money* and in Davenport, "Impact of the Congressional Budget Process" indicate the adverse consequences for the budget that the divided consideration of expenditures can have.



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SERVICES OF TOMORROW, TODAY

Forecasting With the Index of Leading Indicators

by Gary Gorton*

Henry: Yes, that's right.

John: Can you foretell the future?

Judging by how long they have been in use, leading indicators of economic activity must be considered a forecasting success. Even with the widespread development of econometric models, the use of leading indicators has continued and even flourished in popularity. Indeed, the announcements of such indicators are widely reported in the popular press. Such widespread acceptance and attention probably are explained by the appealingly simple logic of this forecasting approach: if the indicator goes one way today, economic activity will go the same way tomorrow.

Not only are leading indicators apparently

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easy to use, they are rather easy to construct. Unlike econometric modeling, the leading indicator approach to forecasting does not require assumptions about what causes people's economic behavior. Instead, it relies on statistically detecting patterns among economic variables which can be used to forecast turning points in economic activity.

Using the leading indicators is a simple means of accomplishing the difficult task of predicting the future. But does this approach pay high dividends? In particular, does it forecast turning points accurately? Is it reliable? Does it have any problems? In the main, is it worth using? The predictive abilities of the Index of Leading Indicators can be evaluated by examining its past performance and its method of construction. On balance, although it has certain weaknesses, the Index of Leading Indicators also has particular strengths that make it a useful tool for prediction.

THE NATIONAL BUREAU BUSINESS CYCLE CHRONOLOGY

Business cycles are recurring alternations of prosperity and recession. The first business cycle indicators were published in the 1920s by the Harvard Economic Service. Popular during the 1920s, these indicators were discontinued when they failed to predict the Great Depression.¹ During the sharp recession of 1937-38, Henry Morgenthau, Jr., the Secretary of the Treasury, asked the National Bureau of Economic Research to devise a system of indicators that would signal when the recession was nearing its end.² The National Bureau, under the leadership of Wesley C. Mitchell and Arthur F. Burns, had assembled and analyzed hundreds of economic time series since the 1920s. Based on this analysis, Mitchell and Burns selected a number of series which seemed to have been good predictors of past business upturns. The Treasury Department published the list in May 1938.

There have been numerous refinements and modifications of that original list. The Bureau has, by now, analyzed over 1,000 economic series. Today a wide variety of indicator data is published in a monthly *Business Conditions Digest* by the Bureau of Economic Analysis, a division of the Department of Commerce. The basic approach, however, is the one originally devised by the National Bureau.

In studying the business cycle, statistical techniques must be used to separate the cyclical component from other movements (such as seasonal and trend-related changes) in a particular economic series. Once the cyclical component of the series has been identified, the peaks and troughs can be picked out—sometimes easily, sometimes

with difficulty.³ The basic procedure for identifying a business cycle is to plot the cyclical component of each series against calendar time and then to inspect the movements of the series for common turning points. An historical plot shows that there are dates around which many of the series move downwards and other dates around which many of the series move upwards. The dates of these clusters of turning points are called reference dates, and the collection of reference dates is called the business cycle chronology. This chronology shows the peaks and troughs, when booms turn into recessions and recessions turn into upswings.

The cyclical components of different series don't all move in exactly the same way, but inferences about the business cycle pattern can be made by identifying clusters of turning points. If the turning points of many different series are bunched closely together, then the procedure will not likely go astray.⁴

Given the business cycle chronology, various economic series can be classified with respect to the reference dates. The cyclical components of some series almost always have peaks *before* the reference troughs. Such series are called *leading indicators*. In many cases the relation between a series and the cycle is easy to explain. Some series, such as housing starts, contracts for

³See Arthur F. Burns and Wesley C. Mitchell, *Measuring Business Cycles* (New York: National Bureau of Economic Research, 1946), Chapter 4, Section 1.

⁴Sometimes it is difficult to date a business cycle if the turning points of the individual series are widely scattered or if they are concentrated around two separate dates. The method of *visually* examining the plots of the series in search of turning points is somewhat arbitrary. Burns and Mitchell concede that there are problems with the notion of a reference date, writing: "If this concept is somewhat fuzzy, so must be our dating" (p. 95). They go on to say: "Neater results could be attained by estimating the cyclical turns of a quantity corresponding to some precise concept of aggregate economic activity. But . . . the existing records virtually rule out this course except for the most recent business cycles" (p. 95).

¹This early system of indicators, called the Harvard ABC curves, is described by Oskar Lange, *Introduction to Econometrics*, pp. 85-94.

²The National Bureau of Economic Research is a private, not-for-profit research group.

construction, and new orders for machinery and equipment, represent decisions made early in a lengthy investment process. For example, changes in actual production lag behind new orders because the orders must first be filled, and how soon they are filled depends on the volume of unfilled orders and on the state of inventories. Thus unfilled orders and order backlogs are leading indicators of production activity. Another example of a lead-lag relation is changes in the workweek and employment. Many employers find that it is cheaper to increase or decrease hours of work for existing employees than to hire or fire workers. Consequently, most manufacturers increase or decrease the workweek before they increase or decrease the level of employment. As a result, the workweek leads employment.

For most series, however, the relations are not so clear cut. Rather than analyze very complicated economic relations, the general strategy of the National Bureau procedure is to measure leads and lags against the common standard of the business cycle chronology. Using the chronology, individual series can be classified without assuming a theory of the business cycle. Consequently, the approach may be thought of as "measurement without theory," since it does not try to explain the behavior of each series but simply notes its relation to the chronology.⁵ The lack of explicit economic theory is considered a virtue by some economists, a vice by others (see *ECONOMETRIC MODELS AND THE INDEX OF LEADING INDICATORS* overleaf).

The National Bureau, recognizing that fluctuations in business activity typically are spread over a number of sectors in the economy, employs a variety of leading indicators.

⁵See Thomas J. Sargent and Christopher A. Sims, "Business Cycle Modeling Without Pretending To Have Too Much A Priori Economic Theory," in *New Methods in Business Cycle Research* (October 1977), Federal Reserve Bank of Minneapolis.

The individual components are weighted to reflect their relative importance as turning-point indicators, then added together to form a single Index of Leading Indicators. This composite index should consistently turn down (up) prior to business-cycle troughs (peaks) if the National Bureau approach is to be useful for prediction.

HOW WELL DOES THE INDEX PERFORM?

One frequently used measure of economic activity is the Federal Reserve Board Index of Industrial Production. Its turning points correspond closely to the business cycle reference dates.⁶ Because of this close coincidence, the forecasting performance of the Index of Leading Indicators can be tested by examining its ability to predict the Index of Industrial Production. There are two ways to evaluate the performance of the Index of Leading Indicators. One way is to look at its ability to predict business cycle turning points only. The other is to look at its ability to predict movements of economic activity at all points of the cycle.

The Turning Point Approach. The first method of evaluation accepts the National Bureau's emphasis on turning points. The Index of Leading Indicators is supposed to predict business cycle turning points, but how do we know when the Index is predicting a turning point? One common approach is to decide that an upturn (downturn) in economic

⁶The Index of Industrial Production put out by the Federal Reserve Board goes back to 1923. An older version goes back to 1919, and a still older version to 1913. Consequently, it could not be used by the National Bureau to construct the business cycle chronology for earlier periods. The forecasting performance of the Index of Leading Indicators is evaluated in this article for the post-World War II period, so the Index of Industrial Production is used instead of the reference dates. Another possibility is to use the Gross National Product. Construction of this measure, however, began in the 1920s. In addition, the GNP is only available on a quarterly basis, while the Index of Leading Indicators comes out monthly.

ECONOMETRIC MODELS AND THE INDEX OF LEADING INDICATORS

Both macroeconomic models and the Index of Leading Indicators are designed to forecast future economic activity. Econometric models are typically quarterly or annual models which can accommodate long-run and short-run forecasting as well as some policy simulation. The Index of Leading Indicators is very simple in comparison to large econometric models. The Index cannot be used for simulation, nor can it make long-range forecasts.

The Index of Leading Indicators, however, is an example of an approach to forecasting which represents a major alternative to econometric models. Construction of the Index does not rely on the type of *a priori* theory embodied in econometric models, though it does require choosing individual series and a method of combining them to construct an index. A main virtue of the Index of Leading Indicators is that it may detect statistical regularities which are missed by large scale econometric models precisely because the data are not subject to the type of restrictions imposed by such models.* Some of these restrictions, which are hypotheses about how people behave, may be mistaken. The Index of Leading Indicators also imposes restrictions on the data, in the form of the weights attached to the individual series in the Index. But the weights on the individual series are not derived from assumptions about people's economic behavior. Though it is not known for sure, the Index may contain different, and possibly more, information than econometric model forecasts.†

As with econometric models, however, it is not now known how the behavior of the Index is affected when the government makes major changes in policy. People's economic behavior changes when new policies come into existence, making econometric models which are based on people's previous behavior patterns inadequate for forecasting behavior under the new policies.‡ A policy change can also affect the way leading indicators are related to the underlying pattern of economic activity. How a policy change affects this relation cannot be known in advance, so the problem with the Index of Leading Indicators when policy changes is the same as with econometric models.

Economists do not agree on whether econometric models are inherently deficient or not, or on whether forecasting methods in the spirit of the National Bureau's approach represent a positive step forward in forecasting. In the face of this disagreement, the practical forecaster should use all available information; so a method which does not specify causal-economic relationships, like the Index of Leading Indicators, is worth using.

* For evidence that large scale econometric models fail to detect important statistical regularities see: J.P. Cooper and C.R. Nelson, "The *Ex Ante* Prediction Performance of the St. Louis and FRB-MIT-PENN Econometric Models and Some Results on Composite Predictors," *Journal of Money, Credit, and Banking* 7, 1 (February 1975), pp. 1-32; also, C.R. Nelson, "The Prediction Performance of the FRB-MIT-PENN Model of the U.S. Economy," *American Economic Review* 62, 5 (December 1972), pp. 902-917.

† For a discussion of the comparative performance of econometric models and time series, see: C.W.J. Granger and Paul Newbold, *Forecasting Economic Time Series* (New York: Academic Press, 1977), pp. 289-302; and R.L. Cooper, "The Predictive Performance of Quarterly Econometric Models of the United States," in *Econometric Models of Cyclical Behavior* (New York: Columbia University Press, 1972), edited by B.G. Hickman. Also, see Ray C. Fair, "An Analysis of the Accuracy of Four Macroeconomic Models," *Journal of Political Economy* 87, 4 (August 1979), pp. 701-718.

‡ Economists disagree on how important this problem is. See Richard W. Lang, "Using Econometric Models To Make Economic Policy: A Continuing Controversy," forthcoming in this Review. Also, Robert E. Lucas, "Econometric Policy Evaluation: A Critique," *The Phillips Curve and Labor Markets*, Carnegie-Rochester Conference on Public Policy (Supplement to the *Journal of Monetary Economics*, ed. by Karl Brunner and Allan H. Meltzer, 1976).

activity will occur if the Index has been above (below) its previous high (low) for a specified number of months. The problem is to decide how many months should be looked at before deciding that the Index is predicting an upturn or downturn.

Since movements in the Index of Leading Indicators are partly random, many upward or downward movements are reversed if we wait long enough. Suppose, for example, that the Index declines for two months in a row. If we adopt a two-months rule, we would conclude that the Index is predicting a downturn in economic activity. It could well be the case, though, that in the next month the Index will rise to a level above that of three months ago. Then under a three-months rule,

it would *not* predict a downturn.

There is an inherent arbitrariness to the number-of-months approach. It is not obvious how many months the Index of Leading Indicators must move in the same direction before a turning point in economic activity is predicted. Different rules for determining turning points in the Index of Leading Indicators result in different predictions about turning points in the Index of Industrial Production.

Using the one-month rule, the Index of Leading Indicators successfully predicts all ten turning points in the Index of Industrial Production during the period 1948-70 (Figure 1).⁷ This seems to be persuasive evidence of the predictive ability of the Index of Leading

FIGURE 1

**LEADING INDICATORS PREDICT
WITH DIFFERENT LEAD LENGTHS***

Performance of the Index of Leading Indicators, 1948-1970, Using the One-Month Rule

<u>Date of Turn in Index of Leading Indicators</u>		<u>Date of Turn in Index of Industrial Production</u>	<u>Lead Months</u>
	<u>Peaks</u>		
June 1948		July 1948	1
January 1953		July 1953	6
November 1956		February 1957	3
January 1960		January 1960	0
September 1969		July 1969	-2
		Average Lead	1.6
	<u>Troughs</u>		
May 1949		October 1949	5
November 1953		April 1954	5
February 1958		April 1958	5
December 1960		February 1961	2
May 1970		November 1970	6
		Average Lead	4.0

*Figure 1 summarizes the results of a study by Stekler and Schepsman which applied the one-month rule to leading indicators. The left hand column shows the turning points chosen in the Index of Leading Indicators. At these dates the Index predicted turning points in Industrial Production. The middle column shows the subsequent turning points in the Index of Industrial Production. The last column shows the lapse of time between the change in the Index of Leading Indicators and the actual turning point in Industrial Production.

SOURCE: H.O. Stekler and Martin Schepsman, "Forecasting With an Index of Leading Series," *Journal of the American Statistical Association* 68, 342 (June 1973), pp. 291-296.

Indicators. The Index produces a number of false signals, however, over the same period. That is, one-month changes appear in the Index of Leading Indicators which do not correspond to any subsequent turning point in the Index of Industrial Production. Under the one-month rule, over the period 1948-70, the Index of Leading Indicators predicted twenty-four peaks and nine troughs which did not happen (Figure 2).

At the other extreme, if we adopt a four-month rule or a five-month rule, we make fewer mistakes but the average lead declines. In general, the accuracy of the prediction from the Index of Leading Indicators increases as the number of months used for the rule increases. But while the accuracy of the prediction increases, the Index loses its ability

to give advance notice.⁸ Using a five-month rule, business cycle peaks are, on average, detectable two and one-half months after they have happened. Troughs, using the five-month rule, are identified, on average, just as they are happening. Thus there is a trade-off between the accuracy of the prediction of the Index of Leading Indicators and the length of time of advance notice. Further, the trade-off is not the same for peaks as for troughs. The Index of Leading Indicators predicts troughs more accurately than peaks under any month rule. Also, the length of the advance notice period quickly declines as the number of months increases when predicting peaks.

⁷H.O. Stekler and Martin Schepsman, "Forecasting With an Index of Leading Series," *Journal of the American Statistical Association* 68, 342 (June 1973), pp. 291-296.

⁸In a similar study by Hymans, the Index of Leading Indicators not only signaled false turns, but, for the period 1956-71, the Index did not signal half the peaks and 42 percent of the troughs which actually occurred. Hymans, roughly speaking, used a two-month rule. Saul H. Hymans, "On the Use of Leading Indicators to Predict Cyclical Turning Points," *Brookings Papers on Economic Activity* 1973, 2, pp. 339-384.

FIGURE 2
LEADING INDICATORS
SOMETIMES SIGNAL FALSE TURNS*
True and False Turns, 1948-1970

Criterion	Peaks			Troughs		
	Average Lead	Number of True Turns	Number of False Turns	Average Lead	Number of True Turns	Number of False Turns
1	1.6	5	24	4.0	5	9
2	0.6	5	15	3.0	5	3
3	-0.4	5	9	2.0	5	2
4	-1.4	5	5	1.0	5	1
5 or more	-2.4	5	3	0.0	5	0

*A negative number for "average lead" means that the Index is "predicting" turning points which have already happened.

SOURCE: H. O. Stekler and Martin Schepsman, "Forecasting With an Index of Leading Series," *Journal of the American Statistical Association* 68, 342 (June 1973), pp. 291-296.

Though the Index of Leading Indicators occasionally signals turning points in economic activity which do not occur, much of the time it is successful. Evaluated from the standpoint of the number-of-months approach, the Index does not always predict accurately, but at least it does not miss turns in the direction of economic activity. If the Index of Leading Indicators could be used to predict economic activity at all points in time, however, then the difficulties of choosing a months rule could be eliminated.

The Whole-Cycle Approach. A number of economists have used so-called time series methods to investigate the historic lead-lag relations between the Index of Leading Indicators and economic activity over *all* points in the cycle rather than just near turning points.⁹ These methods can identify certain movements in one series which are associated with movements in another series.¹⁰

The length of time it takes for a complete business cycle, up-down-up, is called its period. The National Bureau has found that business cycles average about three years

from peak to peak, for a period of thirty-six months. Studies of the relations between the business cycle and the Index of Leading Indicators should focus on cycles with periodicities close to those of the business cycle.

The cyclical behavior of an individual series can be represented by adding together many cycles of different periodicities. That is, any cyclical pattern can be approximated by adding together many waves with different periods (see REPRESENTING A SERIES BY CYCLES . . . overleaf). There is a statistical indicator that measures the correlation, or strength of association, between cycles of the same periodicity from any two series. This measure is called squared coherence.¹¹ The more closely related these movements are, the closer the squared coherence is to unity for each periodicity. If the movements of the two series are not related for a given periodicity, then the squared coherence is zero for that periodicity. Calculating the squared coherence for the whole range of periodicities yields a profile of the degree of association between two series.

Time-series tests of the relationship between the leading indicators and the business cycle also typically use industrial production as the basic measure of economic activity. At a periodicity of twenty-four months, the squared coherence between the Index of Leading Indicators and the Index of Industrial Production is .83, close to unity (Figure 3 overleaf). Furthermore, for two-year cycles the Index of Leading Indicators leads the Index of Industrial Production by about two months on average. Hence, for two-year cycles the predictive content of the Index of Leading Indicators is high; that is, the move-

⁹Hymans, "Leading Indicators;" M. Hatanaka, "Application of Cross-Spectral Analysis and Complex Demodulation: Business Cycle Indicators," in C.W.J. Granger, *Spectral Analysis of Economic Time Series* (Princeton: Princeton University Press, 1964); Alan J. Auerbach, "The Index of Leading Indicators: 'Measurement Without Theory,' Twenty-five Years Later," National Bureau of Economic Research, Working Paper No 761; Salih N. Neftci, "Lead-lag Relations, Exogeneity and Prediction of Economic Time Series," *Econometrica* 47, 1 (January 1979), pp. 101-113.

¹⁰A time series is a sequence of values usually recorded at equidistant time intervals. Examples are the monthly unemployment rate, the weekly money supply, the annual Gross National Product. Time series analysis is a statistical method which aims to make inferences about the basic features of the random process generating the series from the information contained in the observed series. This is done by constructing a model from the data, but it is a purely statistical model, not a model based on economic theory like econometric models. For an introduction to the subject, see C.W.J. Granger and Paul Newbold, *Forecasting Economic Time Series* (New York: Academic Press, 1977).

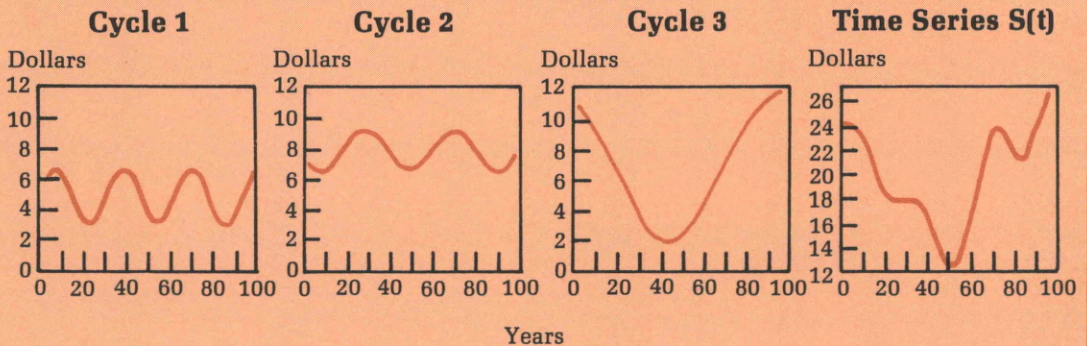
¹¹The squared coherence is analogous to an R^2 statistic in regression analysis. It shows the proportion of the variance in one series at frequency ω that is accounted for by variation in the other series.

ments in the two series at a periodicity of two years are very close. For cycles of 20 to 60 months the Index of Leading Indicators is also a good predictor. It has high squared coherences at these periodicities, and it

leads. But the lead length is highly variable depending on which periodicity dominates the cycle. The lead varies in length from seven and a half months (for cycles of 60 months) to less than two months (for cycles

REPRESENTING A SERIES BY CYCLES OF DIFFERENT PERIODICITIES

A time series is a sequence of observations of some economic variable recorded at equidistant time intervals. The weekly money supply and the monthly Index of Leading Indicators are examples of time series. Even though the observations are at discrete intervals (weeks, days, months, years), they can be regarded as coming from a continuous process. In the right-hand panel, the hypothetical time series, $S(t)$, is plotted as a continuous function, even though the observations are at intervals of years. $S(t)$ is measured in dollars in this hypothetical example.



The other three panels show three artificially generated component cycles of different periodicities. The time series, $S(t)$, is approximated by the strictly periodic cycles in the other panels.* Thus each of the three cycles has been chosen in such a way that, when they are added together at each year, the resulting series is very close to the series, $S(t)$. Some of the values plotted in the panels are:

Year	Cycle 1	Cycle 2	Cycle 3	S(t)
1	5.39734	7.00505	11.4135	23.8159
5	6.68294	6.54500	10.7285	23.9565
10	6.81859	6.68682	9.5775	23.0829
20	3.48640	8.63025	6.7081	18.8248
30	4.44117	9.40234	3.9407	17.7842
40	6.97872	7.56815	2.2420	16.7889
50	3.91196	6.53656	2.2054	12.6539

In this example, the three cycles have been chosen so that their values at each year exactly add up to the time series, $S(t)$. Actual time series can only be approximated.

* See Gwilym M. Jenkin and Donald G. Watts, *Spectral Analysis and its Applications* (San Francisco: Holden-Day, 1969), for an introduction to these approximation methods.

of 20 months).

The shortest peak-to-trough or trough-to-peak duration on record is six months, corresponding to a one-year cycle. So cycles with periods of less than one year are not of much practical interest when studying business cycles. This is fortunate, since the data indicate that leading indicators would perform quite poorly for short cycles. The time-series approach suggests that leading indicators work best for cycles with periods of two years or more.

When the Index of Leading Indicators is evaluated using the whole cycle approach, many of the same conclusions reached in the turning-point analysis hold up. The Index still can give false signals, and the lead time still varies. Thus, while there is some information about future economic activity in the Index, its signals are highly variable and therefore somewhat unreliable.

POSSIBLE PROBLEMS WITH THE INDEX OF LEADING INDICATORS

False signals and variable lead times appear whether the Index is evaluated by the turning point approach or by the whole cycle approach. If these problems could be eliminated, or at least minimized, the Index of Leading Indicators would be a more accurate predictor of future economic activity.

It could be that false signals and variable lead times are, at least partially, the result of the method used to construct the Index of Leading Indicators. Constructing the Index involves choosing the component series, then deciding how to weight each of them in importance in adding them together. Both of these steps are difficult, and they may be the source of some of the Index's undesirable features.

The Bureau of Economic Analysis, which produces the Index of Leading Indicators, chose the twelve component series of the Index and their weights after evaluating over 150 candidate leading series with respect to

FIGURE 3 THE INDEX OF LEADING INDICATORS IS A GOOD PREDICTOR FOR SOME CYCLES, NOT FOR OTHERS

Lead-Lag Relations Over the Whole Cycle
(1948-Mid-1972)

Periodicity (months)	Squared Coherence	Phase Lead (+) or Lag (-) of ILI* Relative to Index of Industrial Pro- duction (months)
60	0.85	7.6
40	0.92	4.3
30	0.93	2.8
24	0.83	2.3
20	0.54	1.5
12	0.46	-0.1
8	0.49	0.2
6	0.35	0.2
4.8	0.19	0.4
4	0.14	0.3
3.4	0.18	0.0
3	0.19	-0.2
2.7	0.11	0.0
2.4	0.10	0.0
2.2	0.16	-0.1
2	0.10	-0.1

*Index of Leading Indicators.

SOURCE: Saul H. Hymans, "On the Use of Leading Indicators to Predict Cyclical Turning Points," *Brookings Papers on Economic Activity* 1973, 2, pp. 339-384.

six criteria.¹² These criteria were: (1) economic significance; (2) statistical adequacy;

¹²The Index of Leading Indicators has recently been changed by the removal of one of the twelve series. The Index of Net Business Formation has been eliminated because of data collection problems. No new series replaced the Index of Net Business Formation. Instead,

(3) timing at turning points; (4) conformity to historical business cycles; (5) smoothness; (6) currency or availability of data. Candidate series were scored; that is, points were given to each series for each criterion, and then they were totaled. The twelve chosen had high scores but not necessarily the highest, since diversified coverage of economic activities was also desired. The weights are the scores (Figure 4).¹³

Choosing Series. A good leading indicator consistently leads business cycles by at least a few months, as evidenced by its having turning points just prior to the reference dates. But choosing series on this basis suggests a particular notion of causality based on the temporal ordering of the turning points. This notion of causality is a statistical one which is used in forecasting.¹⁴ An inference can be drawn about future economic activity when a turning point in the leading series is observed. When the leading series rises, it implies a rise in future economic activity. For the leading series to "cause" subsequent economic activity, forecasts using the leading series must be more accurate than forecasts which do not use the leading series. It is not enough that turning points in the leading series come before reference dates.

If the classification of economic series

the weights on the remaining eleven series were adjusted. Since the bankruptcy rate reached Depression levels during the current recession, the removal of the Index of Net Business Formation is not a trivial change and has, consequently, led to a minor controversy. See, for example, *Business Week*, July 26, 1982, p. 11.

¹³For a complete description of the criteria and the "scoring" procedure, see Victor Zarnowitz and Charlotte Boschan, "Cyclical Indicators: An Evaluation and New Leading Indexes," *Handbook of Cyclical Indicators* (May 1977), Bureau of Economic Analysis, U. S. Department of Commerce.

¹⁴See C. W. J. Granger, "Investigating Causal Relations by Econometric Models and Cross-Spectral Methods," *Econometrica* 37, 3 (1969); and Christopher A. Sims, "Money, Income, and Causality," *American Economic Review* 62, 4 (1972).

using the National Bureau turning point approach is valid, then forecasts of, say, the Index of Industrial Production should be more accurate when the leading indicators are used than when they are not used. After all, forecasts about future Industrial Production can be made from observing past and current values of the Index of Industrial Production alone. If forecasts of Industrial Production based on the leading indicators are more accurate than forecasts using only Industrial Production's own past history, then the leading indicators have been chosen in a useful way. The particular leading indicators which most improve forecasting accuracy would be the most useful ones.

The National Bureau's only criterion for leading indicators is that they consistently lead. But an indicator which consistently leads the Index of Industrial Production, for example, does not necessarily help predict the Index of Industrial Production any better than can be done by using only current and past values of the Index of Industrial Production. In other words, there may be no additional information in a leading indicator; the leading indicator may not "cause" the Index of Industrial Production.¹⁵

Using modern statistical techniques, the various leading series can be tested to see if they contain information which is really useful for predicting. Testing eleven of the twelve component series in this way reveals that six of the component series are not helpful in predicting the Index of Industrial Production when the individual series are adjusted to remove regular seasonal movements (Figure 5 overleaf). When the past history of Industrial Production is used to forecast its future value, taking account of these six leading series does not improve the forecast.

¹⁵Thomas Sargent gives some theoretical examples of this in his book *Macroeconomic Theory* (New York: Academic Press, 1979), pp. 247-248.

FIGURE 4
THE INDEX OF LEADING INDICATORS
INCLUDES TWELVE DATA SERIES
Component Series of the Index of Leading Indicators

BEA Series Number	Description of Series	Weight
1	Average workweek of production workers, manufacturing	.984
3	Layoff rate, manufacturing (inverted)	1.025
8	New orders, consumer goods and materials, 1972 dollars	1.065
12	Index of net business formation	.984
19	Index of stock prices (Standard and Poor)	1.079
20	Contracts and orders, plant and equipment, 1972 dollars	.971
29	Building permits, private housing	1.025
32	Vendor performance	.930
36	Change in inventories on hand and on order, 1972 dollars	.957
92	Percent change in sensitive prices (smoothed)	.971
104	Percent change in total liquid assets (smoothed)	1.011
105	Money supply (M1), 1972 dollars	1.065

SOURCE: *Handbook of Cyclical Indicators* (May 1977), U.S. Department of Commerce.

When nonseasonally adjusted data is used, only one component series is not helpful. These results suggest that it would be better not to seasonally adjust the data, contrary to the Commerce Department's current procedure. Also, other series which are not presently used as components of the Index of Leading Indicators have yet to be tested to see if they could improve the forecasting power of the Index of Leading Indicators.

Choosing Weights. Perhaps the unreliability of the Index of Leading Indicators could be reduced if the weights used to combine the twelve included series were chosen differently. The twelve series chosen represent a fairly diverse coverage of economic activity.¹⁶ The Index is for all practical purposes unweighted since the weights vary so little (from .930 to 1.079). In a statis-

tical sense, these weights were not chosen in the best way. That is, they were not estimated from the data, but rather were computed according to a more or less subjective scoring procedure.

When the weights to be used in constructing the Index are statistically estimated they do not resemble those currently used in the Index. Indeed, some of the statistically estimated weights turn out to be negative. Moreover, one researcher found that estimating the weights over different sample periods indicated that the relations between the component series of the Index and the underlying business cycle pattern were not stable, since different weights for the Index were chosen for each sample.¹⁷ This finding suggests that

¹⁶The indices of lagging and coincident indicators are also described in the *Handbook of Cyclical Indicators*.

¹⁷Alan J. Auerbach, "The Index of Leading Indicators; Measurement Without Theory," Twenty-five Years Later," National Bureau of Economic Research, Working Paper No. 761.

FIGURE 5
NOT ALL SERIES ARE HELPFUL PREDICTORS

Component Series of the Index of Leading Indicators	Seasonally Adjusted Data	Nonseasonally Adjusted Data
Average workweek of production workers, manufacturing		
Layoff rate, manufacturing (inverted)		
New orders, consumer goods and materials, 1972 dollars		
Index of net business formation	not helpful in prediction	
Index of stock prices (Standard and Poor)	not helpful in prediction	
Contracts and orders, plant and equipment, 1972 dollars		
Building permits, private housing	not helpful in prediction	
Vendor performance		
Change in inventories on hand and on order, 1972 dollars	not helpful in prediction	not helpful in prediction
Percent change in sensitive prices (smoothed)	not helpful in prediction	
Percent change in total liquid assets (smoothed)	(not tested)	(not tested)
Money supply (M1), 1972 dollars	not helpful in prediction	

SOURCE: Salih N. Neftci, "Lead-Lag Relations, Exogeneity and Prediction of Economic Time Series," *Econometrica* 47, 1 (January 1979), pp. 101-113.

the relations between the individual series used to construct the Index and the underlying pattern of economic activity change over time.

When the weights are estimated over one sample period and the Index so constructed is employed to forecast over another sample period, however, the results are poor com-

pared to the Bureau of Economic Analysis Index with equal weights. Even though the weights chosen by the Bureau of Economic Analysis don't seem to be the best in a statistical sense, no obviously superior set of weights has yet been found.

Consideration of how the component series and the weights for the Index of Leading

Indicators are chosen reveals some problems and puzzles, but not necessarily solutions and answers. Not all the component series really improve the forecasts when compared to forecasting with only the past history of Industrial Production. But this is only a problem when seasonally adjusted data is used. The weights, seemingly not chosen in the best way, haven't been improved on. Only more research can resolve these issues. On balance, the most important problem with the Index of Leading Indicators seems to be that it uses seasonally adjusted data.¹⁸ But no index has yet been constructed with non-seasonally adjusted data.

WHERE DOES ALL THIS LEAD?

The Index of Leading Indicators, like other forecasting methods, has its drawbacks. The most important of these is its tendency to signal turning points falsely. Another problem

¹⁸The government's method of deseasonalizing data has been criticized before. See, for example, W.S. Cleveland and G.C. Tiao, "Decomposition of Seasonal Time Series: A Model for the Census X-11 Program," *Journal of the American Statistical Association* 71 (1976), pp. 581-587.

is unreliable lead times. It would be easy to conclude that the difficulties with the Index are so serious that it should be discarded. But that would be too hasty. Good forecasters use a variety of techniques and information. The Index of Leading Indicators does forecast turning points, and it has a strong record when evaluated by the whole cycle approach. The Index is a useful summary of the outlook for the aggregate economy since it combines a great deal of information about diverse activities. Moreover, it's free.

While the Index of Leading Indicators has some problems, the general approach has proven useful. No new, improved, index is yet available, but progress in the spirit of the National Bureau's "measurement without theory" approach is being made toward indices with improved predictive abilities.¹⁹

¹⁹An example of such current work is Robert B. Litterman, "A Use of Index Models in Macroeconomic Forecasting," Federal Reserve Bank of Minneapolis, Staff Report 78. Also Stephen Beveridge and Charles R. Nelson, "A New Approach to Decomposition of Economic Time Series with Attention to Measurement of the 'Business Cycle'," *Journal of Monetary Economics* 7 (1981), pp. 151-174.

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