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Chapter Author: Wilfred Lewis, Jr.

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# The Federal Sector in National Income Models

WILFRED LEWIS, JR.

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## *Introduction*

THE federal budget and the economy interact at many points, with the level of economic activity determining receipts and certain expenditures and being influenced in turn by tax rates and government outlays. This paper attempts to specify some of these interrelationships in the hope of increasing, if only slightly, the precision with which the government sector can be handled in long-term and short-term economic models.

The usual practice is to place a substantial portion of the federal sector in a box called "exogenous." This is as it should be. However much the economic scientist feigns a disinterest in mundane reality, there is usually at the root of his inquiries at least an indirect interest in normative public economic policy. So even if the political scientists offered models in which government behavior was completely determinate, I submit that the economist would decline them. And, of course, there have been few offers of this sort. More than one model-builder has been mildly shocked to find that the government itself does not always know how much it is going to spend within a fairly wide margin of error only a short period ahead.

Having stated the impossibility as well as the undesirability of specifying public sector behavior, I now attempt to make this sector perhaps a little more manageable for the model-builder. In some cases, reasonable quantitative estimates of parameters are possible. In others, identifying if not measuring the parameters may suggest rough limits on the range of permissible values. Finally, certain problem areas are mentioned, where I think further research would pay dividends in pinning down important interrelationships between the federal sector and the rest of the economy.

NOTE: The author was on the staff of the United States Bureau of the Budget when this paper was prepared. However, there is obviously no expressed or implied official endorsement of any of its contents. He is indebted for the perceptive comments of Samuel M. Cohn and Edward F. Denison.

## FEDERAL SECTOR IN NATIONAL INCOME MODELS

### *Long-Range Projections for the Federal Sector*

#### FEDERAL REVENUES UNDER CONDITIONS OF STABLE GROWTH AND CONSTANT RATES

A long-run projection of revenues for the federal government conveniently starts from a calculation of yields under existing rates for most taxes, modified in the case of social security payroll taxes, where rate increases are built in under existing law. Subsequently, the effects of additional rate changes can be fed in according to the policy assumptions made or in conjunction with a projection of expenditures.

A yield calculation based on existing rates may appear, on the surface, a rather mechanical exercise, but in practice there is some margin for error. This is particularly the case when both the tax revenues and tax base one is trying to relate are on a national income account basis—presumably the usual situation in economic model-building. Both the base and the tax in national income terms differ conceptually from their counterparts in the tax code. The corporation income tax is an outstanding example.

#### *Corporation Income Tax*

On the assumptions that present tax rates are continued, and that profits on the national income definition have been determined elsewhere in the model, what is the best procedure for estimating federal corporate profits tax liability?<sup>1</sup> The ratio of corporate profits tax to corporate profits could be affected by any of the following:<sup>2</sup>

1. Secular drift in the ratio to profits of any of the items which are included in taxable profits but excluded from national income profits, such as intercorporate dividends, capital gains, or profits of mutual financial intermediaries
2. Secular drift in the ratio to profits of items excluded from taxable profits but included in national income profits, such as depletion, state corporate income taxes, profits of Federal Reserve banks, or tax-exempt interest

<sup>1</sup> Although five points of the corporate tax are scheduled to expire at the end of this fiscal year, this has been the case each year since 1954, and each year the rates have been extended for another year.

<sup>2</sup> A detailed reconciliation of national income profits and the profits tax and their *Statistics of Income* counterparts is given in one of the supplementary tables to the national income accounts, e.g., *U.S. Income and Output*, Department of Commerce; Table VII-19, p. 230.

## FEDERAL SECTOR IN NATIONAL INCOME MODELS

3. Secular drift in the ratio to profits of items taxed at special rates, such as Western Hemisphere trade corporations or corporations choosing the partnership option under the small-business liberalization enacted in 1958
4. Secular drift in the ratio of losses to aggregate profits, since the effects on tax liability of losses and profits are not symmetrical
5. Secular drift in the proportion of profits accruing to corporations with net profits of \$25,000 or less, because of the rudimentary progressivity in the tax structure

It is doubtful that many, if any, of these reconciliation items would appear among the list of variables in a model of manageable size. How much precision is lost by ignoring some or all of them?

Table 1 shows profits and taxes on the two bases over a ten-year period. The bottom part of this table decomposes the ratios of national income profits to *Statistics of Income* profits, of taxes to profits on a national income basis, and of national income taxes to *Statistics of Income* taxes.

Aside from the recession years of 1954 and 1958, the *Statistics of Income* ratio of taxes to profits ( $T_R/R$ ) has remained between 48.5 per cent and 49 per cent since the current rates went into effect in 1952. With recession years again omitted in order to approximate conditions of stable growth, the ratio of *Statistics of Income* profits to national income profits ( $R/C$ ) also shows no particular trend. Thus changes in the reconciliation items, averaged over the cycle, are negligible in size or else cancel out against others. However, there is one item for which this is not the case. The major factor in the decline of national income tax relative to *Statistics of Income* tax ( $T_C/T_R$ ) is for credits against United States liability for foreign taxes paid by foreign branches of United States corporations. These credits, which quadrupled in the period 1948-57 (from \$278 million to \$1,053 million) while total profits were increasing about a third, are included in liabilities reported in *Statistics of Income* but excluded from the tax on a national income basis. In consequence, the profits elasticity of tax on a national income basis under conditions of stable growth may be as low as 0.91 or 0.92 if foreign taxes paid by United States corporations continue to grow faster than United States taxes. This compares with the approximately unit elasticity of taxes on a *Statistics of Income* liability basis.

# FEDERAL SECTOR IN NATIONAL INCOME MODELS

TABLE 1

CORPORATE PROFITS AND PROFITS TAX, NATIONAL INCOME BASIS  
COMPARED TO STATISTICS OF INCOME, 1948-58  
(dollars in millions)

	$T_C$ Federal Corporate Income Tax Liability, National Income Basis <sup>a</sup>	$T_R$ Federal Corporate Income Tax, <i>Statistics</i> of Income <sup>b</sup>	$R$ Taxable Corporate Income, <i>Statistics</i> of Income <sup>c</sup>	$C$ Corporate Profits Before Tax, National Income Basis <sup>d</sup>
1948	\$11,813	\$11,920	\$32,772	\$33,000
1949	9,773	9,817	27,093	26,370
1950	15,711	15,929	40,032	40,628
1951	19,110	19,623	41,150	42,153
1952	17,088	17,597	36,090	36,691
1953	17,806	18,256	37,261	38,311
1954	16,417	16,823	34,859	34,061
1955	20,869	21,741	44,663	44,862
1956	20,195	21,364	44,124	44,683
1957	19,916	20,582	42,369	43,208
1958	17,657	18,814	39,612	37,410
	$\frac{T_C}{C}$	$\frac{T_R}{T_R}$	$\times \frac{T_R}{R}$	$\times \frac{R}{C}$
1948	•	.9910	•	0.9931
1949	•	.9955	•	1.0274
1950	•	.9863	•	0.9853
1951	•	.9740	•	0.9762
1952	.4657	.9711	.4876	0.9836
1953	.4648	.9754	.4900	0.9726
1954	.4820	.9759	.4826	1.0234
1955	.4652	.9599	.4868	0.9956
1956	.4520	.9453	.4842	0.9875
1957	.4609	.9676	.4858	0.9806
1958	.4720	.9385	.4750	1.0589

<sup>a</sup> *Survey of Current Business* and *U.S. Income and Output*, Department of Commerce. Excludes excess profits tax (*Statistics of Income*, Internal Revenue Service) for 1950-54

<sup>b</sup> *Statistics of Income*. Excludes excess profits tax for 1950-54.

<sup>c</sup> Net income, returns with net income, from *Statistics of Income*, less following items (from *Statistics of Income* or Treasury Department): Net operating loss deduction; net income as reported on small business returns (Form 1120-s); 85 per cent of domestic dividends; special credits, life insurance companies; and special credits, Western Hemisphere Trade Corporations.

<sup>d</sup> *Survey of Current Business* and *U.S. Income and Output*.

<sup>e</sup> Tax rates differed from those presently in effect.

## FEDERAL SECTOR IN NATIONAL INCOME MODELS

### *Individual Income Taxes*

As with the corporation income tax, there are a number of differences between the tax base established in the revenue code and its personal income counterpart in the national income accounts. Differences include both taxable nonincome, such as capital gains, and nontaxable income, such as transfer payments. Progressive rates might also be expected to affect the trend in yields.

Table 2, bottom, records the two components of the trend in taxes as a percentage of personal income. Actual yields have been adjusted for the different rates in effect prior to 1954 to obtain a longer perspective.

Contrary to what might be expected under a system of progressive rates, there is no discernible trend in the ratio of taxes to taxable income. The ratio of taxable to total personal income does, however, rise substantially. It can be shown, although I have not included the data here, that this growth is due to the increasing proportion of personal income in the total of incomes reported in taxable returns, rather than to the other reconciliation items. This confirms that exemptions, rather than progressive rates, are the major source of income sensitivity of the individual income tax.

The combined effects of stable yields relative to taxable income and of growing taxable income relative to total personal income has been a personal income elasticity of taxes at unchanged rates, measured for comparable stages of the cycle in order to approximate stable growth conditions, of 1.25 or more. A faster rate of growth of per capita income than in the period from which this estimate is drawn would mean a still higher elasticity, since exemptions per taxpayer (with no change in law) can reasonably be assumed more or less constant.

### *Excise Taxes*

Table 3 records federal indirect business tax accruals (mainly excises) adjusted for the estimated effects of tax rate changes. It appears that federal indirect business taxes have had a GNP elasticity of slightly more than 0.8 in the period since 1952, aside from changes in rates. This may understate the GNP elasticity for purposes of a stable growth model, since GNP in recent years has been below potential; and there is a relatively high marginal response of the automobile excise tax to cyclical changes in GNP. On the other

# FEDERAL SECTOR IN NATIONAL INCOME MODELS

TABLE 2

INDIVIDUAL INCOME TAX, TAXABLE INCOME, AND PERSONAL INCOME, 1948-53  
(dollars in billions)

<i>Individual Income Tax</i>						
Tax Rate Adjustment Factors				<i>TI</i>	<i>Y</i>	
Unadjusted <sup>a</sup>	(1959 Rates = 100) <sup>b</sup>	<i>T</i> (Adjusted)		<i>Taxable Income</i> <sup>a</sup>	<i>Personal Income</i> <sup>d</sup>	
1948	15.44	85.5	18.06	74.7	210.4	
1949	14.54	85.5	17.00	71.6	208.3	
1950	18.38	89.6	20.51	84.3	228.5	
1951	24.23	105.1	23.05	99.4	256.7	
1952	27.80	114.3	24.32	107.5	273.1	
1953	29.43	114.3	25.75	115.7	288.3	
1954	26.67	100.0	26.67	115.3	289.8	
1955	29.61	100.0	29.61	128.0	310.2	
1956	32.73	100.0	32.73	141.5	332.9	
1957	34.39	100.0	34.39	149.4	351.4	
1958	34.34	100.0	34.34	149.3	360.3	
1959p	38.90	100.0	38.90	167.2	383.3	
		$\frac{T}{Y}$	=	$\frac{T}{TI}$	×	$\frac{TI}{Y}$
1948		.0858		.242		.355
1949		.0816		.237		.344
1950		.0898		.243		.369
1951		.0898		.232		.382
1952		.0891		.226		.394
1953		.0893		.223		.401
1954		.0920		.231		.398
1955		.0955		.231		.413
1956		.0983		.231		.425
1957		.0979		.230		.425
1958		.0953		.230		.414
1959p		.1015		.233		.436

p = preliminary.

<sup>a</sup> *Statistics of Income*, Internal Revenue Service.

<sup>b</sup> First-bracket rate, current year, divided by first-bracket rate, 1959, times 1.03 (for years prior to 1954) for approximate effect of reduction in liabilities in Revenue Code of 1954.

<sup>c</sup> Joseph A. Pechman, "What Would a Comprehensive Income Tax Yield?" *Tax Revision Compendium*, Committee on Ways and Means, 86th Cong., 1st sess., 1959, I, 257; and *Statistics of Income*.

<sup>d</sup> Department of Commerce.

# FEDERAL SECTOR IN NATIONAL INCOME MODELS

TABLE 3  
FEDERAL INDIRECT BUSINESS TAXES, 1952-60  
(billions of dollars)

Calendar Year	Actual <sup>a</sup>	At Constant 1960 Tax Rates <sup>b</sup>	Adjusted Tax as Percentage of GNP
1952	10.52	10.18	2.93
1953	11.19	10.83	2.96
1954	10.06	10.46	2.88
1955	11.04	11.65	2.93
1956	11.60	11.94	2.84
1957	12.21	12.28	2.77
1958	11.88	12.22	2.75
1959	13.04	13.48	2.79
1960	14.00	14.00	2.77

<sup>a</sup> Department of Commerce.

<sup>b</sup> Adjusted for the estimated revenue effects of: (1) the 1954 Excise Tax Reduction Act; (2) the increase in gasoline and highway-user tax rates in 1956 and 1959; and (3) the repeal of the excise tax on passenger transportation in 1958.

hand, tobacco and alcohol, for which income elasticity is probably below unity, account for about half of federal excise taxes. On balance, the GNP elasticity for the system of federal excises under conditions of stable growth and unchanged rates may be taken to be about 0.85.

## *Contributions for Social Insurance*

A calculation of the long-run income elasticity of federal contributions for social insurance—mainly the payroll taxes to finance old age, survivors, and disability insurance—runs into a number of obstacles. Actual data for past years is clouded by changes in coverage, tax rates, and limits on taxable wages, all of which affect the income elasticity of taxes. For related reasons, a projection based only on current rates would be of little use.

For federal employment taxes, unlike other taxes, specific changes in rates already scheduled in the present law are highly likely, and should therefore be put into a projection. The proper treatment of the limit on taxable wages, for which no changes are scheduled under the present law, is less certain.

For given coverage and tax rates, a limit on taxable wages implies an income elasticity of yield of less than unity and a declining elasticity with the passage of time as the mean of the frequency distribution of wages by size in covered industries rises relative to the limit.



# FEDERAL SECTOR IN NATIONAL INCOME MODELS

TABLE 4  
CONTRIBUTIONS FOR FEDERAL OLD-AGE, SURVIVORS,  
AND DISABILITY INSURANCE, 1951-60

	Limit on Annual Taxable Wages	Actual Contributions (billions) <sup>a</sup>	Combined Payroll Tax Rates	Contributions Adjusted to Tax Rates in First Year of Each Wage Limit (billions)	Adjusted as Per Cent of Total Wages and Salaries
1951	\$3,600	\$3.32	3.0%	\$3.32	1.94%
1952	3,600	3.76	3.0	3.76	2.03
1953	3,600	3.98	3.0	3.98	2.01
1954	3,600	5.14	4.0	3.85	1.96
1955	4,200	5.95	4.0	5.95	2.82
1956	4,200	6.55	4.0	6.55	2.88
1957	4,200	7.87	4.5	6.99	2.93
1958	4,200	7.90	4.5	7.02	2.93
1959	4,800	9.74	5.0	9.74	3.77
1960	4,800	12.05	6.0	10.04	3.70

<sup>a</sup> Department of Commerce.

Table 4 shows, by subperiods in which the taxable wage limit was constant, accrued taxes adjusted for rate changes (but not for coverage). Over each of the two four-year intervals—1951-54 and 1955-58—the elasticity of taxes at constant rates relative to total wages and salaries appears equal to or even slightly greater than unity. This probably reflects the influence of periodic legislative extensions of coverage under the system. Coverage has now reached such high percentages of the labor force that future extensions will perforce be nil or at most at a much slower pace than in the past. On the other hand, the limit has in the past been lifted by legislation at fairly regular intervals. It can probably be safely assumed that this practice will continue with rising productivity and average income. All things considered, an elasticity of yield of approximately unity (aside from rate changes) seems reasonable. To this one would add the effects of scheduled increases in tax rates.

OASDI actuaries duck the problem of a limit on taxable wages in both their benefit and tax calculations by assuming constant average wages in covered employment (contrary to all past experience). From the standpoint of actuarial soundness of the insurance system, this is roughly equivalent to assuming periodic changes to increase

## FEDERAL SECTOR IN NATIONAL INCOME MODELS

the limit on taxable wages to keep pace with rising productivity and wage rates.

### TOTAL RECEIPTS

The long-run behavior of federal revenues obviously hinges on the distribution of income shares between corporations and individuals. There is the argument, of course, that the profits share in GNP can be expected to continue declining, as it has apparently been doing over the last decade or so. Because of the high marginal federal tax return from the profits share, such a tendency would reduce the GNP elasticity of the over-all federal revenue system. In passing, however, a counterargument can be noted, which holds that the apparent decline in the profits share is related to the operation of the economy below potential in recent years, and this trend would not occur under conditions of stable growth at unchanged rates of factor utilizations. A continuation of the recent growth in capital consumption allowances, relative to GNP, would also reduce the GNP elasticity of taxable incomes and taxes. Again, however, this may be a phenomenon related to the below-potential operation of the economy. In any event, an analysis of income shares is outside the scope of this paper, and I am content to let this be determined elsewhere in the model.

Table 5 gives an illustrative ten-year projection of federal receipts based on the elasticities discussed above, assuming a 5 and one-quarter per cent annual growth rate in money GNP and assuming that the major income shares—profits, wages and salaries, and total personal income—all move proportionately to GNP. A minor redistribution of relative income shares would not alter the basic conclusions suggested by Table 5, nor are these conclusions seriously affected by my use of actual 1960 receipts as a base rather than a hypothetical high-employment estimate. I have also chosen to ignore in this illustration two relatively minor changes in tax rates—the temporary doubling of the federal portion of the unemployment payroll taxes for two years starting January 1, 1962, and the approximately \$150 million increase in highway user taxes on July 1, 1961.

The important points are that the tendency of individual income taxes to rise a good deal faster than personal income, and the increases in OASDI payroll taxes already scheduled in the present law, more than outweigh the effect of less than unit elasticities of the federal excise system and corporation income tax accruals. The GNP

# FEDERAL SECTOR IN NATIONAL INCOME MODELS

TABLE 5

ILLUSTRATIVE TEN-YEAR PROJECTION OF FEDERAL RECEIPTS,<sup>a</sup> 1960 AND 1970  
(national income account basis, billions of dollars)

	Calendar 1960 (actual)	Calendar 1970 (projected)
Gross national product	504.4	841.4
Federal receipts		
Corporation income taxes	21.2	33.6 <sup>b</sup>
Personal taxes	43.2	81.5 <sup>c</sup>
Indirect business taxes	14.0	21.7 <sup>d</sup>
Contributions for social insurance:		
OASDI	12.0	31.0 <sup>e</sup>
Other	5.6	9.4 <sup>f</sup>
Total receipts	96.0	177.2
Total receipts as per cent of GNP	19.0%	21.1%

<sup>a</sup> Assuming 3.5 per cent per year real growth in *GNP*, a 1.75 per cent increase per year in the *GNP* deflator, and unit *GNP* elasticity of corporate profits, personal income, and wages and salaries.

<sup>b</sup> Profits elasticity of tax of 0.92.

<sup>c</sup> Personal income elasticity of tax of 1.25.

<sup>d</sup> *GNP* elasticity of tax of 0.85.

<sup>e</sup> Wages and salaries elasticity of tax of 1.0, plus increases scheduled in present law in combined rate on employers and employees, from 6 per cent in 1960 to 9.25 per cent by 1970.

<sup>f</sup> Wages and salaries elasticity of tax of 1.0.

elasticity of the total system under these assumptions works out to be on the order of over 1.2. Expressed differently, assuming stable growth, constant income shares, and present tax rates (plus the scheduled OASDI increases), federal revenues would rise from 19 per cent of *GNP* in 1960 to 21 per cent in 1970.

I hope it is clear that I am forecasting neither 5 and one-quarter per cent growth nor unchanged unemployment ratios. The purpose of this projection is to bring out certain features of the federal revenue system—particularly its potentially high *GNP* elasticity—not to forecast revenues. For forecasting, tax receipts have to be solved for simultaneously with the values for their respective bases. These obviously depend not only on private income-spending relationships, but on the level of federal spending as well.

## FEDERAL SECTOR IN NATIONAL INCOME MODELS

### LONG-RANGE PROJECTIONS OF FEDERAL SPENDING

Long-run projections of federal spending are usually done in terms of ranges or alternatives, such as "high," "low," and "medium." The very wide margin allowed for possible error in the form of a difference between the "high" and the "low," typically amounting to several percentage points of the gross national product, has limited the usefulness of some of these projections. In what follows, it will be argued that the usual projections of total federal spending are too timid in this respect—it is possible to forecast with some confidence within a smaller range than is usually done.

The model-builder attempting a long-range projection of government spending is faced with several decisions right at the outset.

In dealing with the public sector, the model-builder should be as explicit as Otto Eckstein was in stating whether he is prescribing what he thinks ought to be or whether he is forecasting what the political process is likely to produce.<sup>3</sup> Although exercises of both types are useful, ambiguous ones are not. While intending no slight to projections of the prescription type, provided they are clearly labeled as such, my following remarks are addressed to the forecast variety.

With defense outlays accounting for half or more of the federal budget, and with nonzero probabilities for both general war on the one hand and disarmament on the other, some explicit assumption about international politics is required. One approach is to make alternative projections based, say, on war, cold war, and disarmament.<sup>4</sup>

Since these probably imply profound differences all through the economy, including the level of nondefense as well as defense spending, the mix of total output and the resultant value per man-hour of input, as well as profit rates in the private economy and the size of the labor force, this approach logically calls for a corresponding number of complete economic models.

Either because there is far less material with which to construct a

<sup>3</sup> Otto Eckstein, *Trends in Public Expenditures in the Next Decade*, Committee for Economic Development, April 1959, p. 14.

<sup>4</sup> For example, the ten-year projection of federal budget trends published by the Bureau of the Budget in January 1961 included, in addition to "high," "low," and "medium" projections, which were based broadly on "no marked change in the international situation," a fourth alternative based on the possibility of controlled disarmament.

## FEDERAL SECTOR IN NATIONAL INCOME MODELS

confident projection of expenditure trends under the general war or disarmament alternatives, or because the forecaster assigns relatively low probabilities to these two alternatives, most projections are based broadly on a continuation of international tension as it has prevailed for most of the years since World War II. Within this broad assumption, however, there would appear ample residual uncertainty in the defense-spending area. That fluctuations in the level of defense spending can be caused by Berlin crises, sputniks, and intervening periods of lesser tension has been amply demonstrated. This uncertainty is typically handled by making a "high," a "low," and a "medium" defense projection sometimes embracing a quantitatively very wide range (e.g., Table 6).

TABLE 6  
SELECTED TEN-YEAR PROJECTIONS OF FEDERAL DEFENSE SPENDING,  
TO 1968, 1970, AND 1971

Projector	Defense Concept Used	Year Projected	Range from "Low" to "High" Projections (billions)
Otto Eckstein <sup>a</sup>	Dept. of Defense, military functions	1968	\$15
Bureau of the Budget <sup>b</sup>	Major national security <sup>c</sup>	1970	10
National Planning Association <sup>d</sup>	National security <sup>e</sup>	1971	57

<sup>a</sup> Otto Eckstein, *Trends in Public Expenditures in the Next Decade*, Committee for Economic Development, 1959. Both the high and low projections assume that disarmament is excluded and that the world situation will not change in a fundamental way.

<sup>b</sup> *Ten-Year Projection of Federal Budget Expenditures*, Bureau of the Budget, 1961. Both high and low assume no important changes in international conditions.

<sup>c</sup> Department of Defense, military functions, plus military assistance, atomic energy, stockpiling, and defense production expansion.

<sup>d</sup> National Planning Association, 1961 Projection Series. Low assumes a substantial easing of international tensions. High assumes the international situation requires a greatly enlarged program for armaments or civil defense. However, neither disarmament nor war is apparently assumed.

<sup>e</sup> Major national security plus space and civil defense.

A similar dilemma confronts the forecaster in the area of non-defense spending. If a forecast rather than a prescription is desired, the model-builder cannot just total up the "needs" for public spending, but must make a judgment as to what balance Congress and the Executive will strike between the pressures for particular program increases and the pressures for minimizing various tax burdens. He

also has to judge what resolution will be made of the sometimes conflicting advice on the proper size of the budget surplus at various stages of the business cycle.

I do not want to minimize the forecaster's problem in sorting through these various uncertainties. But the usual projection allows a larger margin for contingencies than I think is really necessary. At this point, I will simply state those aspects of the usual forecast that give rise to unnecessary imprecision. Subsequently, I will present some historical evidence that argues for a modification of the usual approach.

Almost all the long-range projections I have seen begin by decomposing the federal budget into major functions or program areas, such as defense, agriculture, health, veterans, transportation, etc., and then making for each portion a high, a low, and a medium projection. The high projection for the total budget is then taken as the sum of the individual program highs, etc. However, there is good reason to believe that the pieces so projected are nonadditive. Certainly the high and the low projections are not properly constructed by addition, and perhaps the medium is not as well.

Another mistake, in my opinion, is a tendency to exaggerate the flexibility in the size of the budget available from slight alternation in the political complexion of the legislative and executive branches.

Peacock and Wiseman<sup>5</sup> for the United Kingdom and Kendrick<sup>6</sup> and Cohn<sup>7</sup> for the United States have given very similar descriptions of the growth in central government expenditures. Noting a long-run tendency for such outlays to grow faster than population and prices, all three studies have stressed the unevenness of this growth process. Peacock and Wiseman have put forward an interesting thesis to account for the pattern of alternating increase and stability in government expenditures in democratic societies. The basic propositions in this thesis are that (1) expenditures tend to be broadly conditioned by revenue availability; and (2) unless society is subjected to unusually violent pressures or disturbances, people's ideas about the "tolerable" burden of taxes tend to be fairly stable. A social disturbance, such as war, destroys established conceptions and has a

<sup>5</sup> Alan T. Peacock and Jack Wiseman, *The Growth of Public Expenditures in Great Britain*, Princeton for NBER, 1961.

<sup>6</sup> M. Slade Kendrick, *A Century and a Half of Federal Expenditures*, New York, NBER, 1955.

<sup>7</sup> Samuel M. Cohn, "Economic Policy and the Federal Budget," *Federal Accountant*, September 1959.

lasting impact on expenditures, which Peacock and Wiseman call the "displacement" effect. In the absence of upheaval, differences of opinion about the desirable amount of taxation and expenditure, and the conflict between efficiency through scale economies on the one hand and local autonomy on the other, get resolved in favor of the *status quo*. Any rise in spending during such periods tends to be at rather unspectacular rates.

Major wars are particularly cited not only as leaving a legacy of veterans' pensions and interest on the public debt, but also as changing the notion of the tolerable level of taxation. In theory, Peacock and Wiseman point out, displacements can be negative as well as positive and could be associated not only with wars but with periods of runaway inflation, extraordinary unemployment, or cold war defense outlays. In fact, however, World Wars I and II have been the major displacements in British experience.

In United States experience, major wars—the War of 1812, the Civil War, and the First and Second World Wars—have clearly operated as "displacements" in the sense that Peacock and Wiseman use the term (Table 7). Each of these wars operated to lift the level of spending in the postwar period not only for war-related outlays such as public debt, interest, and veterans' benefits but for civil outlays as well. The Great Depression was also a "displacement" in United States experience, giving rise to a gradual increase in federal cash payments from 2.8 per cent of gross national product in 1929 to 10 per cent in 1940. Displacement effects of smaller wars have generally been less significant. The Korean War was an exception in this respect, leaving a heritage of military outlays substantially higher than prewar. The Mexican War was a minor, but permanent, type of displacement; the Spanish-American War, temporary as well as minor.

In the last century and the first part of this, expenditures in the periods between major displacements probably rose little if any more than could be accounted for by increases in population and prices, and probably less rapidly than the gross national product. Since World War II, however, spending in periods between displacements has risen somewhat faster than the gross national product. A greater income elasticity of the revenue system may well account for this difference.

Long-range forecasts of federal expenditures (e.g., Table 8) are frequently made conditional on the political complexion of the ex-

# FEDERAL SECTOR IN NATIONAL INCOME MODELS

TABLE 7

DISPLACEMENT EFFECT OF MAJOR WARS ON THE LEVEL OF FEDERAL SPENDING,  
WAR OF 1812-WORLD WAR II

	Prewar Five-Year Average	Average of War Years	Postwar, Five-Year Average
War of 1812 (constant dollars per capita, 1926 prices)			
Military	0.71	2.58	1.34
Other	0.77	0.74	1.31
Total	1.48	3.32	2.65
Civil war (constant dollars per capita, 1926 prices)			
Military	1.51	16.34	2.35
Other	1.83	2.47	5.83
Total	3.34	18.81	8.18
World War I (per cent of gross national product)			
Military	0.64	10.37	2.16
Other	1.16	5.76	2.92
Total	1.81	16.12	5.08
World War II (per cent of gross national product)			
Military	2.33	32.94	5.34
Other	8.03	5.70	10.16
Total	10.36	38.64	15.51

SOURCE: M. Slade Kendrick, *A Century and a Half of Federal Expenditures*, New York, NBER, 1955; and *U.S. Income and Output*, Department of Commerce, 1958. Years are fiscal years. Expenditures are federal consolidated cash budget payments to the public.

ecutive and legislative branches, as though to imply that rather abrupt changes in public sector spending might occur as the result of a change in the balance of political power between "spenders" and "nonspenders." For example, Otto Eckstein described his projections as assuming a continuation of the recent balance of political forces with respect to federal spending in his "medium" projection, economy in both Administration and Congress in his "low" figures, and stronger expenditure stress in his "high" figures. The Bureau of the Budget gave a similar explanation of the differences between its high, low, and medium projections. Some hedging by the forecaster on this account is clearly prudent. But it is doubtful if a large range is reasonably required to take care of this source of uncertainty.



# FEDERAL SECTOR IN NATIONAL INCOME MODELS

TABLE 8

SELECTED TEN-YEAR PROJECTIONS OF TOTAL FEDERAL SPENDING,  
TO 1968, 1970, AND 1971

Projector	Federal Expenditure Concept Used	Year Projected	Range from "High" to "Low" Projection as Per Cent of GNP
Otto Eckstein <sup>a</sup>	Consolidated cash	1968	17.3-21.7
Bureau of the Budget <sup>b</sup>	Consolidated cash	1970	15.2-22.0
National Planning Association <sup>c</sup>	National income and product	1971	13.7-18.4

<sup>a</sup> Otto Eckstein, *Trends in Public Expenditures in the Next Decade*; Committee for Economic Development, 1959.

<sup>b</sup> *Ten-Year Projection of Federal Budget Expenditures*, Bureau of the Budget, 1961. (Disarmament alternative disregarded in computing range shown above.)

<sup>c</sup> National Planning Association, 1961 Projection Series. Upper end of range taken from the "high government, low growth" alternative; lower end from the "high consumption, fast growth" alternative.

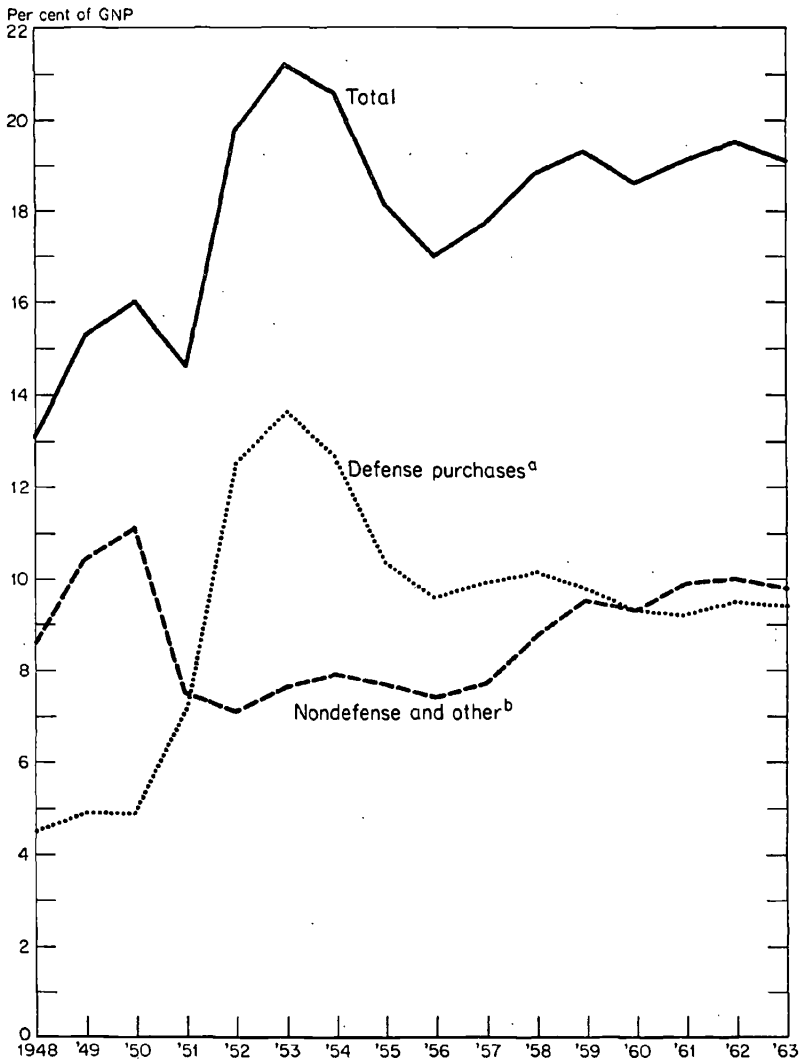
Consider the difficulty a political party would have in justifying significant changes in tax rates. Any such change directly raises the question of the proper allocation of resources between public and private use. A proposed increase of any significant size is likely to arouse accusations of fiscal irresponsibility; and a proposed decrease, complaints of neglect of vital public needs. There are few fighting words more charged than these in our political vocabularies. Attitudes do change, of course, but there can be little doubt of the high degree of sanctity in existing tax rates—the *status quo* raises far fewer political arguments than movements in either direction. Furthermore, attitudes favoring balanced budgets are widespread. Consequently, any proposed reduction that is to be made on the basis of an actual realized surplus in the budget, gets strong support; but it is a clever feat indeed, since a cutback in spending to pave the way for lower taxes would ordinarily be self-defeating. Similar feedback effects may also help to limit changes in the other direction if spending increases are inflationary, or even if they are just thought to be so.

Supporting, although admittedly not conclusive, evidence for the proposition that sudden changes in the balance of power between "spenders" and "nonspenders" are unlikely is furnished by the two most recent changes in national administration. The Eisenhower administration was largely unsuccessful in its announced plan to reduce government spending relative to the gross national product.

## FEDERAL SECTOR IN NATIONAL INCOME MODELS

Defense spending was reduced from its Korean War peak (Chart 1) but remained well above its prewar percentage of gross national product. Nondefense spending (measured in national income terms)

CHART 1



was increased more than GNP the first year in office, slightly less than GNP in 1955 and 1956, and faster than GNP thereafter except for a one-year leveling in 1960.

Expenditures proposed by the Kennedy administration for fiscal 1963 as a percentage of projected gross national product represent

## FEDERAL SECTOR IN NATIONAL INCOME MODELS

a slight decline from fiscal 1962 to about the same percentage as in fiscal 1961.

It must also be remembered that Congress, which is probably still less subject to abrupt change than the executive, has at least as much to say in spending matters.

As further evidence of the high degree of inertia in an existing revenue system, it may be noted that, since 1948, the only major changes in tax rates—in 1950, 1951, and 1954—were associated with the increase and subsequent decrease of Korean War defense expenditures. The 1948 tax cut enacted by the Republican Congress over President Truman's veto comes closer to representing a "displacement" of a domestic political kind. But a large part of the credit is due to a most unusual condition of the federal budget in fiscal 1948—a surplus larger by a factor of over five than any ever achieved before or since, and due more to a fortuitous than a planned simultaneous reduction in defense, foreign aid, veterans' readjustment, and agricultural price support expenditures.

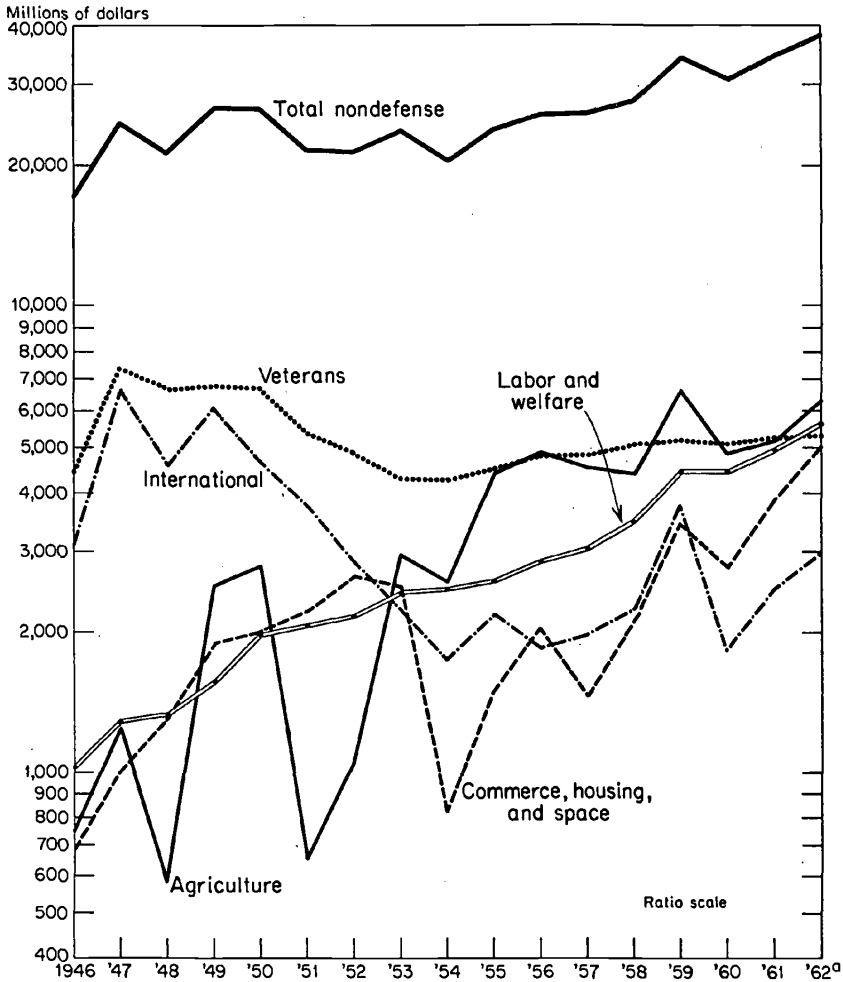
The hypothesis that there is a strong tendency for total federal spending to be set according to revenues available under existing tax rates does not imply that each component follows the same general time path. Some expenditures show considerable year-to-year fluctuation for business cycle or other reasons. Particularly volatile are: (1) farm price supports, which can fluctuate because of weather conditions here or abroad; (2) defense outlays, which can fluctuate quite aside from changes in program direction if contracts let under obligational authority are allowed to bunch up, causing a subsequent bunching of expenditures; (3) interest payments on the public debt, which vary with changes in market rates of interest; (4) unemployment compensation; (5) net mortgage purchases or sales, which are determined largely according to mortgage market conditions; and (6) one-time major outlays, such as subscriptions to international finance organizations. A bunching of fluctuations in individual programs can and does cause year-to-year aberration in total spending from what would be a stable trend.

That a comparatively stable trend in total federal spending over a period of years is consistent with widely divergent movements in major components is illustrated graphically in Charts 1 and 2. In Chart 1, total federal national income expenditures are divided into defense purchases and nondefense. Three points may be noted. First, leaving the Korean War years aside, total outlays as a per-

## FEDERAL SECTOR IN NATIONAL INCOME MODELS

centage of GNP appear well represented by a linear upward trend, with deviations around the trend averaging less than 1 per cent of GNP. Second, the impact of Korean War defense outlays on the expenditure total was somewhat dampened by the efforts of the

CHART 2



Truman administration to finance part of the costs of the war by holding down nondefense spending. Third, the steady upward trend since the end of the Korean War is the net result of a more rapid upward trend in nondefense outlays and a decline in defense outlays relative to GNP. It is, of course, not surprising that the trend of a total lies between the trends of its components. But it is interesting

that the net trend just happens to work out at about the same GNP elasticity as the 1954 revenue code (combined with periodic increases in social security payroll tax rates). This suggests that the "offset factor" operates with respect to defense and nondefense spending, and not just among the nondefense programs, at least when there is no shooting war. Chart 2 suggests the large extent to which fluctuations and divergent trends in major components of nondefense spending have tended to offset one another.

Allowance for an "offset factor" in long-range projections of federal spending is not a new principle. The National Planning Association, for example, in its annual projection series, allows for considerably higher nondefense spending in its "low defense" alternative than in its "high defense" alternative. Similarly, the Budget Bureau's ten-year projection recommended using the "high" nondefense projection as the complement to its disarmament alternative on defense. However, I would recommend even stricter rules. In the absence of disarmament or hot war, a one-for-one offset between defense and nondefense—not year-by-year, certainly, but averaged over a period of years—appears by far the best bet for the forecaster.

In summary, for long-range projections, I would venture a forecast with the following elements: (1) in the absence of a hot war or disarmament, significant changes from current rates of tax for the major sources of federal revenue are unlikely, except for the social security tax rate increases built in under current law; (2) budget policy will continue to aim at small surpluses in years of relatively high employment; (3) total expenditures will rise slightly as a percentage of GNP in line with the greater-than-unity GNP elasticity of the present revenue system; (4) year-to-year volatility in some program areas will produce temporary deviations from trend in total federal spending from time to time; (5) ignoring temporary fluctuations, level or declining trends in some program areas will be offset in time by increases elsewhere.

To repeat an earlier injunction, these elements should be viewed as equilibrium conditions, not as the means for mechanically transforming some assumed growth rate into a forecast of expenditures. The growth rate, the major income shares, revenues, and expenditures must all be solved simultaneously. For many reasons, including three mentioned below, it is obviously not prudent to take 5 per cent or any other growth rate for granted.

## SOME ECONOMIC IMPLICATIONS OF THIS PROJECTION

Among the implications of the projection outlined above, I would flag three as raising interesting problems for policy-makers as well as model-builders. In the first place, although total spending can, in my opinion, be forecast reasonably well (at least in relation to GNP) the composition of the total as between goods and services purchases, on the one hand; and grants, transfers, and subsidies, on the other, is considerably less predictable. This will depend principally on the trend of defense spending, which accounts for upward of 85 per cent of federal purchases of goods and services but only about 50 per cent of total federal expenditures on income and product account. Nondefense spending largely takes the form of grants, subsidies, and transfer payments. I do not believe the current political process makes much allowance for the probability that, from the standpoint of stable growth at unchanged rates of factor utilization, grants, transfers, and subsidies probably carry considerably lower revenue requirements per dollar of outlay than purchases of goods and services. Moreover, the administrative and consolidated cash budgets, which are the ones used for most decision processes, include loans and mortgage purchases as well—items which are excluded altogether from the national income tabulation and which probably carry still lower revenue requirements from a stable growth standpoint, but not from that of balancing the administrative or cash budget.

A second implication of the tendency toward inertia in the federal fiscal system in the periods between displacements might be labeled, for lack of a more inspired name, the "tired program" effect. More and more economists are moving away from the notion of personal consumption as a simple function of current income, in favor of wealth or, what amounts to much the same thing, permanent income, as the more relevant independent variable. But to my knowledge, the implications of federal spending behavior in the context of a permanent-income consumption function have not been explored.

The "tired program" effect can be illustrated by an example. Suppose a law is enacted according to which every red-headed person becomes eligible for federal transfer payments of, say, \$50 a month for the rest of his life. Obviously, the enactment of such a

program will release substantial sums for private spending relative to the initial amount of federal outlay. Red-heads would receive not only the first month's benefit check, but also a much larger asset in the form of entitlement to future benefits—an asset in many cases liquid enough to be transformed into a substantial sum of cash at a commercial bank. Subsequent federal outlays under such a program would come close to being capital transfers in a national income sense—an exchange of one liquid asset for another (cash).

Old programs seldom die, and the growth of federal spending during one of our so-called inertia periods between two displacements is likely to be made up much more of the growth of old programs than the initiation of new ones. As a consequence, the total income-generating effects of federal spending during such a period are probably subject to decay, at least relative to potential gross national product.

Something analogous, of course, takes place on the revenue side of the budget. The initiation of a new tax has, through a process of capitalization, negative effects on asset values or permanent income in addition to its effects on current income. These depressing effects on aggregate demand subsequently decay with the passage of time, similar to the decay of the stimulating effects of expenditures under old programs.

Offhand, since the combined income and asset impact decays for both receipts and expenditures during an inertia period, one might be willing to judge that there is no a-priori reason to assume a secular trend one way or the other in the net impact of federal behavior on aggregate demand. However, if I reason correctly, there is one a priori reason for judging that the secular trend during an inertia period may in fact be toward a reduced stimulus to aggregate demand by the federal budget. Suppose the balanced budget multiplier effect, according to which expenditures—at least for goods and services—add more to aggregate demand than is deducted by an equal amount of taxes, applies to the asset as well as the income effects of government activity. Whatever its value, if the balanced budget multiplier is constant, if it applies to asset as well as income effects, and if there is no compensating change in the composition of federal outlays, the multiplier would attach to a successively smaller combined income-and-asset impact from federal spending less federal taxes during an inertia period; and the resulting trend would be toward a lower total impact on aggregate demand.

To what extent the tired program effect may be offset by the influence on expenditures of a greater-than-unity GNP elasticity of federal revenues I am not competent to judge. Of course, the composition effect can be either aggravating or offsetting to the tired program effect.

The third problem I would like to flag is that, while private income-spending relationships probably change slowly, it would be fortuitous indeed if they remained constant for as long as ten years. The expenditure process described above seems less than ideally suited—from the standpoint of stable growth at unchanged rates of factor utilization—to making the federal budget compensate for any such secular trends.

### *Short-Run Behavior of the Fiscal System— the Built-in Stabilizers*

My analysis of the short-run behavior of the federal fiscal system is limited to the part which is fairly predictable—the automatic built-in fiscal stabilizers. Considering their prominent place in the literature on fiscal policy and public finance, there have been surprisingly few attempts at empirical measurement of the built-in stabilizers. I will report here only a brief summary of the results from my own research in this field and some of the problems these raise for fiscal policy analysis.

Mainly because the cyclical behavior of the various tax bases differs widely from the secular behavior, the cyclical GNP elasticities of the built-in stabilizers differ substantially from their secular elasticities. Table 9 records the base elasticity of yield for the major federal taxes during the postwar recessions and recoveries. It also records the marginal changes in federal surplus or deficit on account of these and unemployment transfer payments as percentages of the change in GNP during recession and recovery. In each case, actual data have been adjusted to remove the effects of any legislative changes during the recession or recovery period, so as to measure only the automatic response. For all but the individual income tax, the original data are those from the national income and product accounts. For the individual income tax, two modifications to the data were made. First, collections attributable to individual capital gains were removed. Capital gains are excluded throughout the national income and product statistics. Unless a model includes the flow of capital gains, it seems only logical to exclude the tax on such



# FEDERAL SECTOR IN NATIONAL INCOME MODELS

TABLE 9

BUILT-IN FEDERAL FISCAL STABILIZERS, POSTWAR RECESSIONS AND RECOVERIES

Tax	Base	Recessions				Recoveries		
		IV-48 to II-49	II-53 to II-54	III-57 to I-58	II-60 to I-61	II-49 to II-50	II-54 to II-54	I-58 to II-59
		BASE ELASTICITY OF TAX YIELD <sup>a</sup>						
Corporate profit tax accruals	Corporate profits	0.85	0.84	0.90	1.01	0.81	0.88	0.89
Individual income tax accruals	Personal income	1.50	9.71	6.08	-5.80 <sup>b</sup>	0.76	1.15	1.56
Indirect business taxes	Gross national product		2.31	1.42	5.71	1.04	1.69	1.00
Contributions for social insurance	Wages and salaries	0.75	0.44	0.96	2.01	0.82	0.76	0.84
CHANGE IN STABILIZER AS PER CENT OF CHANGE IN GROSS NATIONAL PRODUCT <sup>a</sup>								
Corporate profits tax accruals		25.3	36.4	29.9	57.1	21.1	13.2	15.6
Individual income tax accruals		2.3	7.5	11.1	17.9	7.4	8.2	8.9
Indirect business taxes			7.1	3.9	16.1	3.3	5.0	2.7
Contributions for social insurance		1.3	1.4	2.2	6.1	1.0	1.3	2.0
Unemployment compensation (sign reversed)		10.5	14.1	9.1	25.0	1.1	2.6	2.0

SOURCE: Department of Commerce and Wilfred Lewis, Jr., *Federal Fiscal Policy in the Postwar Recessions*, Brookings Institution, 1962. "Recession" defined as period from peak to trough in quarterly gross national product. "Recovery" defined as period from GNP trough to quarter after which declines in unemployment ratio become minor.

<sup>a</sup> Computed at constant (prerecession) tax rates.

<sup>b</sup> Tax declined while total personal income rose.

gains. Second, refunds and the nonwithheld portion of the tax were placed on an accrual basis, so that the total tax would be as nearly as possible on an accrued liability basis, as is the case with the other taxes in the national income framework.

The fiscal effects of the built-in stabilizers should be distinguished from their economic effects. While the corporation income tax is by far the most important built-in stabilizer in terms of impact on the federal budget, it is by no means clear that this is the case in terms of economic impact.

The major stabilizers obviously differ widely in their effects on disposable personal income. A drop in individual income tax liabilities, or a rise in unemployment compensation, for example, provide

direct support to disposable personal income in the sense that they cause disposable income to drop by less than it otherwise would in an economic contraction. A decline in corporate profits tax accruals, on the other hand, affects disposable personal income only insofar as it induces corporations to alter their employment policies or their dividend payments. The indirect stabilizing effectiveness of a drop in corporate income tax liabilities, by way of induced effects on investment, may also be rather minor, at least for brief recessions of the postwar variety in which corporate liquidity is well maintained or actually increases. Employee contributions for social insurance—payroll taxes paid by employees—resemble income taxes and unemployment benefits in having direct consequences for disposable personal income. Excise taxes, on the other hand, resemble the corporation income tax in having only indirect stabilizer effects on disposable income. The employer contributions for social insurance can be argued either way, although I have treated it as a “direct” stabilizer.

The fiscal effects of the direct stabilizers—individual income and employment taxes and unemployment compensation—during postwar contractions have ranged from \$1.3 billion to \$3.4 billion, measured by changes from peak to trough, or from 14 per cent to 49 per cent of the change in gross national product. They have become more important over the postwar period in their stabilizing effectiveness for three main reasons. First, the increases in OASDI payroll tax rates have increased the cycle sensitivity as well as the level of these taxes. Second, the greater-than-unity GNP elasticity of the individual income tax has caused a secular increase in the average rate of tax and, apparently, has also increased its cycle sensitivity. Finally, there is evidence of a growing responsiveness of consumption expenditures to declines in disposable personal income. This last-mentioned tendency enhances the importance of those factors, like the built-in stabilizers, which cushion a decline in disposable personal income.

The crude response of consumption to changes in disposable personal income is, of course, not reliably measured directly from *ex post* data. Annual data for years in most of which income is rising yield a high marginal propensity to consume, roughly equal to the average propensity, which is no fair indication of what happens in recession. Comparison of actual changes in quarterly data, peak to trough, can be misleading in the other direction, since substantial declines or even increases in gross national product have been ac-

accompanied by small decreases or even increases in consumption, implying an absurdly low or negative marginal propensity to consume. In the absence of a complete model based on underlying behavioral relations for the whole economy, an alternative method of making rough approximations—one I believe is more indicative than a comparison of actual data, whether annual or quarterly—is to compare actual magnitudes at the trough with hypothetical high-employment norms calculated on the basis of a few simplifying assumptions.

Table 10 gives the results of a comparison of this kind. Hypothetical high-employment norms for the trough quarter of each recession were calculated by a linear interpolation of gross national product from prerecession peak to recovery except in 1960–61, where 3 per cent real growth, or 4.4 per cent in current dollars, was projected starting at the peak in the second quarter of 1960. (“Recovery” is defined as the quarter after which further reductions in the unemployment rate became relatively small—I have used II 1950, II 1955, and II 1959 as marking the end of recovery from the first three postwar recessions). Business gross saving, disposable personal income, and consumption are assumed to maintain their prerecession ratios to gross national product under the hypothetical high-employment case. The differences between actual and hypothetical high-employment data are arrayed to show the various offsets to the fall in gross national product that account for the smaller drop in consumption.

At the bottom of the table, the ratios of consumption “shortfall” to GNP shortfall are first calculated as they occurred, and second, as they would have occurred if there were no offset from the direct stabilizers and if the resulting larger drop in disposable personal income were reflected in consumption at the same rate as the actual drop.

As reflected in this table, there has apparently been a growing responsiveness of consumption to shortfalls in gross national product and disposable personal income. Relative to gross national product, the consumption drop has increased from 13 per cent in 1949 to 46 per cent in 1961. Consumption fell short by only 28 per cent of the disposable personal income shortfall in 1949, but reached 100 per cent in 1961.

Whether this growing income sensitivity of consumption reflects the decline in liquid assets (relative to gross national product) in

# FEDERAL SECTOR IN NATIONAL INCOME MODELS

TABLE 10

EFFECTS OF DIRECT FISCAL STABILIZERS ON CONSUMPTION,  
POST-WORLD WAR II RECESSIONS  
(dollars in billions)

	II-1949	II-1954	I-1958	I-1961
ACTUAL LESS HIGH EMPLOYMENT AT CYCLICAL TROUGH				
Gross national product <sup>a</sup>	-\$12.3	-\$22.0	-\$27.0	-\$22.6
Less: Indirect fiscal stabilizers <sup>b</sup>	-2.7	-5.5	-6.0	-5.3
Gross business saving <sup>c</sup>	-4.3	-2.1	-6.6	-4.1
Direct fiscal stabilizers <sup>d</sup>	-1.5	-3.2	-4.5	-4.2
Other adjustments <sup>e</sup>	+2.0	-4.9	-0.5	+1.3
Equals: Disposable personal income <sup>f</sup>	-5.8	-6.3	-9.4	-10.3
Less: Personal savings	-4.2	-1.8	-0.7	
Equals: Personal consumption expenditures <sup>f</sup>	-1.6	-4.5	-8.7	-10.3
RATIOS AND MULTIPLIERS				
Ratios of shortfalls				
Direct stabilizers to <i>GNP</i>	0.12	0.15	0.17	0.19
Consumption to disposable personal income	0.28	0.71	0.93	1.00
Consumption to <i>GNP</i> (" <i>MPC<sub>p</sub></i> ");				
With offsets from direct stabilizers	0.13	0.20	0.32	0.46
Without offsets from direct stabilizers	0.16	0.31	0.51	0.64
"Multiplier"— $1/(1 - MPC_p)$ :				
With offsets from direct stabilizers	1.15	1.26	1.47	1.84
Without offsets from direct stabilizers	1.19	1.45	2.06	2.79

SOURCE: Department of Commerce and Wilfred Lewis, Jr., *Federal Government Fiscal Policy in the Postwar Recessions*, Brookings Institution, 1962.

<sup>a</sup> Hypothetical high-employment obtained by linear extrapolation from peak to recovery, except in 1961, where growth at 3 per cent in real terms (4.4 per cent in current dollars) was assumed starting in II-1960.

<sup>b</sup> Corporate profits tax accruals and indirect business taxes.

<sup>c</sup> Total capital consumption allowances and corporate retained earnings. Hypothetical high-employment value obtained from ratios to *GNP* prevailing at prerecession peak.

<sup>d</sup> Individual income tax accruals excluding capital gains (except 1961, which is on a national income basis), unemployment compensation, and payroll taxes on employees and employers.

<sup>e</sup> Residual, including changes in state-local taxes and transfers, changes in federal taxes and transfers other than built-in stabilizers (including effects of tax rate change), difference between national income and full-accrual basis for recording individual income tax (except in 1961), inventory valuation adjustment, excess of wage accruals over wage disbursements, and statistical discrepancy.

<sup>f</sup> Hypothetical high-employment values obtained from ratios to *GNP* prevailing at prerecession peak.

the postwar period, or the steadily shortened interval between recessions, in which consumers have time to rebuild desired income-debt ratios before the next recession starts, I am none too certain. In any event, this phenomenon has heightened the importance of the direct fiscal stabilizers.

While the ratios shown must be regarded as only crude approximations to the slopes of the underlying analytical consumption functions, their differences from one recession to the next do suggest to me structural change. The significance of this can be interpreted in the following fashion. Suppose, for the sake of argument, that the ratios of consumption shortfall to GNP shortfall were representative of the marginal propensity to consume out of GNP (in Table 10 I have labeled them  $MPC_o$ ). Then the rate at which initial changes in demand would tend to be multiplied into total changes in gross national product would approach  $1/(1 - MPC_o)$ .

Calculated values of this multiplier are shown at the bottom of Table 10. The implication of the steady increase in spread between the multiplier values computed with and without the direct fiscal stabilizers is that, while the stabilizers may have been of relatively minor importance in the 1949 recession, they had acquired major importance for the stability of the economy in 1961.<sup>8</sup>

### Conclusion

The model-builder looking for precise equations tying the federal sector to the rest of the economy will be disappointed by this paper. While I have suggested a method of approximating equilibrium conditions for a projection of total federal spending over the long run, important questions on the economic implication of these conditions remain unanswered. Similarly, for the short run, the fiscal effects of the built-in stabilizers are far more certain than their economic effects. Finally, some evidence was furnished that the basic structure of the economy—the basic environment in which the fiscal system operates—may have changed significantly over the course of the postwar period. All this serves to remind us that, in the current state of the art, numerical results from our models must still be seasoned with large elements of judgment in drawing conclusions for public policy purposes.

<sup>8</sup> The 1.47 multiplier computed for 1957–58 by this method compares with a quite differently estimated multiplier for that recession of 1.34 as computed by James S. Duesenberry, Otto Eckstein, and Gary Fromm, "A Simulation of the United States Economy in Recession," *Econometrica*, October 1960.

## C O M M E N T

BERT G. HICKMAN, Brookings Institution

Wilfred Lewis has proposed a novel method of measuring consumption propensities in that section of his paper which deals with automatic stabilizers. The purpose of this note is to explore the properties of the new technique and to question the inferences which Lewis has drawn from its application to the postwar recessions.

Lewis believes that his "shortfall" measure provides a better approximation to the true recession value of the marginal propensity to consume GNP (or disposable income) than does the ratio of the actual change in consumption to the actual change in GNP (or disposable income). Let us abstract for the moment from the obvious statistical deficiencies of both methods and assume that the observed values of consumption and income at both peak and trough fall on the underlying behavioral (linear) consumption function for the contraction period. Under that assumption, what is the relationship between the two estimates of the slope of the consumption function?

Lewis's first step is to calculate what GNP would have been at the time of the cyclical trough if the contraction had not occurred and if, instead, GNP had increased at a steady arithmetic rate along a high-employment path from the cyclical peak. In symbols:

$$(1) \quad Y_h = Y_p + H = Y_p + (Y_h - Y_p),$$

where  $Y_h$  is hypothetical high-employment GNP for the trough quarter,  $Y_p$  is observed GNP at the peak, and  $H$  is the hypothetical increase of GNP between the peak and trough quarters.

Next, Lewis assumes that the average propensity to consume GNP would have remained constant if the economy had moved along the high-employment path; therefore, hypothetical high-employment consumption is given by

$$(2) \quad C_h = \left( \frac{C_p}{Y_p} \right) Y_h,$$

where  $C_p$  stands for observed consumption at the cyclical peak.

Finally, let  $C_t$  and  $Y_t$  be the observed values of consumption and GNP at the cyclical trough. Then  $(C_h - C_t)$  and  $(Y_h - Y_t)$  are the recession shortfalls of consumption and income below their high-employment "norms." Lewis uses the ratio of the two shortfalls

# FEDERAL SECTOR IN NATIONAL INCOME MODELS

$$(3) \quad \frac{(C_h - C_t)}{(Y_h - Y_t)}$$

to estimate the value of the marginal propensity to consume during the contraction.

To facilitate comparison of the ratio of shortfalls with the conventional ratio of actual changes in consumption and income, let us substitute (1) and (2) into (3) and simplify. The result is

$$(4) \quad \frac{C_h - C_t}{Y_h - Y_t} = \frac{\frac{C_p - C_t}{Y_p - Y_t} + \frac{C_p}{Y_p} \frac{Y_h - Y_p}{Y_p - Y_t}}{1 + \frac{Y_h - Y_p}{Y_p - Y_t}}$$

The first term in the numerator of the right-hand expression of (4) is the marginal propensity to consume as conventionally measured. Now, suppose that the marginal propensity  $(C_p - C_t)/(Y_p - Y_t)$  were equal to the average propensity  $C_p/Y_p$  at the cyclical peak. In that case, it is easy to see from (4) that the shortfall ratio would have the same value as the ratio of actual consumption and GNP changes, namely  $C_p/Y_p$ . This is because  $C_h$  has been assumed to lie on a consumption function passing through the origin with slope  $C_p/Y_p$ ; and if  $C_t$  also fell on the same function,  $(C_h - C_t)/(Y_h - Y_t)$  would necessarily equal  $(C_p - C_t)/(Y_p - Y_t)$ . But that would mean that the response of consumption to a cyclical decline of GNP was the same as its response to a steady growth of GNP, and that is contrary to both theory and observation. One expects the recession value of the marginal propensity to consume GNP to be smaller than the average propensity at the cyclical peak; that is, one expects the consumption function during a contraction to be flatter than the long-term consumption function passing through cyclical peaks.

Under the normal expectation that the value of  $(C_p - C_t)/(Y_p - Y_t)$  is smaller than  $C_p/Y_p$ , it follows from equation 4 that the shortfall ratio overstates the value of the marginal propensity to consume during a contraction. The overestimate will be greater, the greater the difference in slope between the short- and long-run consumption function. The degree of overstatement will also vary positively with the ratio of  $Y_h - Y_p$  to  $Y_p - Y_t$ , which means that it will depend on the amplitude and duration of the contraction and on the assumption made about the high-employment growth rate.

One important reason for expecting consumption to fall much less than GNP during a contraction is that automatic stabilizers have a

## FEDERAL SECTOR IN NATIONAL INCOME MODELS

cushioning effect on disposable personal income. Thus, there are really two structural relationships underlying the response of consumption demand to changes in GNP. The first is the relationship between disposable personal income and GNP, and the second is the relationship between consumption and disposable personal income. If the structural functions are assumed to be linear within the relevant range, then

$$(5) \quad \frac{C_p - C_t}{Y_p - Y_t} = \frac{\bar{Y}_p - \bar{Y}_t}{Y_p - Y_t} \frac{C_p - C_t}{\bar{Y}_p - \bar{Y}_t},$$

where  $\bar{Y}$  is disposable personal income and the subscripts have their previous meanings. Exactly the same relationship holds among the several shortfall ratios, as can be seen immediately by substituting the subscript  $h$  for  $p$  in (5).

Everything that was said earlier about the relationship between the conventional and shortfall estimates of the marginal response of consumption to GNP carries over to the corresponding estimates of the marginal response of disposable income to GNP. That is, the underlying functional relationship between disposable income and GNP should be flatter during a period of contraction than during a corresponding period of steady high-employment growth, because of the operation of both the private (gross business saving) and fiscal stabilizers. The shortfall ratio should, therefore, overstate the marginal response of disposable income to GNP during a contraction.

It is time now to turn to a comparison of the conventional and shortfall estimates of the several marginal relationships during the postwar contractions. Table 1 contains the shortfall estimates and is similar to Lewis's Table 10. The principal difference between my table and his is that my shortfall estimates are corrected for price changes and his are not. It is preferable to deal with deflated figures, since the underlying structural relationships are defined in real terms.<sup>1</sup> The conventional estimates are also based on deflated figures and are shown in Table 2.

<sup>1</sup> The use of deflated data introduces a complication into the treatment of disposable income. When the functional relationship between GNP and disposable income is in question, the latter should be expressed in the same prices as GNP. With regard to consumption decisions, however, disposable income should be deflated by an index of consumer prices. When the implicit price indexes of GNP and consumer goods diverge, a corresponding divergence is created between the two versions of "real" disposable income. In Tables 1 and 2, disposable income is deflated by consumer prices. How much difference this makes in the computed relations between disposable income and GNP is shown in the footnotes to the tables.



# FEDERAL SECTOR IN NATIONAL INCOME MODELS

TABLE 1

SHORTFALL ESTIMATES OF MARGINAL INCOME AND CONSUMPTION  
PROPENSITIES, POST-WORLD WAR II CONTRACTIONS  
(values in billions of 1954 dollars, seasonally adjusted quarterly totals at annual rates)

	II-1949	II-1954	I-1958	I-1961
ACTUAL LESS HIGH EMPLOYMENT AT CYCLICAL TROUGH				
Gross national product <sup>a</sup>	-\$11.9	-\$21.9	-\$24.7	-\$20.2
Less: Direct fiscal stabilizers <sup>b</sup>	-1.7	-3.2	-4.1	-3.6
Other items <sup>c</sup>	-5.5	-11.8	-11.0	-7.3
Equals: Disposable personal income <sup>d</sup>	-4.7	-6.9	-9.6	-9.3
Less: Personal saving <sup>e</sup>	-4.4	-1.9	-0.7	-0.1
Equals: Personal consumption expenditure <sup>f</sup>	-0.3	-5.0	-8.9	-9.2
RATIOS AND MULTIPLIERS				
Ratios of shortfalls:				
Direct stabilizers to <i>GNP</i>	0.14	0.15	0.17	0.18
Disposable income to <i>GNP</i> ( <i>MPY</i> ):				
With offsets from direct stabilizers <sup>g</sup>	0.39	0.32	0.39	0.46
Without offsets from direct stabilizers	0.54	0.46	0.55	0.64
Consumption to disposable income	0.06	0.72	0.93	0.99
Consumption to <i>GNP</i> ( <i>MPC</i> ):				
With offsets from direct stabilizers	0.03	0.23	0.36	0.46
Without offsets from direct stabilizers	0.03	0.33	0.51	0.63
"Multiplier"— $1/(1 - MPC)$ :				
With offsets from direct stabilizers	1.03	1.30	1.56	1.85
Without offsets from direct stabilizers	1.03	1.49	2.04	2.70
"Multiplier"— $1/(1 - MPY)$ :				
With offsets from direct stabilizers	1.64	1.47	1.64	1.85
Without offsets from direct stabilizers	2.17	1.85	2.22	2.78

<sup>a</sup> Hypothetical high employment obtained by linear interpolation from peak to recovery, except in 1961 where growth at 3 per cent per annum assumed starting in II-1960.

<sup>b</sup> As in Lewis's Table 10, except deflated by the implicit price index for *GNP* (1954 = 100).

<sup>c</sup> Estimated as residual. In addition to items specified in Lewis's Table 10, includes the difference between disposable income as deflated by the implicit price index for consumer goods and services and what disposable income would be if deflated by the implicit price index for *GNP*. If the latter index were used to deflate disposable income, the successive shortfall estimates would be -5.0, -6.2, -8.5, and -9.3.

<sup>d</sup> As in Lewis's Table 10, except disposable personal income deflated by implicit price index for consumer goods and services.

<sup>e</sup> Residual.

<sup>f</sup> As in Lewis's Table 10, except for conversion to 1954 dollars.

<sup>g</sup> If disposable income were deflated by the implicit price index for *GNP*, as discussed in note c, the successive ratios of disposable income shortfall to *GNP* shortfall would be 0.42, 0.28, 0.34, and 0.46.

# FEDERAL SECTOR IN NATIONAL INCOME MODELS

TABLE 2

CONVENTIONAL ESTIMATES OF MARGINAL INCOME AND CONSUMPTION  
PROPENSITIES, POST-WORLD WAR II CONTRACTIONS

(values in billions of 1954 dollars, seasonally adjusted quarterly totals at annual rates)

	IV-1948 to II-1949	II-1953 to II-1954	III-1957 to I-1958	II-1960 to I-1961
CHANGE FROM PEAK TO TROUGH				
Gross national product	-\$7.0	-\$13.7	-\$18.0	-\$10.2
Less: Direct fiscal stabilizers <sup>a</sup>	-1.7	-3.0	-3.2	-2.8
Other items <sup>b</sup>	-4.1	-9.4	-10.0	-5.3
Equals: Disposable personal income <sup>c</sup>	-1.2	-1.3	-4.8	-2.1
Less: Personal saving <sup>d</sup>	-4.2	-1.5	-0.3	0.4
Equals: Personal consumption expenditure <sup>e</sup>	3.0	0.2	-4.5	-2.5
RATIOS AND MULTIPLIERS				
Ratios of changes:				
Direct stabilizers to <i>GNP</i>	0.24	0.22	0.18	0.27
Disposable income to <i>GNP</i> ( <i>MPY</i> ):				
With offsets from direct stabilizers <sup>f</sup>	0.17	0.09	0.27	0.21
Without offsets from direct stabilizers	0.41	0.31	0.44	0.48
Consumption to disposable income	-2.50	-0.15	0.94	1.19
Consumption to <i>GNP</i> ( <i>MPC</i> ):				
With offsets from direct stabilizers	-0.43	-0.01	0.25	0.25
Without offsets from direct stabilizers	-1.025	-0.46	0.41	0.57
"Multiplier"— $1/(1 - MPC)$ :				
With offsets from direct stabilizers			1.33	1.33
Without offsets from direct stabilizers			1.69	2.33
"Multiplier"— $1/(1 - MPY)$ :				
With offsets from direct stabilizers	1.20	1.10	1.37	1.27
Without offsets from direct stabilizers	1.69	1.45	1.78	1.92

<sup>a</sup> See note b of Table 1.

<sup>b</sup> See note c of Table 1. If disposable income were deflated by the implicit price index for *GNP*, the successive changes in disposable income would be -1.4, -0.6, -3.8, and -2.3.

<sup>c</sup> See note d of Table 1.

<sup>d</sup> See note e of Table 1.

<sup>e</sup> See note f of Table 1.

<sup>f</sup> If disposable income were deflated by the implicit price index for *GNP*, as discussed in note b, the successive ratios of changes in disposable income and *GNP* would be 0.20, 0.04, 0.21, and 0.22.

The first thing to notice is that the shortfall ratios considerably understate the combined importance of the private and fiscal stabilizers as offsets to the decline of *GNP*. Thus, according to the shortfall estimates, the marginal response of disposable income to

## FEDERAL SECTOR IN NATIONAL INCOME MODELS

GNP (labeled *MPY*) in the four contractions ranged from 0.32 to 0.46, whereas the conventional estimates lie between 0.09 and 0.27.<sup>2</sup> As expected, the shortfall estimates are considerably larger than the conventional ones. One way to gauge the importance of the disparity is to calculate the corresponding theoretical multipliers for a given marginal propensity to consume disposable personal income. If the latter is assumed to be unity, the marginal response of consumption to GNP (*MPC*) would be the same as the marginal response of disposable income to GNP (*MPY*), as can be seen from equation 5 above. The implied limiting multiplier values under this assumption are shown at the bottom of each table and range between 1.10 and 1.37 on the conventional basis and between 1.47 and 1.85 on the shortfall basis.<sup>3</sup>

Observe also that the shortfall estimates understate the importance of the direct stabilizers alone. As already discussed, the shortfall method is biased toward overestimates of marginal consumption propensities. For exactly the same reasons, the method will tend to underestimate marginal saving propensities. A glance at the tables will show that the shortfall estimates of the marginal response of the direct stabilizers to GNP are indeed smaller than the conventional estimates.

Thus, the absolute importance of the direct stabilizers as income offsets during contractions is understated by the shortfall estimates. This is not true, however, of their importance relative to the combined influence of the indirect and private stabilizers, since the marginal response of the latter to GNP is also underestimated by the shortfall method. Hence, when the theoretical multipliers with and without direct stabilizers are compared under the assumption that the marginal response of consumption to disposable income is unity, it is found that their ratio is about the same under both estimating

<sup>2</sup> The low values for the 1953-54 contraction are misleading. Personal income taxes were reduced about \$3 billion at the beginning of 1954. After allowance for the effects of a simultaneous increase in personal contributions for social security and for the treatment of nonwithheld tax receipts in the national income accounts, it appears that disposable income would have been about \$1.5 billion lower in the second quarter of 1954 were it not for the tax reduction. When allowance is made for the tax changes, the shortfall and conventional estimates of the induced decline of disposable income per dollar of decline in GNP become, respectively, 0.38 and 0.20—values which are much closer to those for the other contractions.

<sup>3</sup> When corrected for the tax changes discussed in note 2, the values for the 1953-54 contraction become 1.26 and 1.62 on the conventional and shortfall bases, greatly reducing the range of variation between the multiplier estimates for the several contractions.

## FEDERAL SECTOR IN NATIONAL INCOME MODELS

methods. For the most recent contraction, the multipliers with and without direct stabilizers are 1.27 and 1.92 by the conventional method and 1.85 and 2.78 by the shortfall method. In either case, the multiplier without direct stabilizers is about 1.5 times that with direct stabilizers.

With regard to the relationship between consumption and disposable personal income, it will be recalled that Lewis gives considerable stress to the upward progression of the shortfall ratios during the successive postwar contractions, interpreting the data as evidence of a "growing responsiveness of consumption expenditures to declines in disposable personal income." It is important to remember, however, that the short-term relationship between consumption and current disposable income has displayed considerable instability during the postwar period, although rather more so before than after 1953. It is especially doubtful that the observed consumption-disposable income ratio for the 1949 contraction in either Table 1 or Table 2 has any significance as a measure of the marginal response of consumption to disposable income. Lewis has argued that the progression of his shortfall ratios is strong evidence of a change in the *net* response of consumption to disposable income, on the grounds that nonincome determinants of consumption may be assumed to be constant during each brief recession, even though changing during the long intervals between recessions. In 1948-49, however, real consumption expenditure *rose* \$3.0 billion even as real disposable income *fell* \$1.2 billion (Table 2). Apparently these contrasting movements were due principally to changes in instalment credit regulations and to the increased availability of new automobiles during the contraction—sales of automobiles were largely supply-determined during the early postwar years, and production was stepped up considerably during the contraction. In any event, it is hard to credit the idea that the net response of consumers to a \$1 billion reduction of real income would be a \$3 billion increase of real consumption expenditure.

There are similar difficulties with respect to the contraction of 1953-54. As Table 2 reveals, personal consumption expenditure increased \$0.2 billion and disposable income declined \$1.3 billion between the second quarters of 1953 and 1954. But this peak-to-trough comparison is strongly affected by an upsurge of expenditure during the last few months of the contraction. Real consumption actually fell \$2.8 billion as disposable income dropped \$1.7 billion

between the second quarter of 1953 and the first quarter of 1954. Consumption then rose \$3.0 billion, as disposable income increased only \$0.4 billion during the second quarter of 1954. To view the same facts a little differently, the ratios of the consumption and disposable income shortfalls during the successive quarters of the contraction were 0.938, 1.567, 1.136, and 0.725. Notice that it is only the last of these ratios that looks considerably lower than the trough ratios of 1958 and 1961.

The marginal ratios based on peak-to-trough changes in consumption and income for the contractions of 1957-58 and 1960-61 appear somewhat more reasonable as estimates of the induced response of consumption to decreases in disposable income. At least the consumption and income changes are in the same direction. Notice, however, that the implied marginal propensity to consume for 1960-61 is greater than one. Moreover, again there is evidence of marked variability in the consumption-income relationship during the course of each contraction. For example, the successive quarterly shortfall ratios were 0.673 and 0.927 during the brief 1957-58 recession, and 1.824, 0.880, and 0.989 during the 1960-61 contraction.

With so much variability in the short-term relationship between consumption and disposable income, and with such small movements of disposable income, it is extremely hazardous to rest an estimate of the marginal response of consumption to disposable income on two observations alone, whether by the conventional or the shortfall method. Still less is it justifiable to conclude on the basis of four such estimates that a structural change in the responsiveness of consumer demand to decreases in disposable income has occurred during the postwar years. The 1949 experience is clearly a special case, and the remaining contractions differ much less than is suggested by Lewis's comparison of shortfalls at the troughs.

Suppose, however, for the sake of argument, that the shortfall estimates of the marginal response of consumption to disposable personal income during the successive contractions were entirely accurate. What would such a trend toward greater sensitivity of consumption to changes in disposable income imply about the multiplier effects of autonomous changes in demand? It is easy to calculate the implied limiting multiplier values from a combination of the shortfall estimates of the consumption-disposable income relationship in Table 1 and the conventional estimates of the disposable

## FEDERAL SECTOR IN NATIONAL INCOME MODELS

income-GNP relationship in note 2 and Table 2.<sup>4</sup> The resulting multipliers for the successive contractions are 1.01, 1.17, 1.34, and 1.26. These differences, while not insignificant, are not especially striking. The reason, of course, is that the public and private income stabilizers have exerted such a strong influence during the postwar contractions that disposable income has declined by only a small fraction of the decline in GNP. Under these conditions, even a high marginal response consumption to disposable income can have comparatively little effect on aggregate demand.

To sum up: the shortfall technique does not appear to be a promising method for the estimation of marginal saving or consumption propensities during contractions. It is subject to the same statistical deficiencies as the more conventional comparisons of actual changes in consumption or saving with those in income; and in addition, it is inherently biased toward overestimates of consumption propensities and underestimates of saving propensities. Neither the conventional nor the shortfall method is adequate to deal with the problem of variability in the short-term relationship between consumption and disposable income. This last stricture is less applicable to the more stable relationship between disposable income and GNP, however; therefore, the conventional method may yield reasonably accurate estimates of the marginal response of disposable income to GNP, whereas the shortfall method seriously overstates the response.

JOSEPH A. PECHMAN, Brookings Institution

Wilfred Lewis's interesting and perceptive paper discusses three significant aspects of the federal sector of the United States economy: (1) recent changes in its size and composition; (2) the long-run elasticity of its revenue system; and (3) the contribution of the federal stabilizers to economic stability. On all of these points, Lewis has added a great deal to our knowledge; and my remarks are for the most part only refinements of his major conclusions.

### *Long-Run Growth of the Federal Sector*

Lewis agrees with the Peacock and Wiseman hypothesis that, with the exception of periods of military, social, or economic upheaval,

<sup>4</sup> The reason for using the conventional estimates of the marginal relationship between disposable income and GNP is, of course, that the shortfall estimates give a biased estimate of the response.

## FEDERAL SECTOR IN NATIONAL INCOME MODELS

government expenditures are broadly conditioned by the availability of revenue. Lewis observes that, since the end of the adjustment following the Korean War, the ratio of federal expenditures to the gross national product in the United States has fluctuated moderately around a trend line which is tilted slightly upward. The upward tilt is explained by two factors: (1) the slight progressivity of the federal tax system that is associated with the growth of the economy; and (2) periodic upward adjustments in payroll tax rates and in the limit on taxable wages. Abstracting from recessions, Lewis's advice to a forecaster of federal expenditures is to estimate federal revenues at present tax rates, make an adjustment for any future statutory payroll tax increases already enacted, and then subtract a small amount (not specified) for the surplus. Needless to say, this advice holds only on the assumption that the forecaster can predict relative income shares ten years hence and that international tensions will remain substantially unchanged.

The available statistical evidence and the history of Executive and Congressional action on expenditures in recent years provide ample support for this hypothesis. The ratio of federal expenditures (national income basis) to gross national product reached its post-Korean low in 1956. Since then, the ratio has increased every year except 1960. Between 1956 and 1963, the federal revenue system remained virtually unchanged, with the exception of increased payroll taxes in 1957, 1959, 1960, and 1962. Substantial deficits were incurred in this period whenever unemployment exceeded about 5 per cent of the labor force; but the rate of growth of revenues at a given level of unemployment has kept pace with the rate of growth of expenditures.

Lewis goes on to point out that the revenue constraint has a substantial impact on the composition of federal expenditures through the "offset factor." If some high-priority programs require increased outlays, other programs will be squeezed. Conversely, as some programs begin to taper off, other programs, which have been held back for budgetary reasons, spurt forward. The offset effect is most apparent between defense and nondefense programs, but it operates among nondefense programs as well.

I have very little to add to Lewis's observations on these points except to lament our continued failure to devise some government machinery for determining the appropriate size and composition of the federal budget. If Peacock and Wiseman and Lewis are right,

the revenue-raising capacity of the particular revenue system inherited from the period after the last major war or crisis determines central government expenditures for many years thereafter. It would obviously be sheer coincidence if this particular level of expenditures were the "right" level in the sense that it reflects even approximately the needs and desires of the nation's citizens for government services. I hasten to add that I am not saying that the level of government expenditures determined by the inherited revenue system is either too high or too low. I am saying only that, in all likelihood, this level is wrong and that it is time to devise techniques for making the correct decisions.

I also share Lewis's concern about the relative movements of purchases of goods and services, on the one hand, and grants, subsidies, transfers, and loans on the other. Lewis points out that, from the standpoint of stable growth, grants, subsidies, and transfer payments carry lower revenue requirements per dollar of outlay than purchases of goods and services; loans and other credits carry even smaller revenue requirements. Federal purchases as a percentage of total federal expenditures declined from 65 to 56 per cent between fiscal years 1956 and 1961. Part of this trend is explained by the high level of unemployment that developed during the period. The relative decline in purchases was arrested in fiscal years 1962 and 1963, and the trend will be further moderated if the nation gets back to high employment, but it is doubtful that it will be reversed.

### *Long-Run Elasticity of the Federal Revenue System*

Lewis has shown considerable ingenuity—as well as intimate knowledge of many highly technical details—in his calculations of the long-run elasticity of the federal revenue system. He estimates the elasticities of the major taxes as follows: individual income tax, 1.25; corporate profits tax, 0.92; indirect business taxes, 0.85; and contributions for social insurance, 1.0. He then proceeds to estimate the yield of the present tax rates (plus the scheduled payroll tax increases) in 1970, on the assumptions that (1) the income shares will be the same as they were in 1960, (2) real GNP will grow at an annual rate of 3.5 per cent from the 1960 base and (3) the GNP price deflator will rise at an annual rate of 1.75 per cent. Given these assumptions, it turns out that federal revenues would rise from 19 per cent of GNP in 1960 to 21 per cent in 1970 and that the GNP elasticity of the revenue system would be about 1.2.



## FEDERAL SECTOR IN NATIONAL INCOME MODELS

The following comments and suggestions may be helpful in interpreting and improving Lewis's results:

1. It is obvious that, with the individual income tax having an elasticity of 1.25 and all other taxes having an elasticity no greater than 1, the elasticity for the whole system could hardly be 1.2 unless all the other taxes were of negligible importance. The two elasticities turn out to be almost the same because Lewis has included the scheduled increases in OASDI contributions during the coming decade in his estimate of the yield of the "present" revenue system for the year 1970. Fortunately, he provides the data necessary to correct for the increased contributions. For 1970, it turns out that the payroll tax rates in effect in 1960 would produce contributions of \$20.1 billion in 1970 instead of the \$31.0 billion shown in Lewis's Table 5.

2. Lewis's estimate that the elasticity of the federal corporate income tax under conditions of stable growth may be as low as 0.92 is not borne out by his own data. This estimate is based on the decline in the ratio of corporate tax on a national income basis to the tax reported in *Statistics of Income* between 1948 and 1958. But he fails to observe that, since 1950, changes in this ratio have been offset by changes in the opposite direction in the ratio of profits as reported in *Statistics of Income* to profits on the national income basis. This explains why there seems to have been no trend during recent years in the effective rate of corporate income tax on a national income basis (see  $T_c/C$  in Table 1). Actually, the small variation in effective rates of the corporate income tax in 1952-58—years in which the corporate income tax rate was the same—appears to be related to changes in inventory profits.

In 1960, when inventory profits were negligible, the average effective tax rate on corporate profits was exactly 47 per cent. By contrast, using an elasticity of 0.92, Lewis obtains an average effective rate of 45 per cent in 1970. If this rate is adjusted upward by two percentage points, the corporate profits tax would yield \$1.7 billion more in 1970 than the amount Lewis shows in Table 5.

3. I have some doubts about the use of a constant *elasticity* to project individual income tax receipts for a period as long as ten years. What seems to have remained constant in the past twelve years is not the elasticity of the tax, but its built-in flexibility, or  $dT/dY$ . Between 1955 and 1959, for example, the individual income tax rose by \$1.28 billion for every \$10 billion rise in personal income. Now, since  $dT/dY$  is larger than  $T/Y$ , the latter will keep

## FEDERAL SECTOR IN NATIONAL INCOME MODELS

rising until it reaches  $dT/dY$ . This is what Lewis observes in his Table 2. Note, however, that a  $dT/dY$  of 0.128 gives an elasticity of 1.6 when  $T/Y$  is 8 per cent, 1.42 when  $T/Y$  is 9 per cent, and 1.28 when  $T/Y$  is 10 per cent.

Lewis's assumption of an elasticity of 1.25 for the individual income tax works out to be equivalent to a  $dT/dY$  of 0.143. I suspect that a rise in the average marginal rate on personal income is in the offing, but it is not clear when it will come and how steep the rise will be. Pending further research into this problem, I would keep  $dT/dY$  at about 0.13. This reduces the personal income tax shown in Lewis's Table 5 for 1970 by \$3.4 billion.

4. As Lewis suggests, much of the decline in the effective rate of federal indirect business taxes between 1952 and 1960 was the result of the relatively depressed level of automobile sales in the late 1950s. In fact, the average rate scarcely budged between 1957 and 1960, suggesting an elasticity closer to 1 rather than to 0.85. Nevertheless, in view of the heavy weight of the alcohol and tobacco taxes in the excise tax structure, Lewis's present judgment of an elasticity of less than 1 is perhaps justified. Additional quantitative research needs to be done to clarify this point.

5. Collecting the suggested revisions of the yields of the payroll, corporate, and individual income taxes explained above, I find that the yield of the 1960 tax rates in 1970 would be close to \$165 billion, as compared to the \$177 billion given in Table 5; and the ratio of total receipts to GNP in 1970 turns out to be 19.6 per cent, instead of 21.1 per cent. Thus, the GNP elasticity of the entire revenue system for 1960-70 is reduced from Lewis's estimate of 1.25 to 1.07. In other words, the federal revenue system at present tax rates is only slightly better than proportional (assuming stable growth and constant income shares).

6. It should also be noted that Lewis's projection of federal receipts in 1970 starts off from the base year 1960, when unemployment averaged 5.6 per cent. Consequently, the 1970 projection understates by a substantial margin what receipts would be at full employment, which is now ordinarily assumed to be at the point where unemployment is 4 per cent of the labor force. The shortfall of GNP below full employment in 1960 was probably of the order of about 5 per cent. Applying this to Lewis's GNP estimate for 1970 raises that figure by about \$42 billion. At this level of employment, corporate profits would probably be a higher percentage of

## FEDERAL SECTOR IN NATIONAL INCOME MODELS

GNP than in 1960, say, 10 per cent instead of 9 per cent. On these assumptions, and adding the statutory increases in OASDI taxes scheduled in the period 1960–70, federal receipts in 1970 at full employment would approach \$190 billion, assuming an average annual rate of growth in real GNP of 3.5 per cent and an average increase in the deflator of 1.75 per cent per year.

### *Cyclical Flexibility of the Federal Revenue System*

Lewis shows that the fiscal effects of the “direct” federal stabilizers (i.e., individual income and payroll taxes plus unemployment insurance benefits) have increased sharply during the postwar period. At the same time, changes in consumption have come to depend more and more on changes in disposable income—a development that is explained by the sharp reduction in the liquidity of consumers. As a result of the rising sensitivity of consumption to income, the economy might now be highly unstable were it not for the stabilizers.

Although Lewis’s multiplier is not the usual one we are accustomed to seeing, I believe his conclusions are essentially correct. What is perhaps equally interesting from a technical standpoint is the manner in which these conclusions were obtained (see Table 10). The heart of the exercise is the assumption that if there were no direct stabilizers, the drop in disposable income would have been reflected in consumption at the same rate as the actual drop in consumption below the high-employment “norm.” There is no way of checking this assumption, but it is important to note that the ratio of the shortfall in consumption to the shortfall in disposable income increased so markedly over the four contractions in the postwar period (from 0.28 to 1.00) that any other reasonable assumption would not change the conclusion.

I have considerable doubts, however, about Lewis’s finding that the direct stabilizers have been materially strengthened in the postwar period. It is true, as he points out, that payroll tax rates have increased; and this, of course, increased the built-in flexibility of the system somewhat. But individual income tax rates, though higher than they were in 1949, are lower than during the Korean War. Lewis was influenced by the fact that the direct stabilizers accounted for 48 per cent of the change in GNP in the latest contraction; but I believe that, if he were to correct for the degree of shortfall in each of the recessions, much of the difference in the ratio of the direct

## FEDERAL SECTOR IN NATIONAL INCOME MODELS

stabilizers to GNP would disappear, except for the changes in tax rates.

If these observations are correct, I would draw the following conclusions from Lewis's data on the direct stabilizers: First, the fiscal effects of the direct stabilizers have tended to increase over the postwar period, but not significantly. Second, however, since changes in consumption now appear to be more sensitive to changes in disposable income than they were in the early postwar period, the importance of the stabilizers has been greatly enhanced. Third, in view of the possibility that the economy may well be more unstable now than it was, say, fifteen years ago, it is time to devise practical methods of strengthening the stabilizers and of using discretionary fiscal actions more promptly and more vigorously during intervals of economic contraction.

### REPLY by Wilfred Lewis

1. Joseph A. Pechman has given us some useful additional facts to be considered in making long-range estimates of federal revenues. He is no doubt right that I have underestimated the elasticity of the corporate profits tax and overestimated that of the individual income tax. For the reason stated before, I am not yet convinced that the elasticity of the profits tax is as high as unity on a national income accounts basis. The 1958 average rate of 0.4720 is certainly an overstatement (this was a recession year); and I would not take too seriously the preliminary national income account estimates for 1960 (which give the 0.47 ratio used by Mr. Pechman) until these can be reconciled with *Statistics of Income* data.

2. The major factor in Pechman's marking down of the GNP elasticity of the over-all system to 1.07 is his unwillingness to label payroll tax rate increases scheduled under present law as part of the revenue "system." While admittedly it stretches somewhat the definition of elasticity to include rate changes, these are a fiscal fact of life that should be kept in mind by policy-makers as well as private forecasters. The tendency to overlook these rate changes just because they take place quietly and outside the administrative budget has, among other things, given rise to misleading descriptions of what went wrong with federal fiscal behavior in early 1960. Accepting Pechman's suggested revisions for corporation and individual income taxes, but not for payroll taxes, the elasticity of the federal

revenue system still works out to be over 1.2. This is a rough measure of the rate at which expenditures will have to grow in order to justify the present revenue system, to say nothing of the matter of working down the unemployment rate. The condition that expenditures will roughly match available revenues can be as easily met at 3 per cent growth as at 5 per cent in the absence of a deliberate policy otherwise.

3. The proposition of structural change toward a more unstable economy, by virtue of a greater marginal response of consumption to recession-induced changes in disposable personal income, can be stated a little more rigorously than was done in my text. For a simple linear consumption function, assuming no shift in the function, the ratios used in Table 10 (0.28 in 1949-II, 0.71 in 1954-II, 0.93 in 1958-I, and 1.00 in 1961-I) can be shown to lie between the average and marginal propensities to consume, since they are simply arbitrarily weighted averages of the two. Consequently, the ratios given overstate the marginal propensities in 1949 and 1954, have little bias in 1958, and understate in 1961, implying that the structural change is even greater than indicated in Table 10. The argument that these ratios are not indicative of net regressions of consumption on income because we have not controlled for other variables falls down if we make the not implausible assumption that the change in other variables affecting consumption, such as liquid assets, takes place between recessions but can be regarded as constant for a particular recession. I would conclude either that the consumption function is nonlinear or that the structure has changed frequently enough to make estimation of parameters by ordinary methods troublesome, to say the least. The differences from one recession to the next appear to be mainly in the area of consumer durables.

4. I agree with Mr. Hickman that the shortfall ratios do not measure the underlying marginal propensity and that, because of short-term instability, the ratios should be interpreted cautiously. However, I would point out that the shortfall estimates overstate consumption propensities with respect to disposable income only on the conventional assumption that the marginal propensity to consume during recession is below the average—an assumption which does not appear consistent with the actual behavior of consumption during the two most recent contractions. My basic contention—that there has been an increased responsiveness of consumption to income changes over the postwar periods—is also borne out by actual changes from peak to trough as in Hickman's Table 2.

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Combining "conventional" measures of the disposable income—the GNP relationship with the shortfall measures of consumption propensities—Hickman notices no striking differences among the multiplier values for different recessions (1.01, 1.17, 1.34, and 1.26). However, using his method, and computing the multipliers as they would appear without offsets from direct fiscal stabilizers, yields a progression (1.03, 1.43, 1.69, and 1.91) which, while less striking than the ratios in Table 10, still indicates to me an increasing importance of the built-in fiscal stabilizers for the stability of the economy, especially since, for reasons stated before, I think the degree of change in underlying structural relationships is probably understated in these calculations.

