TAXES AND INCOME: A MICROUNIT ANALYSIS

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The paper details the methodology used and the results obtained in a recently completed study of the total U.S. tax burden based on microdata survey files. The method of constructing the data base—the 1966 MERGE file—is discussed, and the needed imputations and adjustments to income and taxes to bring the file totals up to national income aggregates are described. An explanation is included of adjusted family income, a unique income concept used in the study to measure and compare tax burdens.

The study involved the evaluation of effective tax burdens under eight different assumptions regarding the incidence of the various major taxes. Those assumptions are detailed and the results of the study are presented. The essential conclusion of the study is that the overall impact of the tax system is virtually proportional for 90 percent of the families in the United States regardless of the incidence assumptions used. However, substantial differences in tax burdens were found among various subgroups of the population.

Economists and policymakers have long been interested in the distribution of total taxes by income classes. While a number of empirical studies on this subject have been published during the past 30 years,[1] the earlier studies generally utilized a size distribution of income derived from a household survey and then allocated the various taxes by income classes on the basis of alternative shifting assumptions and the best available indexes available to implement the assumptions. Frequently, the income concept used for the income size distribution was different from the concept used to allocate taxes. Moreover, the allocations were based on grouped data which made it impossible to link the income and tax payments of individual family units in the distribution.

My colleague, Joseph A. Pechman, and I recently completed a study of U.S. tax burdens in 1966 that is very much in the tradition of the earlier studies.[2] However, in our work we introduced a number of modifications that have been made possible by the technology of high-speed electronic computers. The income and tax estimates were made for each unit in a representative sample of 72,000 family units.[3] Tax burden estimates were prepared not only for all families, but

[1]One of the earliest studies was by Gerhard Colm and Helen Tarasov, *Who Pays the Taxes?*, Temporary National Economic Committee, Monograph No. 3 (U.S. Government Printing Office, 1941). Another important study was by 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*, Vol. IV (March 1951), pp. 1–54. Also, see W. Irwin Gillespie, "Effect of Public Expenditures on the Distribution of Income," in Richard A. Musgrave (ed.), *Essays in Fiscal Federalism* (Brookings Institution, 1965), pp. 122–186; Roger A. Herriot and Herman P. Miller, "The Taxes We Pay," *The Conference Board Record*, Vol. VIII (May 1971), pp. 31–40, and Richard A. Musgrave, Karl E. Case and Herman Leonard, "The Distribution of Fiscal Burdens and Benefits" (Harvard Institute of Economic Research, Cambridge, 1973; processed), pp. 1–31.

[2]*Who Bears the Tax Burden?* (Brookings Institution, 1974).

[3]Throughout the study, the term "family" is used to describe single individuals as well as the Census family concept of two or more persons related by blood, marriage, or adoption.

also for several significant demographic and economic subgroups. Perhaps most important, we prepared estimates of the distribution of tax burdens on the basis of eight different sets of assumptions regarding the incidence of the major taxes in the U.S. tax system. We did not attempt to resolve the question of tax incidence, but to provide estimates of the distribution of tax burdens under several major competing views. While the study is of interest because of the methodology employed as well as the substantive results, here I will concentrate on the procedures used for deriving the income, tax, and resultant tax burdens in the analysis.

THE DATA

In the past, the data available for tax and income distribution analysis have been deficient in two respects: first, they did not represent the entire income-receiving population; and second, they failed to include all the income known to have been received by that population. While annual information on income subject to tax is available from the U.S. Internal Revenue Service from federal individual tax returns, the omission of people not required to file distorts the distribution for those at the bottom of the income scale. The U.S. Census Bureau also collects income information each year from about 50,000 households which are a representative sample of the total U.S. population. But, besides using a different enumeration unit, the Census employs an income concept that excludes capital gains and other important income items. In addition, both the tax data and the Census data understate income in varying degrees and therefore cannot be linked with personal income and other aggregate statistical series. To remedy these defects, we constructed a new data set—called the MERGE file—that combines the best information available from both the Internal Revenue Service and the Census Bureau. In creating this file, information on 30,000 families and single persons from the 1967 Survey of Economic Opportunity (SEO), conducted by the Census Bureau for the U.S. Office of Economic Opportunity, was combined with data from a file containing information from 90,000 federal individual income tax returns filed for the year 1966.[4] All of this information is available on magnetic tape and can be processed quickly and efficiently on a high-speed electronic computer. The availability of the computer technology permitted us to prepare estimates in the type of detail that was never possible with the older data processing techniques.

DEFINITION OF CONCEPTS

To the average citizen, *income* and *taxes* may seem self-evident concepts: income is the sum of the earnings he receives for his labor services and the return on the investment of his capital; taxes are the amounts he is obliged to pay to the government. These are also the definitions that the economist would apply in the circumstances of most individuals, but they ignore many complications that arise

[4]For details on the methods used to create the file, see Benjamin A. Okner, "Constructing a New Data Base from Existing Microdata Sets: The 1966 MERGE File," *Annals of Economic and Social Measurement*, Vol. 1 (July 1972), pp. 325–342.

from the intricacies of a modern economy and of the government's relationships to the taxpayer.

Income

Economists define the term income as the amount an individual can spend during a particular time period and still have the same net assets (valued in money terms) at the end of the period as at the beginning. Another way of saying the same thing is that income is the sum of an individual's consumption outlays and the increase (or decrease in the value of his assets during a time period.[5] Although it is almost universally accepted by economists, no government or private agency provides regular income estimates on the basis of this concept. The closest data available are those from the national income series published annually by the U.S. Department of Commerce. Family income, the income measure from which the basic income concept used in the study was developed, was based on the national income series.

National income is the value, at factor costs, of the goods and services produced by the nation's economy. It includes compensation of employees, proprietors' income, net interest, net rental income of persons, and corporate profits before taxes. To make this concept correspond to the economists' definition of income for a household unit, transfer payments, gifts and bequests, and accrued gains on capital assets must be added. As defined in the study, family income includes transfer payments and accrued capital gains, but does not include gifts and bequests because of the difficulty of reliably estimating them. In addition since the analysis was confined to family units, income received by persons in the institutional population and by pension funds and nonprofit organizations and income retained by fiduciaries was excluded from family income.[6]

The national income accounts provide estimates of transfer payments,[7] but not of accrued capital gains. Such gains were estimated separately for corporate stock and for other assets. In the case of corporate stock, it was assumed that the retained earnings of corporations provide a rough approximation of the accrued gains on such stock.[8] In the case of other assets, it was necessary to combine estimates of the changes in the value of business inventories, farm assets, and nonfarm real estate. Changes in the value of business inventories are given in the national income accounts; changes in the value of farm assets and nonfarm real estate were estimated on the basis of other sources.

[5]Outlays include tax payments on income as well as the taxes that are paid as part of the market price of consumption goods and services.

[6]The only other departure from the official national income definition was the omission of interest imputed to individuals for the services rendered to them by the banking system.

[7]Interest payments by the federal government are regarded as transfer payments in the national income accounts. Consequently, these were included in the transfer payments that were added to national income in deriving family income.

[8]This approximation is used because the annual fluctuations in the value of corporate stock are very large and even three-to-five year averages may not give an adequate representation of accrued capital gains. Martin J. Bailey and Martin David have shown that over very long periods of time, capital gains on corporate securities are roughly equal to retained earnings. See Martin J. Bailey, "Capital Gains and Income Taxation," in Arnold C. Harberger and Martin J. Bailey (eds.), *The Taxation of Income from Capital* (Brookings Institution, 1969), pp. 15–26; and Martin David, *Alternative Approaches to Capital Gains Taxation* (Brookings Institution, 1968), pp. 242–246.

It should be noted that family income excludes some receipts that are ordinarily regarded as income and includes income that is never received in the form of money. Examples of receipts that are excluded from family income are private pensions and annuities and government retirement benefits (such as civil service pensions) that are not financed through payroll taxes. Private employer and government contributions to such programs are considered income to workers during the year in which the employee earns the benefit;[9] later when payments are received, they are viewed as representing only a change in the form of asset holding by families (that is, cash is increased and a prepaid insurance asset is reduced). Thus, only payments to families financed through payroll taxes or general government revenue were considered transfers and included in family income. The major forms of nonmoney income other than accrued capital gains that were included in family income are employer supplements to wages and salaries for health and other employee benefits and net imputed rent on owner-occupied dwellings.

TABLE 1

DERIVATION OF FAMILY INCOME FROM NATIONAL INCOME, 1966 (IN BILLIONS OF DOLLARS)

Item	Amount
National income (as defined in the national income accounts)	620.6
Plus:	
Transfer payments to persons[a]	63.3
Accrued capital gains on business inventories, farm assets, and nonfarm real estate	36.6
Subtotal	99.9
Less:	
Income not received by family household population[b]	45.6
Imputed interest	15.2
Subtotal	60.8
Equals:	
Family income	659.8

Sources: U.S. Department of Commerce, *Survey of Current Business,* Vol. 50 (July 1970), Tables 1.10, 2.1, 7.2; and authors' estimates based on unpublished worksheets of the Office of Business Economics, U.S. Department of Commerce. Details may not add to totals because of rounding.

[a]Includes net interest payments by the federal government and by consumers which are regarded as transfer payments in the national income accounts.
[b]Includes incomes of persons in the military and institutional population and proprietors' and property income received by fiduciaries, pensions funds, and nonprofit organizations.

The derivation of family income from national income is shown in Table 1. In 1966, national income amounted to $620.6 billion. To construct the family income estimate from this, it was necessary to add transfer payments of $66.3

[9]The federal government does not make current contributions to a fund for military retirement pay, but pays them out of general revenues when military personnel retire. An allowance for the accrued rights of such personnel was not made because there were no data to make such an estimate.

billion and accrued capital gains on business inventories, farm assets, and nonfarm real estate of $36.6 billion. Income not received by households and imputed interest, which amounted to $60.8 billion, was then subtracted, leaving family income of $659.8 billion.

Taxes

The definition of taxes in the study was basically the same as that of government receipts, as defined in the national income accounts. However, since government receipts is a more comprehensive concept than taxes, nontax revenues were excluded from the tax measure. In addition, tax collections attributed to institutions or organizations not in the household population were excluded, and customs duties and estate and gift taxes were omitted from the tax concept.[10] In 1966, total federal, state, and local government receipts amounted to $213.3 billion, while taxes as defined in the study were $183.5 billion (Table 2).

TABLE 2

DERIVATION OF TAXES FROM GOVERNMENT RECEIPTS, 1966 (IN BILLIONS OF DOLLARS)

Receipts	Amounts
Federal, state, and local government receipts	
(as defined in the national income accounts)[a]	213.3
Less:	
Personal and business nontax receipts	7.7
Corporate profits taxes of tax-exempt and other organizations	
not in household population	8.2
Nontax social insurance contribution receipts	7.8
Miscellaneous state-local receipts	0.3
Federal customs duties	1.9
Estate, gift, and death taxes	3.9
Subtotal	29.8
Federal, state, and local taxes	
(as defined in the study)	183.5

Sources: U.S. Department of Commerce, *Survey of Current Business,* Vol. 50 (July 1970), Tables 3.1, 3.3, 3.8; and authors' estimates based on unpublished worksheets of the Office of Business Economics, U.S. Department of Commerce.

[a]Adjusted to exclude the duplication of federal grants-in-aid to state and local governments.

Nontax receipts include personal and business nontax receipts, some items that are regarded as social insurance receipts in the national income accounts, and an assortment of state-local fees and licenses. Nontax receipts from persons are primarily charges for tuition at state colleges and universities and local hospital fees, while nontax receipts from business include rents and royalties and an assortment of fees collected for various government services.[11] The excluded

[10] The net receipts of government enterprise were also excluded from the tax concept used in the study, since these receipts are clearly payments for services rendered.

[11] An exception was made in the case of government receipts from persons for motor vehicle licenses. These are included in the tax concept (as is done in the national income accounts) even though this levy might be defined as a user charge.

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social insurance receipts are payments for civilian government retirement plans which resemble private pension plans. They were omitted because payments into such plans are not regarded as taxes; they represent payments on behalf of individuals for the purchase of future retirement benefits. Nontax receipts of states and local governments consist primarily of marriage license fees, charges for dog licenses, and other similar items.

About one-fourth of all corporate stock is owned by fiduciaries and other organizations not represented in the family population. Total corporation tax accruals were reduced by $8.2 billion to reflect these amounts not borne by family units in the household sector.

The last category of adjustments—the exclusion of customs duties and estate and gift taxes—was made for special reasons. In the case of customs duties ($1.9 billion), the exclusion was based on the presumption that customs duties are levied primarily for nontax reasons.[12] In the case of the estate and gift taxes ($3.9 billion), it obviously makes little sense to distribute death taxes among people who have died, since they no longer exist in the population. Logic would suggest that death and gift taxes be allocated among the current owners of the taxed property that was transferred. However, this would require that the amount of gift or bequest upon which the tax was levied also be distributed among such persons. There was little statistical information available on families who received gifts or bequests in 1966 and therefore no reliable basis upon which to allocate either the assets transferred or taxes collected.

Total 1966 taxes by source are shown in Table 3. For all levels of government, personal taxes and payroll taxes amounted to about half of the $183.5 billion in total taxes. However, as is well known, state and local governments in the United States rely much more heavily on indirect business taxes (which include real estate property taxes) than does the federal government. For the lower levels of government, indirect business taxes accounted for 84 percent of total taxes paid by households, personal taxes were equal to 13 percent, and the other 3 percent was derived from corporate profits taxes. For the federal government, the distribution of revenue by source was quite different: 10 percent of total taxes paid by households came from indirect business taxes, 70 percent from personal income and payroll taxes (social insurance contributions), and almost 20 percent from the corporate profits tax.

Effective Tax Rates

Relative tax burdens in the study were measured by comparing effective rates of tax paid by family units. These were computed by expressing taxes paid as a percentage of income, and thus reflect the proportion of the family's income which is accounted for by taxes.[13]

The income concept used for measuring effective tax rates was *not* family income, but a concept derived from it called *adjusted family income*. This concept

[12]This decision to exclude customs receipts from taxes was a close one. Since these amount to only about 1 percent of total tax receipts, their inclusion would not alter the conclusions of the study.

[13]Although income is generally regarded as an acceptable measure, it should be noted that *income for a single year* (which may be unusually high or low) may be a poor indicator of "true" or "normal" financial status for many families. Current-year income was used for measuring tax burdens in the study because income information for longer periods of time was not available.

TABLE 3

FEDERAL, STATE, AND LOCAL TAXES, BY SOURCE, 1966 (IN BILLIONS OF DOLLARS)

Source	Federal	State and local	Total
Personal taxes			
Income taxes	58.6	5.4	64.0
Motor vehicle licenses	—	1.1	1.1
Property taxes	—	0.8	0.8
Subtotal	58.6	7.4	66.0
Corporate profits taxes	24.4	1.7	26.1
Indirect business taxes			
State-local general sales taxes	—	10.6	10.6
Excise taxes			
Gasoline	2.9	4.8	7.7
Liquor	4.0	1.0	5.0
Tobacco	2.1	1.6	3.7
Other excises	3.6	—	3.6
Motor vehicle licenses	—	1.1	1.1
Other taxes	—	4.9	4.9
Property taxes	—	24.6	24.6
Subtotal	12.7	48.6	61.2
Payroll taxes	30.0	0.3	30.3
Total	125.7	57.9	183.5

Sources: U.S. Department of Commerce, *Survey of Current Business*, Vol. 50 (July 1970), Table 3.1, 3.3, 3.8; and author's estimates based on unpublished worksheets of the Office of Business Economics, U.S. Department of Commerce. Details may not add to totals because of rounding.

bears the same relationship to family income as net national product does to national income: adjusted family income is simply family income plus indirect business taxes. The relationship among the concepts of net national product, national income, family income, and adjusted family income is shown in Table 4.[14]

Adjusted family income is the most appropriate income concept for comparing tax burdens because it would be incorrect to compare burdens which include sales and excise taxes with an income concept which does not include such taxes. Since we were comparing tax burdens under several different shifting assumptions with reference to a proportional income tax, it was necessary to use a consistent income basis.[15] To achieve this, family income of all units was increased

[14]In addition to the adjustment for indirect business taxes, business transfer payments, and the statistical discrepancy were subtracted from the net national product and subsidies less the current surplus of government enterprises added to arrive at adjusted family income.

[15]The same kind of adjustment would be needed in a comparison of tax burdens in different countries that used different tax sources. For example, consider two countries, A and B, which produce total goods and services (net of depreciation) with a market price value of $1,000. Assume that each collects $200 in taxes. Assume, also, that in Country A half the tax revenue is derived from sales and excise taxes, while in Country B all revenue comes from an income tax. In both countries, the real effective tax rate is 20 percent. However, in Country A, national income (valued at factor costs) is $900 (the $1,000 of net product less $100 of indirect business taxes paid indirectly by consumers to the government), while in Country B the national income (which includes taxes levied on the earnings of factors of production) is the full $1,000. Thus, unless indirect taxes are included in income, Country A's tax burden would appear to be 22.2 percent, as compared with 20 percent in Country B.

TABLE 4

RELATIONSHIP AMONG NET NATIONAL PRODUCT, NATIONAL INCOME, FAMILY INCOME,
AND ADJUSTED FAMILY INCOME, 1966 (IN BILLIONS OF DOLLARS)

Item	Amount
Net national product	685.9
Less: Indirect business tax accruals and other adjustments[a]	65.3
Equals national income	620.6
Plus: Net adjustments to arrive at family income[b]	39.2
Equals: Family income as derived from the national income accounts	659.8
Plus: Indirect business taxes[c]	61.2
Equals: Adjusted family income	721.0

Sources: U.S. Department of Commerce, *Survey of Current Business*, Vol. 50 (July 1970), Table 1.9; and Table 1, p. 282, and Table 3, p. 285.

[a]Includes business transfer payments, the statistical discrepancy, and subsidies less current surplus of government enterprises.
[b]See Table 1, p. 282.
[c]Excludes customs duties and nontax receipts and includes other adjustments required for the distribution of tax burdens to household units.

proportionally by the ratio of indirect business taxes to family income, on the assumption that the use of indirect taxes does not alter the distribution of factor incomes. The resulting concept was the basis for measuring effective rates of tax throughout the study.

INCIDENCE ASSUMPTIONS

In the past, studies of the distribution of tax burdens by income classes were based on a more or less standard set of assumptions regarding the incidence of the major taxes. The individual income tax was assumed to be borne by those who paid it. Sales and excises were assumed to be borne by consumers of the taxed commodities. The corporation income tax was assumed to be borne only in part by stockholders; the remainder was allocated to consumers and, occasionally, to corporate employees. The property tax on residences was regarded as a tax on housing services, and the tax on commercial and industrial buildings was assumed to be shifted to consumers. The property tax on land was allocated to owners of land. Payroll taxes imposed on employees were assumed to be borne by them, while those imposed on employers were assumed to be shifted partly to employees and partly to consumers. For the most part, these assumptions were pragmatic compromises made by the analysts in the absence of a consensus among economists on the incidence of the major taxes in the tax system.

During the past fifteen years, there has been a substantial change in the method economists use to analyze tax incidence. The distinguishing feature of this method is that it provides a consistent framework for the analysis of tax incidence, although it has not eliminated differences of opinion about the

incidence of particular taxes. Nevertheless, important modifications are being made in the conclusions regarding the distribution of the burdens of some of the major taxes in the tax system.

The current approach attempts to determine the incidence of a tax by following through its effects on (1) the incomes received by the producers of the taxed commodity or sector (the sources of funds), and (2) the consumption expenditures of individual households (the use of funds). The burden of a tax on any household is the sum of the burdens borne by its members both as producers and as consumers.

Since economists still disagree about the incidence of several of the most important taxes in the overall tax system and since we were able to use a computer to manipulate the MERGE file, we did not limit ourselves to any one view of tax incidence. Instead, estimates were prepared on the basis of eight different sets of incidence assumptions that span the range of opinions currently held.

The eight sets of assumptions used in the calculations in the study may be classified into three basic variants, each illustrating a major approach to tax incidence. The assumptions in each group were chosen to illustrate the effect of modifications in the incidence of one or more of the major taxes without departing from the basic rationale of the particular variant. In all eight sets, it was assumed that the individual income tax is not shifted by the taxpayer, and that general sales and excise taxes are borne by consumers in proportion to their consumption of the taxed items. The major differences among the sets relate to the incidence of the corporation, property, and payroll taxes. The variants and modifications are summarized in Table 5 and are described briefly below.

Variant 1 illustrates the distribution of tax burdens on the assumptions that supplies of labor and capital are fixed and there is perfect competition, price flexibility, and perfect factor mobility. Payroll taxes on both employers and employees were assumed to be borne by employees in proportion to their taxed earnings; the corporation income tax and the property tax on improvements were regarded as taxes on all property income and distributed in proportion to the property income received by each family. In Variant 1A, it was further assumed that the property tax on land is capitalized and was therefore borne by landowners in proportion to the value of land owned. In Variants 1B and 1C, the property tax on land was treated in the same way as the property tax on improvements (that is, it was allocated among all recipients of property income). In addition, in Variant 1C, half the corporation income tax was assumed to be borne by stockholders and the other half was assumed to be borne by owners of property in general.

In *Variant 2*, the corporation income tax was allocated to stockholders in proportion to the dividends they received; the property tax on dwellings was allocated in proportion to the cash or net imputed rent of households, and the property tax on commercial and industrial real estate was allocated to consumption in general. The two sets of assumptions in this variant differ with respect to the treatment of the payroll tax levied on employers. In Variant 2A, which follows the assumptions that are implicit in the U.S. national income accounts, the employer payroll tax was assumed to be borne by employees. In Variant 2B, half of the employer tax was assumed to be shifted to consumers, and the other half was assumed to be paid by employees.

TABLE 5
MAJOR INCIDENCE ASSUMPTIONS USED

Tax and method of allocation	Variant 1			Variant 2		Variant 3		
	A	B	Cᵃ	A	B	A	Bᵇ	C
Individual income tax								
To taxpayers	X	X	X	X	X	X	X	X
Sales and excise taxes								
To consumption of taxed commodities	X	X	X	X	X	X	X	X
Corporation income tax								
To dividend recipients				X	X			
To property income in general	X	X						
Half to dividends; half to property income in general			X					X
Half to dividends; one-quarter to consumption; one-quarter to employee compensation						X		
Half to property in general; half to consumption							X	
Property tax on land								
To landowners	X			X	X	X	X	X
To property income in general		X	X					
Property tax on improvements								
To shelter and consumption				X	X	X	X	
To property income in general	X	X	X					
Half to shelter and consumption; half to property income in general								X
Payroll tax on employees								
To employee compensation	X	X	X	X	X	X	X	X
Payroll tax on employers								
To employee compensation	X	X	X	X		X		X
Half to employee compensation; half to consumption					X		X	

ᵃMost progressive variant.
ᵇLeast progressive variant.

Variant 3 presents various compromises among the incidence views represented in the other variants. Variant 3A allocated the corporation income tax among three groups: half to stockholders; one-quarter to consumers of corporate products; and the remaining quarter to corporate employees. In all other respects, this variant followed the national income accounts assumptions (Variant 2A). In Variant 3B, half the corporation income tax was allocated to consumers and the remaining half was allocated to property income in general; in addition, half the payroll tax on employers was assumed to be shifted to consumers. In Variant 3C, half the corporation income tax was allocated to stockholders and half to property income in general, the payroll tax was assumed to be borne entirely by employees, and half of the property tax on improvements was assumed to be borne by recipients of property income and the other half shifted in the form of higher prices for shelter and consumption goods.

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Although it may not be immediately obvious, the total adjusted family income as well as the taxes paid by units in the household sector depend on the incidence assumptions that are adopted with respect to the various taxes. Under the conventions used in the national income accounts taxes borne by labor or capital are included in national income computed at factor costs. Indirect business tax accruals, which are assumed to be shifted to consumers, are included in the national income computed at market prices. As indicated earlier, family income corresponds to the national income at factor costs, while adjusted family income corresponds to national income at market prices.

However, these relationships apply only under the incidence assumptions used in the national income accounts (Variant 2A). Whenever there is a departure from these assumptions (that is, when a tax is assumed to be borne by consumers rather than by labor or capital or vice versa), family incomes and adjusted family incomes must be changed. The changes are required for two reasons: first, factor incomes are overstated in the national income accounts to the extent that the tax is shifted to consumers; and, second, where taxes are borne by property owners, the amount of taxes allocated to the household sector will depend upon the proportion of total property income received by that sector.[16]

Since all eight sets of assumptions shown in Table 5 treat the individual income tax and sales and excise taxes in the same way, modifications in family income and adjusted family income were required to maintain consistency between the definitions of income and taxes only for the corporation income tax, the property tax, and the payroll tax.

1. When the corporation tax was assumed to be borne entirely by stockholders, the tax is included in factor incomes and hence in family income. This is the procedure used in the national income accounts. However, if part or all of the corporation income tax was assumed to be borne by recipients of property income in general, that part was subtracted from incomes obtained from the corporate sector and added to all property incomes. Similarly, if part or all of the corporation tax was assumed to be shifted forward to consumers, that part was excluded from corporate incomes and added to indirect business taxes.

2. In the national income accounts, the property tax is regarded as an indirect business tax. If all or part of the tax is regarded as a tax on property incomes, property income as measured in the national income accounts was increased by the part of the property tax which was not in factor incomes.

3. Employer and employee payroll taxes are treated in the national income accounts as if they were both borne by employees. If part or all of the payroll tax is assumed to be shifted forward to consumers, that part was deducted from employee compensation and treated as an indirect business tax.

When a tax on labor or capital was assumed to be shifted forward to consumers, the amount of family income was reduced, but adjusted, family income remained unchanged. However, in some cases, the population affected by the tax was different under the two sets of assumptions. For example, if the

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[16]In making these adjustments, it was assumed that consumption patterns and factor shares are the same under the different incidence assumptions.

corporation income tax was treated as a tax on stockholders, the tax was allocated between stockholders in households and financial institutions and only the tax borne by households was included in family income. On the other hand, if part of the corporation income tax was assumed to be shifted to consumers, that part is borne entirely by units in the household sector (since financial institutions do not make consumer expenditures). In this case, the shifted portion of the corporation income tax was excluded from family income, but it reappears as an indirect business tax in adjusted family income.[17]

The steps in the derivation of adjusted family income under each incidence variant are shown in Table 6. For variants under which it is assumed that part of the corporation income tax and payroll tax is shifted to consumption, the shifted part was deducted from family income because it becomes equivalent to an indirect business tax. For those variants which assume that part or all of the property tax is borne by property income, that part was included in family income and deducted from indirect business taxes. The final adjustment was to add indirect business taxes to family income to arrive at adjusted family income.

ALLOCATION OF TAXES

Estimates of the 1966 taxes paid by each family unit in the MERGE file were made under each of the eight sets of incidence assumptions. The federal individual income tax was carried over from the tax file return associated with the family demographic data when the MERGE file was constructed. The portion of the corporation income tax borne by each family was estimated and distributed in accordance with each incidence variant. Payroll taxes were estimated on the basis of the employment incomes reported in the MERGE file or, to the extent shifted to consumers, on the basis of total money consumption. For other taxes, the information reported for persons who had itemized deductions on their federal income tax returns was used when available and the remainder was estimated on the basis of other information in the file.

Since state-local income taxes, retail sales taxes, gasoline excises, and property taxes are allowed as itemized deductions in computing federal individual income tax liability, it was necessary to estimate these taxes only for families who did not itemize or were nonfilers in 1966. The same general allocation procedure was used for each tax. Total collections were first divided between the tax estimated to have been collected from business firms and the tax paid directly by households. The taxes paid by business were assumed to be shifted forward and were distributed among families in proportion to their total money consumption. The taxes paid directly by households were distributed among nonitemizer families on the basis of their estimated consumption of the taxed items in the case of the specific excise taxes and on the basis of total money consumption in the case of the general sales taxes.

[17]In all cases, reductions and increases in family income were allocated among households in proportion to the income sources that were affected by the change. When a tax was distributed in proportion to property incomes in general, the allocation was made on the basis of property income *after* tax (including corporation profits after tax).

TABLE 6

DERIVATION OF ADJUSTED FAMILY INCOME UNDER VARIOUS INCIDENCE ASSUMPTIONS (IN BILLIONS OF DOLLARS)

Item	Variant							
	1A	1B	1C	2A	2B	3A	3B	3C
Family income as derived from national income accounts	659.8	659.8	659.8	659.8	659.8	659.8	659.8	659.8
Less: corporation income tax in national income accounts	−26.1	−26.1	−26.1	−26.1	−26.1	−26.1	−26.1	−26.1
Subtotal	633.7	633.7	633.7	633.7	633.7	633.7	633.7	633.7
Corporation income tax allocated to:								
Corporate stockhoiders			13.0	26.1	26.1	13.0		13.0
Property income in general	30.2	30.2	15.1				15.1	15.1
Corporate compensation						8.6		
Payroll tax (portion of payroll tax assumed to be shifted to consumption)					−8.1		−8.1	
Property taxes allocated to:								
Property income in general	15.0	21.7	21.7					7.5
Landowners (tax on site value)	7.5			7.5	7.5	7.5	7.5	7.5
Family income for each set of incidence assumptions	686.4	685.5	683.5	667.3	659.2	662.8	648.2	676.9
Indirect business taxes:								
Property taxes				17.1	17.1	17.1	17.1	8.5
Federal excise taxes	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7
State-local sales and excise taxes	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
Taxes treated as indirect taxes:								
Corporation income tax						8.6	17.1	
Payroll tax					8.1		8.1	
Adjusted family income	723.1	722.2	720.1	721.0	721.0	725.1	727.2	722.0

Sources: Table 1, p. 282; Table 3, p. 285; and author's estimates based on unpublished worksheets of the Bureau of Economic Analysis, U.S. Department of Commerce. For an explanation of the incidence variants, see Table 5 and pp. 287–290. Detail may not add to totals because of rounding.

Because not all states had income taxes in 1966, it was necessary to select nonitemizer families subject to tax. This was done by assuming that the percentage of nonitemizer families paying state income taxes was the same as the percentage of the population in income tax states in 1966. The families were selected randomly and the tax amounts were allocated on the basis of the reported taxes of itemizer families of similar size, composition, and income. It was assumed that all real estate property taxes reported as itemized deductions were levied on owner-occupied dwellings. The amount not included in the itemized deductions was distributed among families that did not itemize deductions or were nonfilers on the basis of the value of homes or rental payments. The corporation income tax, employment tax, and property taxes were distributed differently under the various incidence assumptions.

Corporation Income Tax

Since the corporation income tax was assumed to be borne by different groups under the different incidence variants, each set of assumptions involved allocations of the corporation income tax among different families and allocations of different amounts of tax.

In 1966, federal and state corporation tax accruals were $34.3 billion. When part of the tax was assumed to be shifted to workers or consumers, the amount shifted was calculated as a percentage of the $34.3 billion total. Thus, under variants 2A and 3B, either one-half or one-quarter of the total ($17.1 billion or $8.6 billion) was distributed on the basis of consumption or compensation. When the tax was allocated to stockholders or recipients of property income in general, the total amount distributed to families changed, because part of corporate earnings or property income is not received by units in the household sector. When the tax was allocated among stockholders, only 76 percent of the total ($26.1 billion) amount was used. When the tax was assumed to be borne by recipients of property income in general, 88 percent ($30.2 billion) was allocated.

After computing the amount of corporation income tax to be distributed for each incidence variant, the tax was allocated among family units in the MERGE file either in proportion to dividend income or property income received by each unit.[18] When it was assumed that part of the tax is shifted to workers, that part was distributed in proportion to total compensation of corporation employees. When part of the corporation income tax was assumed to be borne by consumers, the distribution among families was based on their estimated total money consumption.

As shown in Table 7, the amount of 1966 corporation income tax distributed to families under the eight incidence assumptions differs considerably, ranging from $26.1 billion under variants 2A and 2B to $32.2 billion under variant 3B.

[18]Since there was no direct information on assets owned, it was assumed that income from property is a reliable indicator of property value throughout the study. It is recognized, of course, that this does not take account of nonearning assets, but it is not felt that the omission seriously distorts the results. Ideally, the allocation should have been based on the income shares as they would have been before the imposition of any taxes. Since these amounts cannot be observed, it was assumed that the relative shares could be approximated by the net receipts *after* the corporation income tax, but *before* personal income tax.

TABLE 7

TOTAL TAXES UNDER VARIOUS INCIDENCE ASSUMPTIONS (IN BILLIONS OF DOLLARS)

Item	Incidence variant							
	1A	1B	1C	2A	2B	3A	3B	3C
Individual income tax	64.0	64.0	64.0	64.0	64.0	64.0	64.0	64.0
Corporation income tax								
To dividends				26.1	26.1			
To property income in general	30.2	30.2						
Half to dividends; half to property income			28.1					28.1
Half to dividends; one-quarter to consumption, one-quarter to corporate compensation						30.2		
Half to property; half to consumption							32.2	
Personal property tax and motor vehicle licenses	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Property tax on land								
To landowners	7.5			7.5	7.5	7.5	7.5	7.5
To property income in general		6.6	6.6					
Property tax on improvements								
To shelter and consumption				17.1	17.1	17.1	17.1	
To property income in general	15.0	15.0	15.0					
Half to shelter and consumption; half to property income in general								16.1
Sales and excise taxes	36.6	36.6	36.6	36.6	36.6	36.6	36.6	36.6
Payroll tax on employees	14.1	14.1	14.1	14.1	14.1	14.1	14.1	14.1
Payroll tax on employers								
To employee compensation	16.2	16.2	16.2	16.2		16.2		16.2
Half to employee compensation; half to consumption					16.2		16.2	
Total taxes	185.6	184.7	182.6	183.5	183.5	187.7	189.7	184.6

Sources: Table 3, and Table 15; and author's estimates based on unpublished worksheets of the Office of Business Economics, U.S. Department of Commerce. For an explanation of the incidence variants, see Table 5 and pp. 287–290. Details may not add to totals because of rounding.

Property Tax

Like the corporation income tax, the amount of the property tax paid by families in the household sector varied with the incidence assumption used. If the property tax is considered a tax on shelter and consumption, the entire tax is borne by families; but if the tax is in whole or in part a tax on property income, part of the tax is borne by nonprofit institutions and other groups. Moreover, because the incidence of the taxes on the site value of land and on structures and improvements was assumed to be different in six out of eight variants, it was necessary to estimate these two components of property tax collections and to allocate them separately among family units.

State-local property tax collections reported in the national income accounts amounted to $25.4 billion in 1966. This is the sum of $820 million of personal property taxes, which are regarded as personal tax receipts in the national income accounts, and $24.6 billion of real property taxes, which are regarded as indirect business tax accruals.

The $820 million of personal property taxes consists primarily of taxes levied on automobiles and household furnishings of individuals. Because there was no information on the value of family household furnishings subject to tax in the MERGE file, personal property taxes were distributed among families on the basis of the value of automobiles reported in the SEO. The distribution is the same under all the incidence variants.

The first step in allocating real property taxes to families in the file was to divide the $24.6 billion total among amounts collected on property owned by nonfarm households and farms and nonfarm business enterprises. These estimates were based on 1966 property values from a study by Allen D. Manvel.[19] The estimated collections by sector were $9.5 billion from nonfarm housing; $4.1 billion from farmers; and $10.9 billion from nonfarm business. For each sector, the total was allocated between taxes collected on land and structures on the basis of Manvel data.

Two assumptions were used to allocate the $7.5 billion of property tax collected on land: (1) the tax is borne by landowners; and (2) it is borne by owners of property in general. On the first assumption, the tax on the site value of land was distributed among homeowners, farmers, and owners of business property in proportion to the gross value of property. On the second assumption, 88 percent of the $7.5 billion was distributed among all families on the basis of property income (the same basis used to distribute the corporation income tax on this assumption).

The $17.1 billion of property tax collected on structures and improvements was distributed on the assumptions that: (1) it is borne by shelter and consumption; (2) it is borne by property income in general; and (3) half is borne by shelter and consumption and half is borne by property income in general. On the first assumption, the $6.9 billion of taxes on nonfarm dwellings was distributed to

[19]Allen D. Manvel, "Trends in the Value of Real Estate and Land, 1956 to 1966," *Three Land Research Studies*, National Commission on Urban Problems, Research Report No. 12 (U.S. Government Printing Office, 1968), pp. 1–17. Taxes were allocated on the basis of market value rather than assessed valuations. It was felt that, on the average, the effective tax rate on market value is more reliable than the rate on assessed value which varies widely both within and among jurisdictions.

homeowners on the basis of gross house value (since they would bear this in their role of tenants renting from themselves) and the $1.4 billion of property taxes on multiple family housing was allocated to renters in proportion to reported rental payments. The $8.7 billion of taxes on structures and improvements used in agriculture and other nonfarm businesses was allocated among all families in proportion to their total money consumption (excluding rent).

On the assumption that taxes on structures are borne by owners of capital in general, $15.0 billion (88 percent of $17.1 billion) was allocated among all units in proportion to their property income. The third incidence assumption is simply a mixture of the first two: $8.5 billion (50 percent of $17.1 billion) was allocated to shelter and consumption and $7.5 billion (50 percent of $15.0 billion) was distributed among property income recipients.

Payroll Taxes

Employer payroll taxes for social security, unemployment insurance, and workmen's compensation were assumed to be borne by employees under all the incidence variants except variants 2B and 3B. In these cases, half the employer tax payments under these programs were assumed to be shifted forward to consumers. Therefore, one-half of total employer payroll tax payments were allocated to families on the basis of their total money consumption.

The social security payroll tax on employees was assumed to be borne by workers under all the variants. These taxes were calculated on the basis of the earnings of employees and the self-employed in the MERGE file.

Sales and Excise Taxes

General and selective sales taxes were assumed to be borne by consumers under all of the incidence variants used in the study. Since consumption data were not collected in the original survey, estimates of consumption for each family unit were added to the file in order to allocate these taxes.

The consumption estimates were based on data collected in the Bureau of Labor Statistics' 1960–61 Consumer Expenditure Survey. The 1960–61 data were projected to 1966 income and consumption levels for eleven major demographic groups of families on the assumption that consumption to income ratios would be the same at the same *relative* levels in the income distribution. After aggregate consumption was projected to the 1966 level, separate projections within the total were made for each of several consumption items (such as alcohol, tobacco, gasoline, etc.) which are subject to special excise taxes. This was also done by assuming the same consumption patterns for families at the same relative income levels in 1960–61 and 1966. Examination of the distribution results and comparison of the totals with national income aggregates for 1966 indicated that this method gave reasonable results.

Income, Taxes, and Effective Tax Rates

Table 8 summarizes the amounts of family income, adjusted family income, and taxes under each of the eight incidence variants. Although there are

TABLE 8

FAMILY INCOME, ADJUSTED FAMILY INCOME, TAXES, AND EFFECTIVE RATE OF TAX UNDER
VARIOUS INCIDENCE ASSUMPTIONS (DOLLAR AMOUNTS IN BILLIONS)

Incidence assumption	Family income	Adjusted family income	Total taxes	Effective rate of tax[a]
Variant 1A	$686.4	$723.1	$185.6	25.7%
Variant 1B	685.5	722.2	184.7	25.6
Variant 1C	683.5	720.1	182.6	25.4
Variant 2A	667.3	721.0	183.5	25.5
Variant 2B	659.2	721.0	183.5	25.5
Variant 3A	662.8	725.1	187.7	25.9
Variant 3B	648.2	727.2	189.7	26.1
Variant 3C	676.9	722.0	184.6	25.6

Sources: Table 6, p. 291 and Table 7, p. 293.

[a]Based on adjusted family income.

significant differences in aggregate family income among the variants, differences in adjusted family income—which reflect only the differences in the populations to which taxes were allocated—are relatively small. As a result, the differences in effective rates are small, ranging from a low of 25.4 percent (Variant 1C) to a high of 26.1 percent (Variant 3B).[20]

While the differences in aggregate effective rates are small, the tax burdens of individual families may vary greatly under the different sets of incidence assumptions. All income and tax adjustments were carried through to individual family units and the distributions by income classes reflect these adjustments. Thus, a family with an income of $10,000 under one set of assumptions may be classified in a higher income class under another set and in a lower class under a third set.
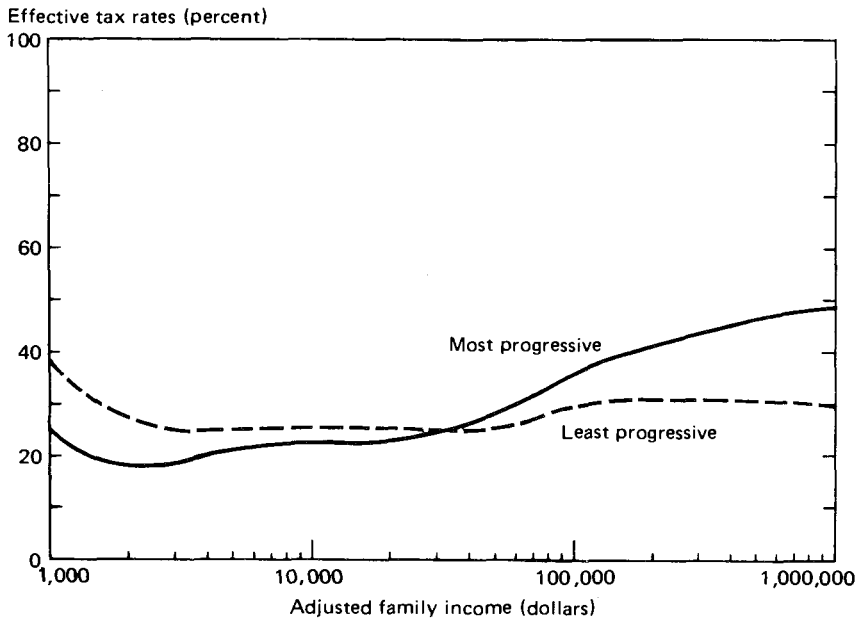
CONCLUSION AND MAJOR FINDINGS

As is obvious from the preceding discussion, creating the data set for the analysis, developing the income and tax concepts, and allocating income and tax amounts to individual family units all involved long and complicated procedures. What may not be as obvious is that all of this work was merely a prerequisite to the major effort to be undertaken—the analysis of the distribution of total tax burdens by income classes. In closing, I want to present a brief summary of our results.[21]

The major findings on U.S. tax burdens in 1966 are summarized in Figures 1 and 2. Each chart shows the effective rates of federal, state, and local tax throughout the scale of incomes for the most progressive and least progressive sets of incidence assumptions used in the study. The only difference between the two charts is that the effective rates are plotted on a logarithmic scale by absolute

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[20]These rates are lower than the more commonly seen 30 to 31 percent ratio of total government receipts to gross national product because of the conceptual differences described above.
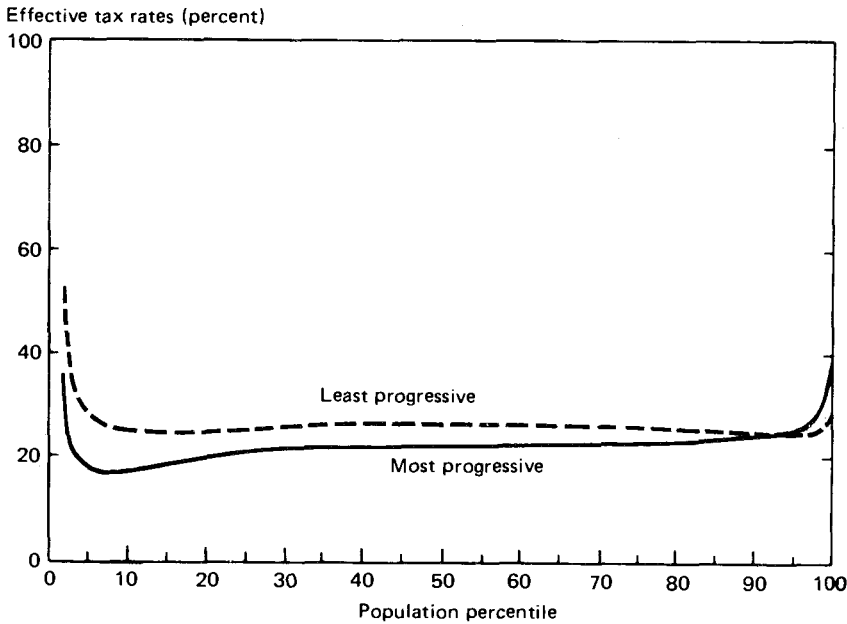
[21]A more extensive discussion is given in Who Bears the Tax Burden?

Figure 1. Effective Rates of Federal, State, and Local Taxes under Variants 1C and 3B, by Adjusted Family Income Classes, 1966

Effective tax rates (percent)

Adjusted family income (dollars)

Source: Computed from the 1966 MERGE data file. For an explanation of the incidence variants, see Table 5 and pages 287–290.

Figure 2. Effective Rates of Federal, State, and Local Taxes under Variants 1C and 3B, by Population Percentiles, 1966

Effective tax rates (percent)

Population percentile

Source: Computed from the 1966 MERGE data file. For an explanation of the incidence variants, see Table 5 and pages 287–290.

income levels in Figure 1 and on an arithmetic scale by income percentiles in Figure 2.

Figure 1 gives the impression that there are large variations in relative tax burdens between low- and middle-income families and between middle- and high-income ones. Under both sets of incidence assumptions, the tax burden is very high at the bottom of the income scale and then drops abruptly until the $3,000 level is reached. For families with incomes between $3,000 and $25,000, effective tax rates range between 20 and 25 percent of income and they then diverge above the $25,000 level. Under the most progressive set of assumptions, the tax burden rises sharply until it reaches almost 50 percent of income for families with incomes of $1,000,000 or more. Under the least progressive set of assumptions, the tax burden reaches a maximum of only about 30 percent for those with incomes of $100,000 or more.

The effective tax rates under the same two incidence variants are shown in Figure 2 for families classified by percentiles in the income distribution. As can be seen, Figure 2 presents a very different picture than does Figure 1. The difference in effective tax rates under the two variants is very small over practically the entire income scale. Under each variant, there is very little difference in overall effective tax rates for families between the tenth and ninety-seventh percentiles of the population. For this broad range of the income distribution, which covers incomes between $2,000 and $30,000 and includes 87 percent of all family units, the tax system is either proportional or slightly progressive. At both ends of the distribution, the effective rates rise sharply, but the rise at the top is much more moderate under the least progressive variant than under the most progressive one.

Because there is so little difference in effective rates for most of the population, the tax system has very little effect on the relative distribution of income in the United States. As expected, the Lorenz curve for the distribution of after-tax income under the most progressive set of incidence assumptions lies closer to the line of equal distribution than the before-tax curve. But the movement toward equality is relatively small: only 5 percent under the most progressive incidence variant (and much smaller percentages under all the other variants examined in the study). In the case of the least progressive variant, the after-tax distribution of income is only one-quarter of 1 percent more equal than the before-tax distribution.[22]

Thus, we found that the overall tax system is virtually proportional for the vast majority of families in the United States. But the nature of incidence assumptions used is crucial in evaluating the progressivity of the overall tax system and its effect on the distribution of income.

If it is assumed that the corporation income and property taxes are taxes on income from capital, the very rich pay high tax rates because a substantial proportion of their income comes from property. Under this assumption, the tax burden of those with income of $1,000,000 or more is roughly double that paid by most families. If the corporation income and property taxes are assumed to be

[22]The figures refer to percentage changes computed with respect to the before-tax area of inequality. Thus, if the area between the before-tax Lorenz curve and the line of perfect equality is A and the area between the after-tax Lorenz curve and line of perfect equality is B, the percentage change in equality is equal to $(A - B)/A$.

shifted in whole or in part to consumers, the tax burden for those at the highest income level is about 30 percent, or only 5 percentage points more than the effective rates paid by most families. However, even the most progressive set of incidence assumptions produces a pattern of tax burdens that has a very small effect on the relative distribution of income.