

## ESTIMATING THE DISTRIBUTION OF THE TAX BURDEN

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1. My purpose is to examine some of the operational problems which arise in estimating the distribution of tax payments under a particular tax structure in a particular country, e.g. the United States. Such estimates involve an uneasy marriage between theoretical hypotheses on the incidence of various taxes by broad economic categories of factor shares and consumer outlays; and the translation of these hypotheses into distributional changes by size brackets of income. The result, therefore, is a quantification of theoretical deductions, rather than empirical evidence in the econometric sense.

This state of affairs is far from perfect and subject to much improvement. Yet, no apology is required. This kind of analysis is needed for the simple reason that distributional considerations are and should be an important factor in tax policy; and that the economist's informed guess, based on explicit and reasoned hypotheses, is to be preferred (with all due allowance for professional modesty) to the implicit and haphazard assumptions of the practical man.

As more pieces of truly empirical evidence on incidence become available, they may be fitted readily into the argument; but until then, theoretical hypotheses retain a central and, indeed, decisive position in our analysis. Accordingly, their validity must be examined briefly in this paper.

## I. GENERAL PROCEDURES AND RESULTS

We begin with a brief outline of the major steps involved in the estimating procedure.<sup>1</sup> These include (1) the selection of

<sup>1</sup> Among an extensive U.S. literature in this field see: Gerhard Colm and Helen Tarasov, 'Who Pays the Taxes' Temporary National Economic Committee, Monograph No. 3, Washington, D.C., 1941; John H. Adler, 'The Fiscal System, The Distribution of Income, and Public Welfare', and E. R. Schlesinger, 'The Statistical Allocation of Taxes and Expenditures in 1938-39 and 1946-47', and Kenyon E. Poole (ed.), *Fiscal Policies and the American Economy*, New York, 1951, pp. 359-421; R. A. Musgrave, J. J. Carroll, L. D. Cook, and L. Frane, 'Distribution of Tax Payments by Income Groups: a Case Study for 1948', *National Tax Journal*, IV (March 1951), pp. 1-54; 'Further Consideration of the Distribution of the Tax Burden', *National Tax Journal*, V (March 1952), pp. 1-39; 'Who Pays the Taxes?' *Proceedings of the Forty-Fifth Annual Conference on*

taxes to be allocated; (2) the allocation of tax burdens by income brackets; and (3) the translation of this allocation into a schedule of effective tax rates, permitting us to determine the degree of progression or regression which applies.

### *Taxes to be included*

2. In choosing the taxes to be included in the burden distribution, three major considerations arise.

First, it is generally agreed that this type of analysis should exclude fees and sales proceeds from public enterprise. Charges in excess of cost (profits of public enterprise) may be treated as indirect taxes, but otherwise such receipts should be excluded.

Secondly, the distinction between fees and taxes is not as clear-cut as the text-book would have it. There are special-purpose taxes which are in a middle position. This holds especially for payroll taxes which pay for social-security benefits. Those who consider such taxes a *quid pro quo* payment in exchange for benefits might wish to exclude them unless the benefit payments are included as well. Similar issues, though less pronounced, arise with regard to highway finance. If extended sufficiently far, this line of reasoning leads to the proposition that there should be no allocation of tax burdens without allocating also expenditure benefits. (See para. 48.)

Third, the analysis may be comprehensive in including the combined tax structures of all levels of government (e.g. Federal, State and local in the U.S.); or, it may be limited to particular levels of government, or to the tax structure of particular regions (such as the tax structure of states or localities in the U.S.). Limitations in this sense will depend upon the purpose of the particular study, various views being useful for particular purposes. Where regional taxes are considered special

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*Taxation* (Toronto, 1952), National Tax Association, pp. 178-221; and 'The Distribution of Government Burdens and Benefits', *American Economic Review Papers and Proceedings*, XLIII (May 1953), pp. 504-43; R. A. Musgrave, 'The Incidence of the Tax Structure and Its Effects on Consumption', *Federal Tax Policy for Economic Growth and Stability*, Joint Committee on the Economic Report, U.S. Congress, November 9, 1955, pp. 96-113; R. A. Musgrave and Darwin Daicoff, 'The Incidence of Michigan Taxes', *Michigan Tax Studies*, Lansing, 1960; and G. A. Bishop, 'The Tax Burden by Income Class, 1958', *National Tax Journal*, Vol. XIV, No. 1, March 1961.

Among other studies, see especially Shirras and Rostas, *The Burden of British Taxation*, Macmillan, 1943; and A. T. Peacock, ed., *Income Redistribution and Social Policy*, Jonathan Cape, London, 1954; and G. Zeitel, *Die Steuerlastverteilung in der Bundesrepublik Deutschland*, J. C. B. Mohr, 1959.

problems arise, such as the question of how to treat that part of the tax burden which is exported. (See para. 44).

Finally, there are technical questions, such as whether to count taxes on an accrual or a cash basis and how to adapt tax receipts available only on a fiscal year basis to the corresponding income data, available on a calendar year basis. Considering the degree of precision (or lack thereof) applicable to other parts of the analysis, these technical problems are minor and need not worry us here.

#### *Distribution of tax payments by income brackets*

3. The next task is to allocate the revenue from each tax to family units grouped by size-brackets of income. (The question whether grouping should be by family or spending units is a fine point which may be passed over.) Alternatively, family units might be grouped by industrial, geographic or demographic criteria, depending on the purpose of the study. For most purposes, however, concern is with the effects of taxation on income distribution by size-brackets, and this is the view here taken.

4. The first and most important step is to decide to what economic category – type of consumer expenditure or factor income – each tax should be allocated. Only this basic allocation pattern (as distinct from that by size distribution) can be derived from general theorizing, and must hence be determined first. In the case of the corporation profits tax, for instance, we must decide whether the tax is to be imputed to the recipients of profit income, to the consumers or to other participants in production. For an excise on cigarettes, we must decide whether the tax is to be imputed to smokers, to the owners of tobacco plantations, or to workers. In making this decision, such empirical evidence as is available will be used, but this evidence is usually scarce. Tax legislators do not oblige the economist by arranging for convenient experiments, and statistical isolation of tax effects is difficult. In most instances, theoretical reasoning must be relied on.

5. The second step is to translate these allocations by economic categories into allocations by family units grouped according to size brackets of income. Here the approach shifts from a largely theoretical to a strictly empirical base. Regarding that part of the corporation tax which is allocated to the

recipients of profit income, we must determine the distribution of profit income by income brackets, and then distribute this part accordingly. Similarly, if it is decided to allocate the cigarette tax to the smokers, we must determine the distribution of consumer expenditures on cigarettes by income brackets, and then allocate the revenue from this tax accordingly.

In some instances reliable distributions are available to match the particular economic category to which the tax is allocated. Thus, a fairly good indication of the distribution of profit income is given in the U.S. by the distribution of dividend income in tax returns, published in the Treasury's annual *Statistics of Income*. In other instances, such as the distribution of consumer expenditures on tobacco, the data are less adequate. Lack of adequate information is painful especially in the allocation of certain important components of the property tax, such as the part which is to be imputed to rental payments by the tenant.

#### *Determination of effective rates*

6. After the distribution of tax payments by income brackets has been decided on, we take the ratios of taxes imputed to each income bracket to income received in that bracket. We thus obtain a schedule of 'effective rates' of tax, on the basis of which the prevailing degree of progression or regression may be measured.

7. The distribution of income, and hence the pattern of effective rates obtained from any given allocation of tax payments, depends on the choice of income concept. This is important especially with regard to inclusion or exclusion of various items of non-money income. Certain components of non-money income – including imputed rent, home-grown food, and so forth – tend to be distributed more equally (i.e. accrue more largely in favour of the lower income groups) than does money income. Their inclusion, therefore, reduces the degree of income inequality, and results in a more progressive, or less regressive, pattern of effective tax rates. The degree, or even the existence, of regression at the lower end of the income scale (in the tax pattern for the U.S.) may depend upon this choice of income concept.

8. In some respects, choice of the appropriate definition of income is a matter of judgement. While there is no absolute basis for telling how much non-money income should be

included, certain other issues may be answered on logical grounds. (See paras. 37, 46.) On the whole, however, the determination of effective rates is relatively straightforward, once the distribution of tax payments by income brackets has been obtained.

9. Such, at least, is the case in the United States, where the required data on the distribution of income are available. Where these data are unavailable, the pattern of effective rates cannot be determined in this fashion, even if an adequate distribution of tax payments could be determined. And if the basic data on income distribution are unavailable as well, the information needed to translate the distribution by economic categories will be lacking. In such cases, an attempt may still be made to derive some impression of burden distribution by estimating tax burdens for specified family units with stipulated income and expenditure patterns, designed so as to be representative of various points in the income scale.<sup>1</sup>

## II. DISTRIBUTION OF TAX PAYMENTS IN THE U.S.

10. On the basis of the data available for the U.S., a set of estimates such as that shown in Tables I-III may be obtained.<sup>2</sup> Table I shows the allocation of major taxes by income brackets. Table II shows the resulting pattern of effective rates for two income concepts, while Table III shows the 'differential' burden of effective rates. This differential burden (para. 13) is defined as the difference between the burden under actual taxes and that which would result under a proportional income tax of equal yield.

11. As will be seen from Table I, a much larger share of State and local taxes (line 17) is borne by the lower end of the income scale than of Federal taxes. This is the case especially if we exclude social security taxes (lines 7 and 15) but still holds if such taxes are included (lines 9 and 17). Within the Federal tax structure, we see how the individual income tax (line 3) draws the largest share from the higher income groups. The same pattern applies, for the very top of the scale, to the corporation

<sup>1</sup> For a study of this sort, see G. Zeitel, *op. cit.* Also, see C. Shoup, *The Fiscal System of Venezuela*, ch. 1, Appendix B.

<sup>2</sup> These tables do not present an extensive re-estimate on my part, but are included here to indicate the general nature of the results obtained from such an analysis. The results are based largely on those by Bishop (*op. cit.*), but some major adjustments were made where they seemed desirable. For details, see Appendix, below.

TABLE I

Percentage distribution of tax receipts for 1958

Tax source	Family personal income class							Total
	Under \$2,000	\$2,000-3,999	\$4,000-5,999	\$6,000-7,999	\$8,000-9,999	\$10,000-14,999	\$15,000-and over	
	%	%	%	%	%	%	%	%
1. Total taxes, excl. social security	2.3	9.3	16.8	15.4	10.7	13.3	30.8	100
2. Total taxes, incl. social security	2.8	10.8	18.7	16.8	10.6	12.5	27.3	100
<i>Federal taxes</i>								
3. Individual income	0.6	5.8	13.7	16.8	10.9	15.0	37.3	100
4. Corporation income	1.9	6.8	11.0	10.6	7.6	11.7	50.4	100
5. Excises and customs	4.0	13.2	22.4	20.2	13.3	14.2	12.8	100
6. Estate and gift	—	—	—	—	—	—	100.0	100
7. Total exc. soc. sec.	1.4	7.2	13.1	15.3	10.1	13.6	37.8	100
8. Social security	6.4	21.1	31.3	19.2	9.4	7.3	5.0	100
9. Total, incl. soc. sec.	2.2	9.4	16.9	16.0	10.0	12.6	32.5	100
<i>State and local taxes</i>								
10. Individual income	2.8	18.5	23.5	9.5	5.4	9.9	30.3	100
11. Corporation income	1.8	6.8	11.0	10.5	7.6	11.7	50.5	100
12. Property	4.6	14.9	23.9	20.0	12.3	11.9	12.2	100
13. Excises and sales	4.0	13.2	22.4	20.2	13.3	14.2	12.8	100
14. Estate and gift	—	—	—	—	—	—	100.0	100
15. Total, excl. soc. sec.	4.0	13.9	22.5	18.9	12.0	12.6	15.7	100
16. Social security	5.3	17.4	28.6	21.5	11.6	8.5	6.8	100
17. Total, incl. soc. sec.	4.1	14.2	23.0	19.1	12.0	12.3	15.0	100

income tax (line 4). Within the State and local structure, we note the large share of the property tax contributed at the lower end of the scale (line 12). Together with the weight of excises, this accounts for the difference in the overall distribution by levels of government. The absolute weight of the various taxes is given in Appendix Table A1.

12. The effective rates shown in Table II are based on a broad income concept similar to the Department of Commerce's concept of personal income. This concept is adjusted, however, to include various further components as required for consistency reasons in this type of analysis. (See Appendix Table A2.) We note that the overall pattern of effective rates (line 17) is U-shaped, being somewhat regressive at the lower end of the income scale, more or less proportional as a middle range, and progressive at the upper end of the scale.

At the bottom of the Table (line 17) this overall pattern is restated, applying now the same distribution of tax burden (as shown in Table I) to a concept of money income. This distribution is derived by excluding various major components of imputed income. (See Appendix Table A3.) Since this adjustment reduces low relative to high incomes, the regressivity of effective rates at the lower end of the scale is now more pronounced.

Turning to the components of the tax structure, and applying again the broader income concept, we note that the Federal system (line 7) is more or less proportional up to the top bracket, while the State and local system (line 14) is regressive throughout. (Note that these total results include social security taxes, a similar view excluding social security taxes being given in Appendix Table A4.) The Federal individual income tax is progressive throughout (line 2), and provides the major progressive component of the entire tax structure, both at the lower as well as the upper end of the scale. The corporation tax (line 3) is slightly regressive at the lower end and does not become progressive until a fairly high level of income is reached. Excises (line 5) are regressive throughout. Within the State and local structure, the income tax (line 8) is much less progressive, while the property tax (line 10) is regressive, especially at both ends of the income scale.

13. Table III, finally, repeats the overall results of Table II in the form of differential incidence. The figures show the loss (—) or gain (+), expressed as a percent of income, which results as

TABLE II  
Taxes as a percent of income<sup>1</sup>

Tax source	Family Personal Income Class							Total
	Under \$2,000	\$2,000–3,999	\$4,000–5,999	\$6,000–7,999	\$8,000–9,999	\$10,000–14,999	\$15,000–and over	
<i>Broadly-defined income concept</i>	%	%	%	%	%	%	%	%
1. Total taxes	33.1	29.6	28.6	27.7	25.4	25.2	36.3	29.5
<i>Federal taxes</i>								
2. Individual income	2.1	5.0	6.6	8.8	8.3	9.6	15.8	9.4
3. Corporation income	3.5	2.9	2.6	2.7	2.8	3.6	10.5	4.6
4. Excises and customs	4.6	3.6	3.5	3.3	3.2	2.9	1.7	2.9
5. Estate and gift	—	—	—	—	—	—	1.6	.3
6. Social security	8.3	6.5	5.4	3.6	2.6	1.7	.8	3.3
7. Total	18.6	18.0	18.1	18.4	16.9	17.8	30.4	20.8
<i>State and Local Taxes</i>								
8. Individual income	.6	.9	.6	.3	.2	.3	.6	.5
9. Corporation income	.1	.2	.1	.1	.1	.2	.5	.2
10. Property	6.8	5.1	4.6	4.1	3.8	3.0	2.1	3.7
11. Excises and customs	5.5	4.3	4.2	4.0	3.8	3.4	2.1	3.5
12. Estate and gift	—	—	—	—	—	—	.4	.1
13. Social security	1.5	1.1	1.0	.8	.6	.5	.2	.7
14. Total	14.5	11.6	10.5	9.3	8.5	7.4	5.9	8.7
<i>Money-income concept</i>								
15. Federal, Total	19.5	19.3	19.2	19.3	17.8	18.9	31.8	21.9
16. State and local, Total	15.2	12.3	11.1	9.9	9.1	7.8	6.2	9.3
17. Total, all levels	34.7	31.6	30.3	29.2	26.9	26.7	38.0	31.2

<sup>1</sup> The underlying distribution of income broadly defined is based on Appendix Table A2, line 6. The underlying distribution of money income is based on Table A3, line 9. The underlying tax distribution is given in Table I.

TABLE III  
Differential incidence<sup>1</sup>

Tax source	Family personal income class						
	Under \$2,000	\$2,000- 3,999	\$4,000- 5,999	\$6,000- 7,999	\$8,000- 9,999	\$10,000- 14,999	\$15,000- and over
<i>Broadly defined income concept</i>							
<i>Federal, Total</i>	+2.2	+2.8	+2.7	+2.4	+3.9	+3.0	-9.4
<i>State and local, Total</i>	-5.8	-2.9	-1.8	-0.6	-0.2	+1.3	+2.8
<i>Total, all levels</i>	-3.6	-0.1	+0.9	+1.8	+4.1	+4.3	-6.6
<i>Money-income concept</i>							
<i>Federal, Total</i>	+2.4	+2.6	+2.7	+2.6	+4.1	+3.0	-10.1
<i>State and local, Total</i>	-5.9	-3.0	-1.8	-0.6	+0.2	+1.5	+3.1
<i>Total, all levels</i>	-3.5	-0.4	+0.9	+2.0	+4.3	+4.5	-7.0

<sup>1</sup> Based on Table II.

the actual tax structure is substituted for a general proportional income tax. Corresponding to the previously noted U-shaped pattern of effective rates, we find that the two ends of the income scale lose, while the middle gains.

### III. RATIONALE OF ALLOCATING TAX PAYMENTS BY ECONOMIC CATEGORIES

We now turn to a closer look at the rationale underlying the allocation of particular taxes by economic categories.<sup>1</sup>

#### *Formulation of problem*

14. Some basic questions of methodology arise in the very formulation of the problem. At the outset, note that the income position of family units may be affected in two ways, both of which must be accounted for in our analysis. One set of effects stems from the 'income-sources' side, where tax policy may change the family unit's earnings before tax, and/or the share of these earnings taken by income tax. Another set of effects stems from the 'income uses' side, where tax policy may affect the real value of disposable income by raising or lowering the prices of goods on which the family's income is spent. Both effects – those from the income sources side and those from the income uses side – are equally relevant to our analysis. Both must be allowed for.

15. Our problem then is to determine the changes in income position, due to tax policy, which arise for the groups of family units in the various income brackets. These changes may be the result of a number of 'experiments'. Thus, we may (1) 'think taxes away' while holding public expenditures constant, a formulation of the problem which may be referred to as 'absolute incidence'. In this case, tax repeal would result in a corresponding deficit, leading to a change in the general level of prices and/or real income, with a resulting further chain of distributional change.

To avoid this difficulty, we may (2) consider the consequences of a simultaneous shrinkage of both sides of the budget accounts, i.e. a repeal of taxes accompanied by a corresponding cut in public expenditures, thus reversing the historical process of

<sup>1</sup> Inevitably, some of the following thoughts on incidence theory reflect the more detailed discussion to be found in Part Three (esp. Ch. 10, 13, 15 and 16) of my *The Theory of Public Finance*. Having said this much at the outset, I shall refrain from specific references to this discussion.

budget growth. This permits us to hold constant the level of aggregate demand, and hence the level of employment, the general level of prices and total factor earnings.<sup>1</sup> At the same time, this view of 'budget incidence' has the disadvantage of combining the distributional effects of expenditure change with those of tax change. As noted before, this combination is desirable for some purposes, but not for others.

In order to isolate the taxation effect, we may (3) assume the repeal of certain taxes – or for that matter, of all taxes – to be accompanied by the imposition of a proportional income tax of equal yield. This approach, which I refer to as 'differential incidence' permits us to isolate the distributional consequences of the tax adjustment from those of expenditure policy, and to do this without having to account for drastic changes in the general level of income. From many points of view this is the best solution, and the formulation here adopted.

16. Our procedure of adding in, or subtracting out, changes in income due to tax implies the assumption that, short of such corrections, the 'basic' distribution of income remains unchanged. Since changes in tax policy set forth a general chain of adjustments throughout the economy, this may seem an intolerable assumption.<sup>2</sup> The strength of this objection depends on how extensive our corrections are. Moreover, it depends on whether we are justified in assuming – as we shall do below in certain instances – that general adjustments not explicitly allowed for, are distributionally neutral.

17. The assumption of holding unchanged 'income before tax' is less objectionable if we deal with marginal changes in the tax structure than if we consider the tax structure as a whole; and if the marginal changes are sufficiently small, even the formulation in terms of 'absolute' incidence may be feasible. Granting this, I am not prepared to write off the need for a total analysis.<sup>3</sup> By the nature of tax policy, especially in its distributional objectives, the question of 'how should the burden of

<sup>1</sup> This is not quite correct. For the classical model, it disregards voluntary changes in factor supply due to tax changes, as well as changes in price level due to velocity changes. For the Keynesian model it disregards the fact that aggregate demand may change even though total yield is held constant. However, the resulting changes of this sort are obviously much less than for the case of 'absolute incidence'.

<sup>2</sup> See A. R. Prest, 'Statistical Calculations of Tax Burdens', *Economica*, Vol. XXII, No. 87, August 1955, pp. 234-45.

<sup>3</sup> For a contrary view, see A. R. Prest, *op. cit.*, p. 243.

additional taxes be distributed' cannot be answered independent of the burden distribution of existing taxes. Moreover, the prevailing tax structure is not a given data, beyond review and change by current policy. A total view is needed, be it on ability to pay, distributional or benefit grounds. The conclusion of this paper is that such a view is feasible with some degree of reliability, though admittedly more daring and less reliable than a marginal approach.

### *Individual income tax*

18. We now turn to the incidence of specific taxes, beginning with the individual income tax. This tax is assumed to rest on the initial payee. Income before tax is unchanged, and disposable income is reduced by the amount of tax. Since the income tax may be taken to be a general tax, this assumes that total factor supplies, labour and capital, are fixed. How objectionable an assumption is this?

19. With regard to work effort, theorizing suggests that effort will be lower under a progressive than under a proportional tax, although even this nominal result is uncertain if we consider effects on the group as a whole. There is no *a priori* conclusion that any one income tax (with a given degree of progression) will reduce work effort, or that it will raise it. Either result may come about, or work effort may remain unchanged. If the level of work effort falls, the true burden of the tax exceeds the nominal burden and vice versa if effort rises. Both possibilities are here disregarded. Moreover, changes in supply may give rise to changes in the pre-tax rates of return for factors, and in relative product prices. All these changes may affect relative income positions, but we have no way of determining these effects. Failure to allow for them, however, does not wholly invalidate the results obtained by assuming nominal burdens to stay put. It is not unreasonable to assume that. The secondary distributional changes which result from the substitution of a progressive for a proportional tax tend to be more or less neutral; and certainly there is no presumption that they will act as an offset to the change allowed for by assuming the tax to stay put.

20. A more serious doubt, perhaps, applies to the upper ranges of earned income, where the blurring of distinction between demander and supplier, as well as emphasis on relative

income positions, may lead to shifting by setting higher salary (or fee) rates before tax.

21. With regard to capital, the assumption of fixed supply is more dubious. Marginal propensities to save at various points in the income scale are not identical (although they differ less than is frequently assumed) and the supply of saving is not invariant to changes in the distribution of the tax burden. In the longer run at least, this may have repercussions on the rate of growth and factor shares. But the distributional implications of such changes are exceedingly difficult to assess (para. 36) and, given the nature of the production function, may again be more or less neutral.

*General sales tax on consumer goods*

22. A general sales tax on consumer goods (imposed at the retail, wholesale or manufacturer's level) is assumed to fall on the consumer. It is allocated in proportion to the distribution of total consumption expenditures on taxed goods. Since consumption expenditures fall as a fraction of income when moving up the income scale, the resulting pattern of burden distribution is regressive.

23. As distinct from this view, it has been suggested that a general sales tax on consumer goods is equivalent to a proportional tax on factor income, and that it should be allocated accordingly. This reasoning is correct for a simple economy where all income is currently consumed, but it is incorrect for an economy where income is divided between consumption and saving, and output is composed of both capital and consumer goods. Substitution of a tax on consumer goods for a proportional tax on factor income may remain neutral on the income-sources side, but it benefits the saver and hurts the consumer on the income-uses side. To the extent that savers will consume later, the gain is merely one of tax postponement; but to the extent that savings are retained in the form of accumulation, there is continued and absolute tax relief. In either case, allocation to consumption is justified.

24. Let us pause here to consider the internal consistency of our reasoning.<sup>1</sup> In connection with the income tax we have

<sup>1</sup> Prest (op. cit., p. 237) has charged inconsistency between the assumption (a) that factor supplies are fixed, and the assumption (b) that the supply of consumer goods is infinitely elastic. The first assumption he holds necessary to distinguish distributional effects from resulting changes in total output, as well as to the

argued that factor supplies are fixed. Is this consistent with the contention that substitution of a sales tax on consumer goods for an income tax transfers the burden from all income recipients to consumers, distributing gains and losses between family units in accordance with the division of their income use between saving and consumption? After the substitution, consumers get less for their money while savers get more. As a result, resources may shift from the production of consumer goods to that of capital goods. If so, some people who up to now were 'consumers' will, under the stimulus of the tax, become 'savers'. Or, saving may remain constant in real terms, as does real consumption. If so, the tax induces an increased share of money income to go into consumption. Either result is compatible with, and indeed has no bearing on, our contention that the entire burden should be allocated to the consumer.

25. Imputation of the general sales tax to the consumer implies allocation in accordance with consumption expenditures on the general group of products subject to tax. Normally, this includes outlays on durable consumer goods, while outlays on food will be frequently excluded. Outlays on rent will be included only to the extent that items subject to tax enter into construction cost, and so forth. While data on income distribution are readily available in the United States, data on the distribution of consumption expenditures are harder to come by and must be interpolated in part from sketchy data. This is the case especially with regard to consumption expenditures in the upper income groups.

26. Data on consumption to income ratios, based on family budget patterns, typically show a substantial range of dissaving at the lower end of the income scale. Thus, in current U.S. data, saving becomes positive only for income brackets in excess of, say, \$4,000. While all income brackets contain individuals who dissave, it is in these lower brackets that the weight of the

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conclusion of non-shifting under the income tax. The second condition is held necessary for the allocation of the sales tax to the consumer, since it is only with infinitely elastic supply that price rises by just the amount of tax.

Assumption (a) is the same as ours, although we adopt it for somewhat different reasons. Conclusion (b) we also reach, but not via Prest's condition that price rises by just the amount of tax. Our reasoning is independent of what happens to *absolute* prices, the argument being one of relative prices of consumer and capital goods, or of the costs of present and future consumption. As shown above, the supply of consumer goods does not have to be infinitely elastic, the validity of one argument being independent of whether the allocation of the product between consumption and capital formation remains fixed or changes.

dissavers exceeds that of the savers. The result is a heavy allocation of sales tax burden to the low income brackets. To a considerable degree, this dissaving may be accounted for by old people, who live on their past savings, but whose life-time incomes would reflect a zero or positive savings rate. Allocation of the sales tax burden by a distribution of life-time consumption, therefore, might give a more nearly proportional picture than does allocation by current consumption. At the same time, the distribution of saving for permanent accumulation is likely to be more progressive than that of savings for subsequent consumption, which factor points in the other direction.

*Selective sales or excise taxes*

27. Selective sales or excise taxes, similarly, are assumed to fall on the consumer of the taxed product. Thus, an excise on tobacco is distributed in proportion to consumer expenditure on tobacco. There is a clear justification for this procedure, if it can be assumed that the supply schedule for the taxed product is infinitely elastic. If the total product is produced under conditions of increasing cost, price will rise by less than the tax, and the return to factors engaged in the production of the taxed product will decline. Moreover, resources will be transferred to other lines of production, and the consumers of such products will benefit. How can total allocation by expenditures on the taxed article be sustained under such conditions?

28. To illustrate the principle involved, let us suppose that there are two products,  $x$  and  $y$ , and two producers  $A$  and  $B$ . We assume that  $A$  and  $B$  derive their incomes in equal proportion from the production of  $x$  and  $y$ ; but that  $A$  is largely a consumer of  $x$ , while  $B$  is largely a consumer of  $y$ . Now let a proportional income tax be replaced by an excise on  $x$ . Both  $A$  and  $B$  gain from the repeal of the income tax, and their relative factor earnings remain unchanged. The tax-substitution is neutral from the income-sources side. Since the price of  $x$  rises relative to that of  $y$ ,  $A$ 's position on the income-uses side is worsened relative to that of  $B$ . In the limiting case, where  $A$  consumes  $x$  only while  $B$  consumes  $y$  only, the entire burden has been transferred to  $A$ . For the case of mixed consumption, allocation of the burden in proportion to consumption of  $x$  will leave  $A$  with a net loss and  $B$  with a net gain, as should be the case. If the taxed product is a necessity, so that expenditures

thereon decline as a percent of income as we move up the income scale, substitution of the excise tax for a proportional income tax is regressive, just as substitution of a tax on luxuries would be progressive.

29. The principle of burden allocation by consumption pattern rests on the assumption that A and B share equally in the production of x and y, so that the change in the pattern of income-use generates no changes in the pattern of income-source. This assumption is unrealistic, in that different people do derive their incomes from participation in different industries, and transfer of occupation or investment is not always possible, especially not in the short run. Fortunately, however, our task is not to determine the distribution of tax payments by individuals, but to estimate the resulting changes in the size distribution of income. If it can be assumed that the size distribution of income originating in various industries is the same, changes on the income-sources side may be safely neglected; and the same may be expected to hold, provided that there is a random relationship between the distributional origin of expenditures on any particular product and the distributional destination of factor payments incurred in producing that product. There is a fair presumption that this is the case, thus justifying our procedure of disregarding changes from the income-sources side.

30. If excise taxes are to be allocated to the consumer, this is done best by allocating the revenues from a particular product in accordance with the distribution of consumption outlays on that particular product. However, the bulk of excise revenue is usually drawn from certain items of mass consumption, such as tobacco and liquor; and where this is the case the difference involved in allocating all excises by total expenditures on consumption is not likely to be very large.

### *Selective factor taxes*

31. Consider now a tax on the earnings from certain factors only, such as a tax on wage or profit income. Such taxes are again assumed to stay put with the recipient, and are allocated in proportion to the distribution of such income. Since profits rise as a share of income when moving up the income scale, a profits tax is progressive; a tax on wage income, for the opposite reason, is regressive.

32. If factor supplies are fixed, this conclusion follows without difficulty. If factor supplies decline due to the tax, allocation of the burden by nominal payment understates the true cost, as was noted for the income tax; and resulting changes in relative factor prices will have further repercussion on relative product prices. These in turn may affect income positions from the uses side. Arguing similar to para. 28, these effects from the uses side may now be disregarded by assuming that all factors contribute in equal proportions to the baskets of goods consumed by spending units at various points in the income scale. In this case, these effects from the uses side will be distributionally neutral. This is by and large a reasonable assumption, and we may expect that the distributional consequences of a selective factor tax will be dominated from the sources side. Where contrary evidence is available, corresponding changes from the uses side may be allowed for.

33. In a perfect market, it should make no difference whether a selective factor tax is assessed on the seller's or on the buyer's side of the counter. Thus, the distributional consequences should be the same, whether a pay-roll tax is imposed on the seller's or the buyer's side of the market. Yet it is customary to impute the former to the wage earner, while assuming the latter to be passed on to the consumer. This can only be justified on the assumption that the wage bargain is in terms of wage rates net of employer but gross of employee contribution, an assumption which is not easily reconciled with that of inelastic factor supply. Yet some allowance may be made for this consideration. Accordingly, we assume in the above estimates that wages absorb the entire employee-contribution, but only one-half of the employer-contribution, the other half being passed on to the consumer.

#### *Corporation profits tax*

34. Traditional theory has taken a stern view regarding the incidence of a profits tax. For the case of a general profits tax, the verdict has been that there can be no shifting by price adjustments in the short run. The tax, as a function of profits, affects neither marginal revenue or cost, thus leaving unchanged the price at which profits are maximized. However, the tax is likely to depress capital formation in the long run, thereby

reducing the rate of growth, with possible effects on rates of return before tax and on factor shares.

35. The short-run aspect of this conventional doctrine is not as convincing as the formulation suggests. It assumes that the concept of taxable profits coincides with the economist's concept of profits and postulates pricing behaviour of strict profit maximization under monopoly or pure competition. Actually, certain elements of variable cost may be treated as profits, and firms may operate under different behaviour rules. Under conditions of oligopoly, tax changes may operate as a signal to adjust price, and monopolists may follow pricing practices which qualify simple profit maximization. Sense of social responsibility or fear of anti-trust legislation may lead to 'restraint' in monopoly behaviour; pricing may be adjusted to provide for the needed volume of internal funds for desired capital expansion; and the concept of 'just (net) profit' may enter into wage demands in collective bargaining. In all, theoretical reasoning alone leaves us with an open case, and cursory observation of the economic scene gives fair support to the suspicion that some degree of short-run shifting does occur.

In the above estimates, we assume conservatively that one-third of the tax is shifted to the consumer while two-thirds fall on profits.<sup>1</sup> The former third is then allocated by consumption expenditures, similar to a general sales tax or, more strictly, by expenditures on corporation products; and the latter two-thirds are allocated by the distribution of dividend income.

36. The long-run aspect of the traditional doctrine may be valid, but it is difficult to interpret. Even if it could be determined whether and by how much capital formation is reduced, the distributional implications thereof are most difficult to ascertain. Depending on the nature of the production function, the pre-tax rate of return on capital may rise while the gross profit share remains unaffected (as in the Cobb-Douglas case), or the profit share may vary in either direction. The only feasible solution appears to be to disregard the long-run aspect, while allowing for some degree of shifting in the short-run sense.

37. The question remains whether the dividend recipient should be charged with the entire two-thirds of the tax, or only

<sup>1</sup> A just completed econometric investigation of short-run shifting (with Marian Krzyzaniak) suggests that the gross rate of return of U.S. manufacturing corporations, due to tax, increased by an amount sufficient to recover about one-half of the tax.

with that part thereof which is reflected in reduced dividend payments. Charging the dividend recipient fully is in line with imputing the retained earnings to the shareholder as profit income. It requires, therefore, that we should adjust the shareholder's income by adding thereto an amount equal to his share in retained earnings plus his share in the non-shifted part of the corporation tax. Unless this is done, the resulting picture of effective rate is distorted.

Under this procedure, the entire corporation tax may be allocated to family units, be it as consumers or as dividend recipients. If, on the contrary, it is held that retained earnings and the tax thereon may not be imputed to the shareholder, we are left in the embarrassing position of implying that this part of the tax falls 'nowhere', or on the corporation 'as such', while remaining unallocable to family units at the personal level.

38. One complication may be added to our preceding argument regarding the incidence of a general profits tax. The corporation profits tax, in reality, is not a truly general tax, but applies to profits from corporations only. As a result, and to the extent that such mobility exists, capital may be expected to move from corporate to unincorporated enterprise, until eventually net rates of return are equated in both sectors. To the extent that the tax is not shifted to the consumer, the resulting burden on profits is thus spread (in the long run) more broadly among proprietors of all forms of business; and the net rate of return in the corporate sector will decline by less than the full rate of tax, even without any shifting to the consumer. Allocation of the tax to profit income remains in order; and even allocation by dividend income remains appropriate provided only that profit income from unincorporated enterprise is distributed in the same way as profit income from incorporated enterprise. If the former type of profit income is distributed more equally, as may well be the case, allocation by dividend income overstates the progressivity of the corporation tax.

#### *Property tax*

39. In rationalizing the incidence of the property tax, considerable disaggregation is needed. The following components may be separated:

Real estate:

(a) Land: farm, rental, business

- (b) Improvements: farm, rental, business
- (c) Owner-occupied residences

Personal property:

- (d) Business, tangible and intangible
- (e) Farm, tangible and intangible
- (f) Non-farm, tangible and intangible

and different allocations may be applied to the various components. Thus, the items under (a), (c) and (f) may be assumed to fall on the owner and be distributed according to the corresponding pattern of ownership. Those under (b), (d) and (e) may be considered overhead costs and, in the longer run at least, be assumed to be paid by the consumer and distributed by corresponding patterns of consumption or rental payments. The appropriate allocation of the tax on rental property under (b) between tenants and landlords will depend upon the circumstances of the housing market. Its treatment may be of strategic importance in estimating the burden on the lower income brackets.

#### *Gift and transfer taxes*

40. In the case of gift and transfer taxes, a more or less arbitrary decision must be made whether such taxes should be imputed to the donor or donee. Proceeding on the former base, allocation is a simple matter, since the exemptions are usually so high, relative to the lower limit on the highest available income bracket, that these taxes may be assigned safely to family units in the top bracket.

#### IV FURTHER ISSUES

We now turn to a number of further problems, including the treatment of regional taxes, the concept of income, and expenditure incidence.

#### *Treatment of regional taxes*

In the preceding discussion we have proceeded on the tacit assumption that all taxes are imposed by a central government, operating in a closed economy. This is not the case. Various levels of government must be distinguished, and foreign trade must be allowed for.

41. A first problem (taking again the U.S. setting as an

illustration) relates to the treatment of State and local as distinct from Federal taxes.<sup>1</sup> Suppose it is agreed that a Federal excise on the manufacture of automobiles is passed to the consumer of automobiles. Now let such a tax be imposed by the State of Michigan only. We may expect incidence to remain the same provided that all automobiles are manufactured in Michigan, or are sufficiently concentrated in Michigan so that Michigan manufactures dominate the national market. If the opposite holds, i.e. Michigan manufacturers must sell at a price set for them in the national market, the Michigan tax must be absorbed by Michigan producers. It must be allocated from the income-sources side to Michigan capital and labour, depending on their relative abilities to move to lower-tax areas. This burden on Michigan producers would disappear if similar taxes were imposed by other states as well.

42. In dealing with the incidence of Michigan taxes, it is appropriate to consider a change in these taxes while holding the taxes of other states constant. Suppose now that we wish to consider the incidence of all State taxes taken together. In this case, all these taxes must be 'thought away' at once, or all must be considered as replaced by a proportional income tax. In this case it might seem simplest to aggregate all regional taxes and then to treat them as if they were imposed at a uniform central rate. But this would be wrong in principle. While it is proper to inquire into the distribution of the combined (Federal, State and local) tax burden, aggregation must allow for the fact that the component parts are imposed at regionally differential rates.

Suppose that a tax on the manufacture of automobiles is imposed in all states producing automobiles, but at different rates of tax. For instance, the Michigan rate is 10 per cent, the Indiana rate is 8 per cent, and the Illinois rate is 5 per cent. We may then consider the first 5 per cent a general tax to be allocated to the consumer; the next 3 per cent rate will be divided between consumers and factors in Indiana and Michigan, while the final rate of 2 per cent will be paid largely by factors in Michigan.

The more uniform the regional pattern, the less damage will be done by treating regional taxes as if they were uniform Federal taxes, but typically considerable diversity is present.

<sup>1</sup> For a further discussion and application of these problems see Musgrave and Daicoff, *op. cit.*

This is important not only as between states, but also with regard to inter-county differences in effective property tax rates, thus further complicating the treatment of this tax. Having expounded the proper principle, it behoves us to add that these differentials are not readily allowed for in practice. In particular, no such allowance was made in the estimates of Table I above.

43. Consider now the problem of separately estimating the distribution of the tax burden for any particular sub-region, i.e. the State of Michigan. In this case, the appropriate procedure is to 'think away' Michigan taxes or, rather, to replace Michigan taxes by a proportional Michigan income tax, while holding constant taxes in all other states. The estimated incidence of Michigan taxes in *such* an analysis, therefore, will differ from that of the Michigan component in the incidence of all (Federal, State and local) taxes.

44. A final problem, in measuring the incidence of regional taxes, is posed by the treatment of such part of the tax burden as is exported to the 'foreigner'. Suppose again that Michigan dominates the national market, and Michigan manufacturers succeed in passing the burden of a manufacturer's excise on automobiles to the consumer. The Michigan share in the burden now is limited to the Michigan share in automobile purchases, and the remainder is allocated to family units outside Michigan. Now it may be argued that Michigan not only exports part of its taxes, but also imports part of the taxes imposed by other states. While this is true, it does not seem appropriate to include these imported taxes into an estimate of the burden of Michigan taxes on Michigan households – at least, not if we can disregard retaliation and assume that tax imports are independent of tax exports.

45. These problems, here discussed in terms of U.S. Federal and State taxes, are of obvious importance to the analysis of central taxes in an economy which is highly involved in international trade. Even where the total involvement is less, these considerations may be highly important for particular industries. Moreover, they become crucial for tax burdens in common-market countries, where we have a combination of a broad free trade area with regionally limited tax systems, but varied and independent fiscal structures. In such a setting the closed-economy case is obviously a great oversimplification of a much more complex problem.

*Choice of income concept*

46. As previously noted (see para. 7), the resulting pattern of effective rates (the degree of progression or regression) depends not only on the distribution of tax burdens, but also on the concept of income which is used to determine the underlying pattern of income distribution. Whether to include imputed income, and which types thereof, or whether to limit the analysis to money income is a matter of opinion. Once elements of imputed income are included, there is no logical stopping-point, and a good argument can be made for choosing that income concept which is used for purposes of income tax. In the U.S. this leaves us pretty much with a pure money-income concept.

The income-tax concept may be defective, however, and it may be held that a broader and more meaningful concept should be used. Clearly, this is necessary in the case of countries where a large part of income is in non-money form. In all, the best answer is that more than one base should be used, which is the procedure followed in Tables II and III above.

47. Certain other issues of income definition are subject to a more definite solution. The proper treatment of retained earnings and the non-shifted part of the corporation-income tax was noted already in para. 37. In apparent analogy to the corporation tax, it has been suggested recently that sales or excise taxes which are allocated to the consumer on the tax side, should also be allocated to him (and by the same pattern) on the income side.<sup>1</sup> If this is done, the resulting distribution will be more favourable to the lower income groups, and the tax distribution (schedule of effective rates) will be less regressive or more progressive than otherwise. Inclusion of such taxes on the income side, however, would be a mistake.

When making a comparison of overall tax burdens between countries, it is quite proper to compare the ratios of total taxes to net-national product at market prices. Use of net-national product of factor cost would exaggerate the burden of excise or sales-tax intensive as against income-tax intensive, countries. But it does not follow from this that income, to be included in the income distribution for purposes of analysing tax-burden distribution, should be defined to add up to net-national product at factor cost. This is an entirely different matter and requires a different income concept.

<sup>1</sup> See G. O. Bishop, *op. cit.*, p. 45.

Consider again the case of the corporation tax, the unshifted part of which is properly added to income. This tax element is part of corporation profits before tax, and hence forms part of the shareholder's pre-tax income. By the same token, repeal of the corporation tax would raise his income accordingly. All this follows (see para. 37 above) from the underlying interpretation of the corporation as a partnership. But the sales tax is a different matter. This tax is not a part of the household's pre-tax income. The taxpayer is burdened by the sales or excise tax because he chooses to use his income for consumption of the taxed products. Putting it differently, repeal of a general sales tax would benefit all suppliers of factors proportionately from the income-sources side so that – if the tax were to be allocated at all on the income side – it would have to be allocated in proportion to income and not to consumption. Since the allocation on the income-source side would be proportional, nothing is changed by omitting it. What remains is the difference on the income-uses side between consumers and savers – or, for selective excises, between consumers of different products – and this is allowed for properly by allocating the tax burden according to consumption.

48. Similar considerations apply to the treatment of social security contributions. Assume first that social security taxes are included on the tax side of the burden distribution. The taxes should then be included on the income side, provided they fall on wages and are not shifted to the consumer. In Tables II and III above, we thus include the entire employee contribution and one-half the employer contribution on the income side, where the analogy to the unshifted part of the corporation tax holds; and do not include the half of the employer contribution which we assume to be shifted forward, so that the analogy to the excise case applies.

Assume now that social security taxes are to be excluded on the tax side of the calculation. The appropriate procedure, in this case, would be to compute income as before, by adding back such part of payroll taxes as fall on wages, but then to deduct social security benefits from income. If the social security plan is on a *quid pro quo* basis, the two sides will tend to cancel.

#### *Treatment of public expenditure*

49. Our entire discussion has been concerned with the

distribution of the tax burden, without much reference to the distributional implications of the expenditure side of the budget. This partial view of redistribution through the budget is useful and methodologically feasible, especially if formulated in terms of differential incidence. At the same time, I hasten to add that any meaningful theory or policy of public finance must ultimately combine the issues posed by the two sides of the budget. This indeed, is the cardinal principle of the economist's view of public finance. The distributional implications of expenditure policy, therefore, pose an important further problem.

50. The distinction between transfer payments and goods and service (or 'exhaustive') expenditures is useful in this connection. The distributional implications of transfer payments may be dealt with similar to those of taxes. Transfer payments, conceptually, may be translated readily into (negative) taxes, and divided into various groups, e.g. negative lump sum taxes, income taxes, excises and so forth. Their incidence may be determined on this basis quite similar to that of positive taxes; and in either case, the incidence or distributional result is an important, if not *the* central policy objective.

51. Goods and service expenditures are a different matter. Such expenditures may have distributional implications by affecting factor earnings and prices, and thus the 'private' income of family units. They may be important, but they are not a direct policy objective. They are incidental to the process of providing general benefits by satisfying social wants. Thus, goods and service expenditures affect the total income position of family units by making available free of direct charge the benefits of public services. While I consider it necessary, for the theory of public finance, to relate such benefits to the subjective preferences of individuals, it is obvious that the empirical problems of imputation by income brackets are most difficult.

52. On the one extreme, we have such wholly general services as national defence or space exploration. Whether the benefits therefrom should be allocated on a *per capita*, proportional or progressive basis is difficult to say. Yet, what is done here will greatly affect the resulting pattern of distribution through the budget. On the other extreme, we have such outlays as public hospitals for charity patients, where an imputation to low-income groups is possible; or of highway expenditures, the benefits of which might be allocated by direct or indirect auto-

motive consumption. In the middle, we have expenditures on education which combine private benefits to the student and are allocable to income brackets by number of schoolchildren, with public benefits which result for society as a whole from a higher level of education. Like benefits from defence, these are most difficult to allocate. Unfortunately, the private and general-type benefits are combined in unspecified proportions, thus precluding a neat division.

53. The fact that allocation of total benefit is difficult or impossible does not prevent us from doing so in those areas where such allocation can be made.<sup>1</sup> At the same time, this leaves us in the awkward position of not being able to move from an analysis of the distributional effects of certain expenditure policies to the distributional effects of the budget as a whole. If *all* expenditure benefits could be allocated, a *net* picture could be obtained by deducting the allocation of the *total* tax burden from the allocation of *total* expenditure benefits. But since only certain expenditures can be included, what *part* of the tax burden are we to choose for the netting procedure?

54. One answer is to pair certain expenditures and taxes which are linked contractually (e.g. payroll taxes and social security expenditures) or by open or tacit earmarking (e.g. gasoline taxes and highway expenditures). In the highway case, the purpose of benefit taxation should produce net-distributional neutrality. In the social security case, some redistribution remains, but the very nature of the tax-expenditure combination again points in a similar direction. What is important, in this case, is not so much redistribution by income brackets but redistribution by other groupings, such as young and old, healthy and indigent, owners of small and large cars, and so forth.

55. Such partial results are of some interest, but they do not give an overall picture of budgetary redistribution. For this purpose, general benefits and general taxes cannot be omitted. Moreover, the partial view tends to be misleading. Those special benefits which can be allocated tend to be distributed such that the ratio of benefits to income falls when moving up the income scale; and the corresponding benefit taxes tend to be regressive. The resulting impression is that there is little redistribution. Inclusion of the more progressive general-purpose taxes,

<sup>1</sup> See Musgrave and Daicoff, *op. cit.*

combined with a proportional (or, in any case, less progressive) allocation of general benefits, suggests a considerably higher degree of fiscal redistribution and tends to give a more realistic picture.

#### *Explanation to Tables*

##### *Table A-1*

Source of total tax receipts in the last column: Department of Commerce, *Survey of Current Business*, July 1954, p. 21.

Line 3. Individual income taxes are distributed according to the distribution of personal income tax liability given in Appendix Table A-5, line 1.

Lines 4 and 11. The corporation income tax is assumed to fall two-thirds on profits while one-third is shifted on to consumers in the form of higher prices. Therefore, two-thirds is distributed according to the distribution of dividends in Table A-5, line 2; and the remainder is distributed similarly to the distribution of consumption expenditures in Table A-5, line 3.

Lines 5 and 13. Excises, customs duties and sales taxes are assumed shifted forward in higher prices; therefore they are allocated to consumption expenditures as in Table A-5, line 3.

Lines 6 and 14. Estate and gift taxes are allocated to the upper income bracket as in the Bishop study.

Line 8. Social security contributions on the Federal level. Employee contributions are assumed to fall on wage earners, and therefore their share is allocated like covered wages in Table A-5, line 4. One-half of the employer's contribution is assumed to be shifted forward by way of higher prices while the remainder is shifted back to the factors of production; namely, labour. That portion shifted backwards is distributed like covered wages, whereas that part of the employer's contribution shifted forward is allocated like consumption expenditures in Table A-5, line 3.

Line 10. The individual income tax on the State and local level is distributed similarly to the distribution of the Wisconsin income tax distribution in Table A-5, line 6.

Line 12. The property tax distribution is the same as in the Bishop study where one-half is allocated to consumption expenditures and one-half is distributed like housing expenditures in Table A-5, line 7.

Line 16. State and local social security payments are allocated as in the Bishop study; that is, all to wages and salaries, a distribution of which is found in Table A-5, line 5.

##### *Table A-2*

Line 1. Family personal income is distributed by Table A-5, line 8, given in Department of Commerce, *Survey of Current Business*, April 1959, p. 11, and July 1959, pp. 8, 9.

Line 2. Social security contributions are broken down according to Department of Commerce, *Survey of Current Business*, July 1959, p. 22. Out of a total of \$15,121 million, employee contributions are \$6,989, while the remaining \$8,132 is contributed by the employer. The employee contribution and one-half of the employer contribution is imputed to income on the basis of covered wages in Table A-5, line 4.

TABLE A-1

Distribution of Tax receipts for 1958

Tax source	Family personal income class							Total
	Under \$2,000	\$2,000- 3,999	\$4,000- 5,999	\$6,000- 7,999	\$8,000- 9,999	\$10,000- 14,999	\$15,000- and over	
	<i>Millions of dollars</i>							
1. Total taxes, excl. social security	2,224	8,955	16,120	15,791	10,312	12,771	29,489	95,654
2. Total taxes, incl. social security	3,166	12,061	20,788	18,764	11,804	13,909	30,296	110,775
<i>Federal taxes</i>								
3. Individual income	201	2,040	4,836	5,937	3,837	5,288	13,159	35,299
4. Corporation income	335	1,177	1,904	1,835	1,316	2,032	8,733	17,321
5. Excises and customs	444	1,478	2,508	2,261	1,490	1,598	1,442	11,222
6. Estate and gift	—	—	—	—	—	—	1,350	1,350
7. Total, excl. soc. sec.	977	4,695	9,248	10,033	6,643	8,918	24,684	65,192
8. Social security	801	2,643	3,909	2,400	1,183	911	626	12,468
9. Total, incl. soc. sec.	1,778	7,338	13,157	12,433	7,826	9,829	25,310	77,660
<i>State and local taxes</i>								
10. Individual income	54	351	446	180	103	188	573	1,895
11. Corporation income	16	59	95	91	66	101	436	863
12. Property	648	2,091	3,347	2,796	1,727	1,663	1,713	13,984
13. Excises and sales	529	1,759	2,984	2,691	1,773	1,901	1,716	13,353
14. Estate and gift	—	—	—	—	—	—	367	367
15. Total, excl. soc. sec.	1,247	4,260	6,872	5,758	3,669	3,853	4,805	30,462
16. Social security	141	463	759	573	309	227	181	2,653
17. Total, incl. soc. sec.	1,388	4,723	7,631	6,331	3,978	4,080	4,986	33,115

TABLE A-2  
Distribution of income broadly defined (1958)

Source	Family personal income class							
	Under \$2,000	\$2,000- 3,999	\$4,000- 5,999	\$6,000- 7,999	\$8,000- 9,999	\$10,000- 14,999	\$15,000- and over	Total
	<i>Millions of dollars</i>							
1. <i>Family income</i>	8,500	37,100	67,400	63,900	44,200	51,900	65,000	338,000
2. Social security contributions	807	2,624	3,825	2,090	895	530	243	11,056
3. Retained earnings	59	234	344	378	311	682	4,504	6,512
4. Corporate profits tax	109	436	643	703	582	1,273	8,389	12,123
5. Realized capital gains	67	268	394	432	357	781	5,150	7,442
6. Family income, adjusted	9,542	40,662	72,606	67,503	46,345	55,166	83,286	375,133
	<i>Percentage distribution</i>							
7. <i>Family income</i>	2.5	11.0	19.9	18.9	13.1	15.4	19.2	100
8. Social security contributions	7.3	23.7	34.5	18.9	8.1	4.8	2.2	100
9. Retained earnings	.9	3.6	5.3	5.8	4.8	10.5	69.2	100
10. Corporate profits tax	.9	3.6	5.3	5.8	4.8	10.5	69.2	100
11. Realized capital gains	.9	3.6	5.3	5.8	4.8	10.5	69.2	100
12. Family income adjusted	2.5	10.8	19.3	17.9	12.3	14.7	22.1	100

TABLE A-3

*The derivation of an estimated distribution of money income*

Source	Family income brackets							Total
	Under \$2,000	\$2,000- 3,999	\$4,000- 5,999	\$6,000- 7,999	\$8,000- 9,999	\$10,000- 14,999	\$15,000 and over	
1. <i>Family personal income</i>	\$ 8,500	\$ 37,100	\$ 67,400	\$ 63,900	\$ 44,200	\$ 51,900	\$ 65,000	\$ 338,000
<i>less:</i>								
2. Food to Gov't employees	104	342	562	425	230	169	134	1,966
3. Imputed rent of owner-occupied dwellings	49	956	1,604	1,488	961	1,010	1,110	7,178
4. Food and fuel grown and consumed on farms	165	437	400	266	127	167	201	1,762
5. Net imputed interest paid	90	810	1,540	1,551	1,077	1,772	2,182	9,022
6. Total imputed income	408	2,545	4,106	3,730	2,395	3,118	3,627	19,928
7. <i>Family money income</i>	8,092	34,555	63,294	60,170	41,805	48,782	61,373	318,072
8. Percentage distribution of family money income	2.5%	10.9%	19.9%	18.9%	13.1%	15.3%	19.3%	100%
9. <i>Adjusted family money income</i>	9,134	38,117	68,500	64,273	43,950	52,048	79,657	355,205
10. <i>Taxes as a per cent of adjusted family money income</i>	34.7%	31.6%	30.3%	29.2%	26.9%	26.7%	38.0%	31.2%



TABLE A-5

*Percentage distribution of the basic series*

	Family personal income							
	Under \$2,000	\$2,000- 3,999	\$4,000- 5,999	\$6,000- 7,999	\$8,000- 9,999	\$10,000- 14,999	\$15,000- and over	Total
1. Personal income tax liability (Federal, 1957)	%	%	%	%	%	%	%	%
2. Dividends	0.6	5.8	13.7	16.8	10.9	15.0	37.3	100
3. Consumption expenditures	0.9	3.6	5.3	5.8	4.8	10.5	69.2	100
4. Covered wages	4.0	13.2	22.4	20.2	13.3	14.2	12.8	100
5. Wages and salaries	7.3	24.1	34.6	18.9	8.1	4.8	2.2	100
6. Wisconsin individual income tax	5.3	17.4	28.6	21.6	11.7	8.6	6.8	100
7. Housing expenditures	2.8	18.5	23.5	9.5	5.4	9.9	30.3	100
8. Family personal income	5.3	16.7	25.5	19.8	11.4	9.5	11.7	100
9. Farm operator families (aggregate family personal income)	3.0	11.0	20.0	19.0	13.0	15.0	19.0	100
10. Housing expenditures (Goldsmith)	9.4	24.8	22.7	15.1	7.2	9.5	11.4	100
11. Interest (Goldsmith)	0.7	13.3	22.3	20.7	13.4	14.1	15.5	100
	1.0	9.0	17.1	17.2	11.9	19.6	24.2	100

Line 3. Retained earnings are imputed to income on the basis of dividend income as in Table A-5, line 2.

Line 4. The unshifted part of the corporation income tax must also be imputed to income. Since it is assumed to fall on profits, it is imputed on a basis of dividend distribution in Table A-5, line 2.

Line 5. The source for the total realized capital gains is the Treasury: *Statistics of Income for 1958*, part I, pp. 7 and 62. Net long-term gains are counted at 100 per cent. Realized capital gains are distributed by income brackets according to Table A-5, line 2.

Line 6. Family income, adjusted on lines 1 plus 2 through 5 is allocated to the bracket limits initially defined with regard to 1 only. More correctly the bracket limits should be shifted upward, but failure to do so is not critical for our purposes.

#### Table A-3

Line 1. Family personal income is the same as in Table A-2, line 1. The totals lines 2 through 7 are from: Department of Commerce, *Survey of Current Business*, July 1959, p. 42.

Line 2. Food furnished to Government employees and clothing to the military (\$1,790 million) and employee lodging (\$176 million) are distributed like wages and salaries in Table A-5, line 5.

Line 3. Net rent of owner-occupied farm and non-farm dwellings is allocated according to a revised estimate provided by Selma Goldsmith.

Line 4. Food and fuel grown and consumed on farms are allocated like a distribution of farm operator families in Table A-5, line 9.

Line 5. Net imputed interest paid is allocated according to an interest distribution provided by Selma Goldsmith like 2.

Line 8. The percentage distribution of line 8 given in line 9 may be compared with an estimated distribution of money income derived from data supplied by the Bureau of the Census: *Current Population Reports - Consumer Income*, Series P-60, No. 35, pp. 1, 18, 25 (Table 4). While the Census data is not given in directly comparable form an attempt at estimating a distribution on the basis of that data leads to the following ratios by size brackets: 4.0, 10.9, 20.6, 21.1, 14.3, 16.5, 12.4. It appears that our distribution is rather similar except for the two extreme brackets, where we impute less to the lowest and more to the top bracket.

Line 9. Adjusted family money income is obtained by adding to family money-income lines 2 through 5 of Table A-2. For both lines 7 and 9 the same comments with regard to bracket limits made in connection with line 6, Table A-2, apply.

Line 10. Text Table I, line 2, as a percent of line 9, this table.

#### Table A-4

This table parallels Table II of the text with the exception that social security is excluded. The underlying income concept is given in Table A-2, line 6 minus line 2. The taxes are given in text Table 1, lines 3 through 7 and 10 through 15.

#### Table A-5

These are the distributive series by which our allocations were made. Lines 1 and 8: Department of Commerce, *Survey of Current Business*, April 1959, pp. 11, 16.

Line 3: Estimates of data in I. Friend and S. Schor, 'Who Saves' in *Review of Economics and Statistics*, May 1959.

Lines 2, 4, 5: The Treasury: *Statistics of Income*, Part 1, 1957, p. 23.

Line 6: *Research Report to the 1957 Wisconsin Legislature*, Vol. II, p. 165.

Line 7: *Life Study of Consumer Expenditures*, Vol. I, 1957.

Line 9: Department of Commerce, *Survey of Current Business*, July 1959, Table II - 12, p. 20.