[JOINT COMMITTEE PRINT]

METHODOLOGY AND ISSUES IN MEASURING CHANGES IN THE DISTRIBUTION OF TAX BURDENS

PREPARED BY THE STAFF

OF THE

JOINT COMMITTEE ON TAXATION

JUNE 14, 1993

U.S. GOVERNMENT PRINTING OFFICE

68-397 WASHINGTON : 1993 JCS-7-93

For sale by the U.S. Government Printing Office
Superintendent of Documents, Mail Stop: SSOP, Washington, DC 20402-9328
ISBN 0-16-041022-3

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I. GENERAL OVERVIEW

A. Introduction to Issues in Distributional Analysis

Uses of distributional analysis

In addition to providing analyses of the revenue effects of proposed tax changes, the staff of the Joint Committee on Taxation ("JCT") provides analyses of the distributional effects of certain tax proposals. Distributional analysis attempts to provide information about how a proposed tax change would affect the economic well-being of different groups of taxpayers. This process is also referred to as determining the incidence of the tax change (that is, determining which individuals bear the burden or benefit of the tax change). This pamphlet[1] discusses the theoretical and practical issues involved in analyzing the incidence of tax changes.

Distributional analysis may be helpful for policy makers who want to evaluate the effect of proposed tax law changes. It is important to note, however, that distributional analysis does not itself determine whether a proposal is desirable. There is no "correct" answer to the question of how tax burdens ought to relate to different characteristics of taxpayers (e.g., income, consumption, wealth, or innate ability); there are other considerations that are relevant, such as the effect of taxes on the level or growth rate of national income.

As the majority of Federal tax revenue is raised through income-based taxes, much attention has been paid to the relationship between tax burdens and taxpayers' incomes. The following characterizations are commonly used. If taxpayers with different incomes face the same average tax burden (ratio of taxes paid to income), then the tax is said to be proportional. If the average tax burden increases as income increases, then the tax is said to be progressive. If the average tax burden decreases as income increases, then the tax is said to be regressive. By comparing how the burden of a proposed change in the tax law is distributed across income classes to how the current tax burden is distributed, policy makers can determine what effect the proposed change will have on the relationship between tax burdens and taxpayers' incomes.

Knowing how the burden of a proposed tax change is distributed across taxpayers also allows policy makers to assess any tradeoffs between the efficiency and equity effects of proposals. For example, a proposal to reduce the tax rate on capital income may reduce distortions of saving behavior caused by the income tax and may also

[1] This pamphlet, prepared by the staff of the Joint Committee on Taxation, may be cited as follows: Joint Committee on Taxation, *Methodology and Issues in Measuring Changes in the Distribution of Tax Burdens* (JCS-7-93), June 14, 1993. For other work explaining Joint Committee on Taxation revenue estimation methodology, see Joint Committee on Taxation, *Discussion of Revenue Estimation Methodology and Process* (JCS-14-92), August 13, 1992, and Joint Committee on Taxation, *Explanation of Methodology Used to Estimate Proposals Affecting the Taxation of Income from Capital Gains* (JCS-12-90), March 27, 1990.

benefit the owners of capital. Distributional analysis shows policy makers the equity effects of a proposal. They can then choose the relationship between efficiency and equity effects they deem appropriate.

Distributional analysis also may be used to help craft tax law changes to compensate for other proposed policy changes. For example, distributional analysis was used in connection with the enactment of the Tax Reform Act of 1986 to attempt to insure that the Act left unchanged the overall relative burdens on different groups of taxpayers.

Expenditure incidence

The full effect of government policies on the economic well-being of different groups of individuals can only be determined by examining the burdens and benefits imposed by changes in expenditure policy as well as tax policy. For example, an increase in individual income taxes could be used to finance an increased level of benefits under the food stamp program. The increased taxes will impose burdens on certain individuals, and the JCT distributional analysis will attempt to measure what those burdens are and who bears them. At the same time, the increased food stamp benefits will increase the well-being of another set of individuals. The effects of that expenditure program will be ignored in the JCT distributional analysis, which looks only at tax changes.

It could be argued that distributional analysis should reflect *both* expenditures and taxes. In theory, that analysis could attempt to measure the entire effect of individuals' interactions with the Federal Government. To be complete, one would want to consider the effects of government regulations as well as direct spending programs. One also could argue that the tax and expenditure activities of State, local, and foreign governments should be taken into account. The objective would be to show how the pre-tax, pre-transfer distribution of resources is altered by all government tax and expenditure policies.

There are a number of reasons why the JCT staff does not pursue such a comprehensive approach. First, the policy makers who make principal use of the JCT distributional analyses are generally interested in isolating the effects of tax policy changes from broader governmental goals. The isolation of tax policy may be the result of jurisdictional constraints in Congress, or it may arise because tax changes are but one possible method to be used to offset the budget effects of a given expenditure change. Second, most proposals for tax changes do not have specific expenditure changes associated with them. Decisions on tax changes and expenditures are usually made independently. When that occurs, there is no way to combine the relevant programs in a meaningful manner. Nonetheless, the JCT staff's isolation of the distributional effects of tax changes can allow the users of the distributional analyses to compare the tax changes with other potential offsets for the expenditure changes. Third, State and local governments play a large role in the tax and transfer process, but to account for their actions would require separate analyses for every relevant jurisdiction. Fourth, the data gathering, modelling, and analysis requirements for the JCT staff would be increased considerably. Finally, the data

that would need to be collected would often not be related to the area in which the JCT staff has a comparative advantage—i.e., taxation.

JCT reporting of tax incidence

This pamphlet discusses issues that arise in producing distributional analyses of tax proposals and explains how the JCT staff calculates the distributional effects of proposed tax law changes. Part II of the pamphlet considers the general theoretical issues in measuring tax incidence. These issues include:

- the definition of the economic burden of a tax;
- a theoretical framework for understanding the measurement of that burden;
- the proper time horizon for measuring the burden of a tax;
- the shifting of burdens between parties in the economy; and
- the distinction between the economic burden of a tax and the revenue collected from a tax.

A discussion follows in Part III on the distributional analysis of particular types of taxes: labor taxes; capital taxes; consumption taxes (both general consumption taxes and specific excise taxes); wealth, estate and gift taxes; and certain special tax issues. Next, there is a discussion in Part IV of how to classify taxpayers for the purpose of reporting distributional effects of tax changes. Further, certain other relevant issues are discussed in Part V. The remainder of Part I summarizes these discussions. Appendices provide discussions of certain additional technical matters.

B. Methodology of Distributional Analysis

Measurement of economic burden

In response to requests from Members of Congress for distributional analyses of specific tax proposals, the JCT staff attempts to measure the distribution of the economic burden of the proposals as accurately as data and time constraints allow. In preparing such analyses, the JCT staff distributes the change in economic burden across groups of taxpayers.

Two points need to be emphasized. First, the economic burden is not the same as the total amount of tax revenue collected. For example, if an excise tax on a good or service is increased, some individuals may choose to avoid consumption of the good. Even though such individuals pay no tax, they bear a burden by foregoing consumption of a good they would purchase in the absence of the tax increase. The distinction between burden and tax revenue is explained in more detail in Part II.B on pages 26–29.

Second, the distribution of the burden across taxpayers does not necessarily correspond to the statutory liability for tax payment. That is, the individuals who are liable for writing the checks to the government may not be the ones burdened by the tax. Instead, the incidence of a tax will depend upon the conditions of supply and demand in the affected markets. Market forces often shift the burden of a tax from the individual assigned the liability for payment

to another party through price changes. While this issue is discussed in detail in Part II.B (pages 21–26), in simple terms, the shifting of a tax change that takes place in the market depends upon the relative behavioral response of taxpayers (how much the quantity demanded or supplied of a good changes in response to a change in the price of the good). Those parties who have the smallest change in behavior in response to a tax change generally will bear the largest part of the burden of the tax change.

In measuring the burden of a change in taxes, the JCT staff must determine not only the aggregate burden but also how much of the burden is shifted among taxpayers. An accurate measurement of that shifting requires empirical evidence regarding taxpayers' behavioral responses, or elasticities of demand and supply for both factors of production and final goods and services. The JCT staff reviews the available empirical literature to determine such elasticities. When there is little empirical evidence, the JCT staff uses theoretical analyses of the markets affected by the tax change to help make assumptions about the extent of behavioral response. In those cases in which there is little or conflicting guidance from either the empirical or the theoretical economics literature, the JCT staff may not be able to do a distributional analysis of the proposal.

In providing distribution analyses of the burden of those proposed tax changes that do not present substantial analytical or empirical obstacles, the JCT staff strives to:

(1) present an accurate reflection of the economic burden (as opposed to statutory incidence) of the tax;

(2) maintain consistency in measurement and assumptions among tax proposals that are expected to have equivalent economic effects on taxpayers, regardless of whether they produce the same statutory liability; and

(3) make it possible for the distribution estimates of several unrelated proposals comprising a package to be summed[2] to produce a distribution effect for the proposals as a package.

In particular, satisfying the third principle above requires that the measures of burden used by the JCT staff are comparable across different tax proposals and different types of taxes. Most of the tax proposals for which the JCT staff is asked to provide distributional analyses involve changes in income-based taxes. For this reason, measures of burden are generally calculated in relation to individuals' annual incomes (annuitized over the five-year budget period). For taxes that are levied not on income, but on wealth or consumption, it is necessary to ensure that the burdens of such taxes are measured so that they may be easily compared to the burden of income-based taxes.

Choice of time horizon for calculating burden

Complete adherence to the above principles would require that the effects of a proposed tax change be calculated across individuals' entire lifetimes (and beyond, if bequest motives are taken into

[2] Adjustments would need to be made for any interactions among proposals before attempting to add their separate distributional effects.

consideration). As is discussed below, the choice of a shorter horizon may cause principle (2) on page 4 to be violated if some of the benefit or burden of the proposal occurs beyond the chosen horizon. Despite that problem, the JCT staff uses a finite horizon for its distributional analyses. In accordance with its adherence to Congressional Budget Office ("CBO") five-year economic baseline forecasts, the JCT staff provides distributional analysis based on predicted changes in taxpayer behavior that occur within the five-year budget window. This choice of a five-year horizon generally conforms to the period used for revenue estimates and other Federal Government budget projections.

When any multi-year horizon is used, the burdens in future years must be made comparable. In aggregating changes in burden it would be inappropriate simply to add the face amount of each year's changes. Comparability is achieved by converting the burdens into present values through appropriate discounting. As an illustration, a $1 tax increase this year followed by a $1 tax cut next year is a net increase in tax because a dollar received today is valued more highly than a dollar received in the future. Part II.C discusses how issues involving the time value of money affect the measurement of tax burdens.[3]

The choice of a five-year horizon for distributional analysis is a departure from the previous approach of the JCT staff, which was to use a one-year period[4] to measure the distribution of burden. For straightforward, permanent rate changes in the individual income tax, analysis of the distribution of the burden created in the first year of the proposed changes would approximate the distribution of the present value of the burdens over the taxpayers' lifetimes. For temporary changes in a broad-based tax, however, the use of a one-year period could lead to inconsistent results across proposals. For example, a temporary reduction in the personal exemption amount in the individual income tax does not have the same effect on an individual's lifetime after-tax income as does a permanent change. But a measurement of changes in tax liability restricted to a one-year time horizon might cause the burdens of the two changes to appear to be identical. To avoid such misleading comparisons, the JCT staff revised its distributional analysis to present an annualized version of the present value of the burden for the entire five-year budget forecasting period for all of its distribution estimates. (See Part II.C, pages 31–36, for a detailed discussion of these issues.)

While the choice of a five-year horizon reduces the possibility of the inconsistency mentioned above, problems remain. The use of any finite horizon for a distributional analysis may affect the measurement of the burden. One instance occurs when a change in burden is expected to occur in a year beyond the finite horizon.[5] An

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[3] It should be noted, however, that because the budget rules do not require discounting of future receipts or outlays by the Federal Government, the JCT staff does not apply present-value discounting in determining the revenue effects of proposed changes in the tax law.

[4] The year chosen for the analysis was not necessarily the current year, but was a year in which the proposal was fully phased in.

[5] An example of such a change would be a proposal to increase required estimated tax payments for a six-year period. A burden is created to the extent that the accelerated payments reduce the amount of interest that could otherwise be earned by the taxpayer during the period

Continued

issue for distributional analysis is whether to count the change in well-being as occurring inside the budget window (because of taxpayers' anticipations) or outside the budget window (when the change in burden is scheduled to take effect).

Matters are even more complicated when the taxpayer has substantial control over the timing of tax payments. For example, recent proposals to expand individual retirement accounts (IRAs) have involved permitting taxpayers either to receive a tax benefit in the current year in return for the payment of taxes in future years or to receive a tax benefit in future years in return for the payment of taxes in the current year. Because the date of IRA withdrawals is largely determined by each individual taxpayer, the taxpayer effectively chooses the length of time an IRA is maintained and thus the magnitude of the total net tax benefit received. In this situation, it is uncertain what level of net tax benefit should be attributed to taxpayers over the five-year budget period. It is inappropriate, however, to attribute to the taxpayer only the current-year benefit or burden, because the taxpayer knows that he or she will face a future burden or benefit in return.

Although the choice of a five-year approach does not solve all consistency problems, it represents a workable compromise for the analysis. For tax changes with complicated timing issues, the JCT staff may adjust the standard methodology to avoid presenting misleading measurements of economic burden.

Accounting for shifts in burden

As noted above, the extent to which the burden of a tax can be shifted among individuals varies considerably depending on the specific tax change being proposed. The extent to which analysts can predict this shifting varies as well. Presented below is a summary of principles followed by the JCT staff in the analysis of the shifting of tax burdens and the measurement of the economic consequences of various types of timing shifts for various types of tax changes. These principles are adopted to help ensure consistency among estimates of different types of taxes.

(1) When the amount that tax burdens are shifted changes with the passage of time, only the burden shifting that occurs within the five-year budget period is used. The amount of burden shifting that occurs only after a five-year period is ignored. The amount of burden shifting that occurs in a period of less than a year is also ignored.[6] This principle is applied to the individual and corporate income taxes, and broad-based consumption and payroll taxes.[7]

(2) When the tax change requires a change in the timing of tax payments, the burden is assumed to be foregone in-

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of time before the tax is ultimately paid. In the year the acceleration ceases, there is actually a reduction in the taxpayer's burden, because the burden was, in a sense, "prepaid."

[6] In general, the incidence of a tax may change with the passage of time because taxpayers may have more ability over time to respond to the tax change. For example, consider the response of gasoline consumers to an increase in a tax on gasoline. An immediate response may be a change in driving habits. As time passes, consumers may choose to replace their automobiles with more fuel-efficient models and they may choose to reduce their commutes by living closer to work. In its distributional analysis, the JCT staff ignores very short-term incidence when it differs from the amount of burden shifting that occurs over a period of time that is longer, but still within the five-year window.

[7] See Part II.C, pages 31–36, for a more detailed discussion of this issue.

terest earnings on the tax payment for the period over which the payments are shifted. This approach contrasts with the revenue estimate for such proposals, which reflects the entire shift of tax liability between fiscal years. This principle is applied to proposals affecting the deferral of taxes.[8]

(3) When taxpayer behavior leads to a voluntary assumption of increased tax liability within the budget period, it is assumed that this increased liability represents at worst no net increase in the taxpayer's economic burden. That is, taxpayers are assumed to take on these additional payments voluntarily in exchange for benefits of at least equal magnitude. Hence, taxes paid as a result of this decision are ignored for purposes of distributional analysis (although not for revenue analysis). This principle is applied to capital gains exclusions that result in increased realizations and to IRA conversions that result in a taxable rollover of accounts.[9]

(4) When an increase in taxation results in reduced consumption of an item, it is assumed that the taxpayer experiences a decrease in well-being as a result of the induced change in consumption patterns. If individuals have substantial behavioral responses to the price changes engendered by tax changes, they may choose not to purchase or produce the taxed good and thereby avoid the tax. Such avoidance of the tax nonetheless is evidence of a burden imposed by the tax, because the individual changed to a less desirable pattern of consumption or production.[10] Distributional analysis attempts to measure that burden based on the taxes that would have been paid if no change in consumption level had occurred. This principle is applied in the analysis of specific consumption taxes.[11]

C. Application of Incidence Analysis to Different Types of Taxes

Following is a summary of the application of the above principles to different types of taxes. A more detailed discussion of the issues involved can be found in the separate discussions of each type of tax in Part III of this pamphlet. At the conclusion to this section, a table summarizes the application of the principles to the different types of taxes.

Taxes on labor

For broad changes in those taxes based on the wages and salaries of employees (such as the payroll tax and the portion of the individual income tax assessed on labor income), the burden of the tax change is assumed to fall entirely on the wage or salary earner, regardless of whether the statutory liability falls on the employer or the employee. This convention reflects the assumption that aggregate labor supply is inelastic. That is, the aggregate amount of

[8] See Part II.C, page 35, for a more detailed discussion of this issue.
[9] See Part III.B.1, pages 46–48, for a more detailed discussion of this issue.
[10] See Part II.B, pages 21–24, for a more detailed discussion of this issue.
[11] See Part III.D, pages 60–66, for a more detailed discussion of this issue.

labor supplied by workers is not very responsive to changes in the after-tax wage rate. While consistent with principle (1) on page 6, it ignores the possibility that, because of fixed-wage contracts, employers may be unable to adjust wages in the very short term. The assumption of inelastic labor supply is not necessarily applied to narrow wage-based tax changes, such as a narrowly designed employment tax credit or wage incentives that are targeted to specific demographic groups or geographic regions. Distributions of these types of proposals are estimated by the JCT staff only if sufficient information is available to make inferences about incidence. (More detailed discussion of these issues appears in Part III.A).

For changes in specific deductions allowed under the individual income tax, the burden or benefit generally is assigned to the individuals whose tax liabilities are changed, because the change is treated as a change in the amount of tax benefit the individual receives from the deduction. For example, an increase in the allowable level of charitable contributions results in an increase in the tax benefit for those individuals making specified donations. This treatment is similar to that used in the distributional analysis of changes in specific consumption taxes, in which the burden is assumed to fall on the consumer (see discussion below).

Taxes on capital and savings

The burden of changes in the individual income tax on capital income is assumed to fall on the owners of capital. This convention reflects the assumption that the existence of a supply of foreign funds and the increasing mobility of capital make it likely that changes in United States individual income taxes on capital will not lead to changes in the pre-tax rate of return to capital. Thus, United States capital owners would bear the full burden of changes in individual income taxes on capital.

The burden of changes in the corporate income tax is assigned to owners of corporate capital. In the short run, changes in the corporate income tax primarily affect the after-tax returns to existing corporate capital. Thus, for the five-year horizon of JCT distributional analyses, the effect of changes in the corporate income tax will largely be felt by owners of corporate equity. The convention ignores the longer-run considerations that the rate of capital formation might change, that capital might flow in from or out to other countries, and that some of the burden of the corporate income tax might be borne by other factors of production, particularly labor.

Changes in broad-based investment incentives, such as investment tax credits and depreciation schedules, that are provided only to new investments will not increase the return on existing capital. Instead, such changes will affect the rate of return available to savers, who are the investors in new capital. The JCT staff distributes the benefit or burden of changes in broad-based investment incentives to individuals according to their saving, rather than according to their ownership of existing capital. Similarly, changes in the taxation of savings, including changes in capital gains taxation and rules affecting IRAs and pensions, are assumed to affect only savers.

Many of the tax proposals affecting capital and savings involve complicated timing issues. For example, in accordance with prin-

ciple (3) on page 7, the measurement of the burden of changes in capital gains taxes does not take into account any additional tax liability generated by increased realizations. As another example, the measurement of the burden or benefit of changes in IRA rules includes only the deferred taxation of earnings on the assets held in the account. (The treatment of these issues is discussed more fully in Part III.B.)

As in the case of labor taxes, the assumption that the entire burden of a change in taxation of capital falls on owners of capital or savers becomes problematic for narrow provisions such as investment tax credits for specific kinds of equipment or capital incentives for targeted geographic areas. Assumptions regarding the distribution of the effects of these types of proposals are reviewed on a case-by-case basis. Distributions of these types of proposals are estimated by the JCT staff only if sufficient information is available to make inferences about incidence.

Taxes on consumption

One seemingly reasonable approach to distributing the burden of a consumption tax would be to attribute the burden of the tax to consumers in relation to the amount of their consumption of the goods and services in the tax base. This procedure would treat the annual burden of a consumption tax as the amount of the consumption tax paid (that is, the burden would be measured as consumption occurs). If the burden of a consumption tax were to be considered in isolation (and if it were measured as a fraction of consumption), then assigning the burden of consumption taxes as consumption occurs might be satisfactory. In practice, however, the measure of the burden of a consumption tax needs to be comparable to the measure of the burden of an income tax. Most of the tax proposals for which the JCT staff is asked to provide distributional analyses involve changes in income-based taxes. If the measures of burden for consumption taxes and income taxes are not comparable, policy makers may receive misleading information about the tradeoffs between using one type of tax or the other to finance a given expenditure.

Another relevant consideration in measuring the burden of a consumption tax is that, for purposes of distributional analysis, the JCT staff measures burden as a fraction of income. Individuals' annual flows of income and consumption will diverge if they engage in saving or borrowing. In particular, individuals may save during peak-earning years in order to finance consumption in retirement. Consider otherwise identical individuals who differ only in age. If the burden of a consumption tax is calculated as consumption occurs, then a consumption tax that imposes identical burdens on the two individuals over the course of their lifetimes would appear in a given year to impose a higher burden (measured as a fraction of income) when consumption is high relative to income (such as in periods of dissaving). Mismeasurement of the burden results because the numerator is measured when consumption occurs while the denominator is measured when income is earned. One way to avoid this problem is to measure both the burden and the income over the taxpayer's lifetime. Because the JCT staff has chosen the five-year budget horizon to calculate the burden of proposed tax

changes, an alternative approach is employed to reduce this mismeasurement. That alternative is to measure the burden of a consumption tax not as the tax paid on consumption as it occurs, but as a reduction in the value of any income as it is received.

To make burden measures for consumption tax changes and income tax changes comparable and to reduce mismeasurement of lifetime burdens over the five-year horizon, the JCT staff converts consumption taxes into equivalent income-based taxes. A broad-based consumption tax is treated as an equivalent wage tax plus a tax on old capital.[12] The burden of the consumption tax is then attributed to wages and capital income as they are earned by individuals. The deduction for new business investment under a consumption tax is attributed to individuals in proportion to their shares of national savings.[13]

In the case of narrow-based consumption taxes or specific excise taxes, a conversion of the tax into an equivalent income-based tax is once again made. The narrower consumption tax or specific excise is treated as a broad-based consumption tax at a lower rate, and that lower-rate, broad-based consumption tax is converted into an equivalent wage tax plus tax on old capital. But there is another consideration. Because the consumption tax is on a narrower subset of consumption items, one also needs to take account of the distributional effect of the rise in the relative after-tax price of the taxed goods. If the taxed goods constitute a different proportion of total expenditure for individuals in different income classes, then the burden of the tax change will fall unevenly upon different income classes. Any difference in expenditure shares for the taxed goods is treated by assigning a higher tax rate for the equivalent income-based tax on those individuals who devote a higher share of their expenditures to the taxed goods. (This procedure is described in more detail in Parts III.C and III.D.)

Taxes on wealth

The primary Federal wealth tax is the unified gift and estate tax, which is a tax on the transfer of wealth. In the case of a transfer made at death, the burden of changes in the estate tax is assigned to the decedent based upon the decedent's income in the year preceding the year of death. Because the importance of the bequest motive as an explanation for saving is still an open question in the economic literature,[14] no decision is made at this time to attribute part of the burden of the estate taxes to the heirs. In the case of the gift tax, available data do not permit the distribution of the burden of changes in the tax.

Because wealth is a stock that results from the accumulation of past flows of saving, taxes on wealth are not directly comparable to taxes on current flows such as income or consumption. Although

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[12] "Old capital" is capital in place at the time a tax is imposed.

[13] Note that this approach is similar to that used in distributing the benefit of individual retirement accounts in which, at the time of contribution, the taxpayer may deduct from gross income the amount of the contribution (the so-called deductible IRA). The tax treatment of the deductible IRA is equivalent to an exemption from tax for the return on the funds invested in the IRA (as long as the individual faces the same marginal tax rates at the time of contribution and withdrawal). The tax benefit from the deduction for the contribution to the IRA is distributed as the earnings from the IRA accrue (tax-free) over time, and not as the deduction is claimed (or as the contribution is made).

[14] For example, see the references cited in Part III.E.

treating the burden of a wealth tax as being spread over the period of wealth accumulation could make a wealth tax more comparable to taxes on current flows of economic activity, there are practical difficulties in determining the period over which the wealth was accumulated. (The treatment of these issues is discussed more fully in Part III.E.)

Special tax issues

Pass-through entities.—In general, entities such as subchapter S corporations, partnerships, common trust funds, regulated investment companies (RICs) and real estate investment trusts (REITs) are required to pass through to the individual taxpayers who own them the revenue earned and costs incurred (while maintaining the tax characteristics of such revenues and costs that are passed through). Thus, for distributional analysis, tax changes that affect items passed through to individuals are assumed to have the same incidence as if they affected the same items received directly by the individual owners. Some tax changes may alter the character of pass-through entities themselves. Because the non-tax factors that affect a business's choice of organizational form are not fully understood, no attempt is made to distribute the burdens of tax changes that alter the character of pass-through entities themselves. (The treatment of these issues is discussed in Part III.F.1.)

Pensions.—Although it is generally believed that the tax benefits provided for contributions to pension plans accrue to the pension beneficiaries, it not clear that the burden associated with all changes in pension rules are borne entirely by the pension beneficiaries. The burden of those changes that affect the taxation of distributions from pension plans is treated as borne by the pension beneficiaries. The burden of those changes that relate to pension plan funding requirements may be borne partly by the owners of the firms involved. Distributions of these types of proposals are estimated by the JCT staff only if sufficient information is available to make inferences about incidence. (The treatment of these issues is discussed in Part III.F.2.)

Nonprofit organizations.—There are many potential beneficiaries of the tax deduction permitted to individuals for charitable contributions to nonprofit organizations. It is possible that the tax benefit may accrue to the individual contributor, to beneficiaries of the nonprofit organization (through goods and services provided at reduced prices) or to employees of the nonprofit organization (through higher wages or benefits). Because it is assumed that the number of nonprofit organizations is sufficiently large that the competition for contributors leads the organizations to pass on to contributors the entire tax benefit, the benefit or burden of changes in the deduction for charitable contributions is assumed to fall entirely on the individuals taking the deduction.

Other tax provisions that affect nonprofit organizations include corporate taxes assessed on holdings of corporate equity by nonprofit organizations and the income tax assessed on unrelated business income. Because of the lack of guidance from either theoretical or empirical analysis as to the incidence of such provisions, no distributional analysis is provided with respect to changes in such

provisions. (The treatment of these issues is discussed in Part III.F.3.)

Non-U.S. persons.—The distributional analyses done by the JCT staff focus on domestic individuals. For reasons of consistency and simplicity, no distributional analysis is done of the burden on foreign persons of U.S. tax changes. (The treatment of these issues is discussed in Part III.F.4.)

Summary

The box below summarizes the application of the JCT staff's general principles to particular taxes.

Tax being changed:	*Distribution of burden or benefit:*
Individual income tax on labor income	To wage or salary earners
Payroll taxes	To wage or salary earners
Targeted tax on labor income	Case-by-case basis
Specific deductions in individual income tax	Generally to the taxpayers whose liabilities are affected
Individual income taxes on capital income	To owners of capital
Corporate income tax	To owners of corporate capital
Broad-based investment incentives	To savers
Taxes on savings	To savers
Broad-based consumption taxes	Converted to equivalent income-based tax and attributed to individuals based on their wages and income from old capital
Narrow-based consumption taxes and specific excise taxes	Converted to equivalent income-based tax and attributed to individuals based on their wages and income from old capital, weighted by the expenditure shares of the taxed good(s)
Estate tax	To decedent based on income in the year preceding the year of death
Gift tax	Generally not distributed
Income items of pass-through entities	Distributed as if earned directly by the owners
Provisions affecting tax treatment of pass-through entities themselves	Generally not distributed
Pensions	Case-by-case basis
Non-profit organizations	Generally not distributed
Non-U.S. persons	Generally not distributed

D. How to Classify Taxpayers

The goal of distributional analysis is to show how changes in the tax system affect individuals, who are placed into classes based on a measure of their economic well-being. This classification of individuals requires two separate decisions: choosing the unit of analysis (the individual) and choosing a measure of economic well-being. The current practice of the JCT staff is to use tax filing units as a proxy for individuals and to use a measure of economic income based on an expansion of adjusted gross income (AGI) as a proxy for economic well-being.[15] Use of these proxies is a compromise between theoretical purity and practical application.

Unit of analysis

The tax filing unit has been chosen as the unit of analysis primarily because of data availability. For individuals filing tax returns, high-quality data are available on annual economic activities.[16] For individuals not filing income tax returns (e.g., those with incomes below the level where an income tax liability is assessed), comparable financial information can be imputed from other, non-tax return, sources (e.g., data collected by the Bureau of the Census, Department of Commerce ("Census Bureau")). Merging these two sources provides a reasonably consistent picture of the reported financial activities of the U.S. population.

Other researchers use alternative concepts for the unit of analysis to study distributional issues. For example, the Census Bureau uses the concepts of household (defined as those individuals, whether or not related, who live in the same residence) and family (a household composed of related individuals) to study income distribution. The Census Bureau concepts are consistent with its practice of surveying individuals who reside at a particular address. By comparison, the tax filing units used by the JCT staff tend to be no larger in size than the households or families used by the Census Bureau. The Congressional Budget Office has presented income distribution data on both a per capita basis and on a standardized household basis. When compared to the tax filing unit used by the JCT staff, these standardized households are somewhat larger units.[17] On the other hand, the tax filing unit is generally larger than the single individual used in the per capita measure.

These alternative approaches involve tradeoffs between theoretical correctness, ease of implementation, and comprehensibility. After careful consideration, the JCT staff has found none to be superior (taking all factors into consideration) to the choice of tax filing unit. (A thorough discussion of these issues is contained in Part IV.)

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[15] A tax filing unit is based on the tax return requirement for individual taxpayers. Thus the following each constitute a tax filing unit: a single individual filing a return; a married couple filing a joint return; each married person that files a separate return; and an unmarried parent filing a head of household return.

[16] Returns filed by dependents of other taxpayers are not included as tax filing units, since these returns do not represent the activities of independent economic units.

[17] See, for example, the analysis presented in the *1992 Green Book, Overview of Entitlement Programs*, Committee on Ways and Means, U.S. House of Representatives, May 15, 1992, pp. 1493-1561.

Measure of economic well-being

An ideal measure of household well-being would take into account what economists call the utility achieved by households from all their activities (i.e., consumption of all goods and services valued by the household, including leisure). This theoretically ideal measure is unobtainable because households engage in many non-market transactions that enhance the quality of life (e.g., maintaining a household where children are nurtured), and because even market transactions have unmeasured effects on the overall level of household utility (e.g., where a person engages in labor he or she dislikes in order to receive a sufficiently high cash wage in return). Since utility is unmeasurable, economists often resort to equating the economic well-being of a household to its annual economic income.[18] A common measure of economic income, termed the Haig-Simons measure of annual income, is defined as the sum of the market value of the household's annual consumption of goods and services plus the annual change in the household's wealth.[19] Two of the major impediments to using the Haig-Simons measure of economic income are that it requires estimates of unobservable or non-market consumption (e.g., the flow of housing services consumed by households residing in owner-occupied houses) and of changes in wealth that are not accompanied by a market transaction (e.g., the change in value of property—stocks, bonds, real estate, collectibles—held for the entire year).

Since market-based transactions are a major component of Haig-Simons income, attempts to develop a proxy for this measure have focused on accurately measuring these transactions. One reasonably complete source of a household's market-based transactions is the annual income tax return. This source has formed the basis for many proxies for economic income (including the measure termed expanded income, used by the JCT staff). As mentioned above, the use of tax returns as primary data sources leads quite naturally to focusing on the tax filing unit as the unit of analysis for distributional purposes.

Expanded income as used by the JCT staff is defined as adjusted gross income (AGI) from the annual Federal income tax return plus estimates of the following items:

(1) tax-exempt interest;
(2) worker's compensation;
(3) non-taxable Social Security benefits;
(4) excluded income of U.S. citizens living abroad (sec. 911 income);
(5) value of Medicare benefits in excess of premiums paid;
(6) minimum tax preferences;

[18] An alternative measure could be permanent income, which is the measure of the lifetime resources available to a household, converted to an annualized basis. A proxy for permanent income which is sometimes utilized is annual household consumption, on the notion that annual consumption better reflects the amount of lifetime resources available to a household on an annualized basis (since annual consumption generally does not show as much variation as annual income).

[19] This concept is described in Henry Simons, *Personal Income Taxation: The Definition of Income as a Problem of Fiscal Policy*, (Chicago: The University of Chicago Press), 1938.

(7) employer contributions for health plans and life insurance;
(8) employer share of payroll taxes; and
(9) corporate tax payments imputed to individual corporate shareholders.

Generally, these additions can be thought of as: cash receipts not included in AGI (items (1)-(4)); the value of non-means-tested Federal program benefits in excess of the tax or charge paid to finance a portion of the benefits (item (5)); special or enhanced deductions allowed in computing AGI (item (6)); employer-provided fringe benefits or employer payments that represent economic income to the employee (items (7)-(8)); and taxes collected from corporations that are attributed to income earned by individuals in their capacity as capital owners (item (9)). This last item focuses on corporate taxes paid, because the starting point of AGI already includes dividend payments and retained earnings (to the extent these are reflected in the form of realized capital gains).[20] It should be noted that, as used by the JCT staff, expanded income is measured in nominal dollars, without adjustment for inflation. This mismeasures economic income. For example, the decline in the real value of interest income caused by inflation is not measured. The use of a nominal income measure makes comparisons across years difficult because taxpayers with the same real income generally will have different nominal incomes in different years.

One significant decision by the JCT staff is to include in its measure of economic income the amount of capital gains income realized in a tax year rather the accrued capital income that would be incorporated under a true Haig-Simons measure of income. This decision was made primarily because the paucity of data on wealth accumulation by households argues against imputations of accrued gains on a household-by-household basis. However, the JCT staff realizes that the discretionary nature of many capital gains realization transactions, together with the fact that a significant share of capital gains income is never taxed (because much capital gains property is passed on to heirs without income tax being levied and because the vast majority of housing capital gains are untaxed due to rollovers and the exclusion from gross income of up to $125,000 in gain for sellers over age 55) are reasons to prefer inclusion of an annual measure of accrued capital gains in economic income.

Another significant decision is to exclude from the measure of economic income any contributions to retirement plans (either by an employer or by an individual through a salary reduction agreement or through a tax-deductible IRA plan) while including in the measure the full amount of distributed retirement income generated by the contributions. As discussed more fully in Part IV.C. below, this decision also reflects data limitations. It is realized that this choice will understate the Haig-Simons measure of income for persons in the prime earning years (when contributions to these retirement plans are made) and overstate the Haig-Simons measure

[20] Some filing units will be found to have negative economic incomes when all these items are summed. These units generally are not included in the distributional analyses performed by the JCT staff.

of income of retired taxpayers (when the entire amounts withdrawn are treated as economic income).[21]

A third significant decision is to include as both economic income and taxes paid the share of corporate income tax indirectly paid by individuals in their capacity as capital providers.[22] In particular, the portion of corporate income tax paid in a year that is not attributed to nonprofit organizations, pension plans, or to foreign shareholders is deemed to be paid indirectly on behalf of individual shareholders. The total amount of this deemed-paid tax is imputed to individuals based on their ownership of corporate shares.[23]

All three of these decisions reflect the fact that the JCT staff's economic income classifier is a considered compromise between theory, ease of implementation, and understandability.[24]

E. Sample Distributional Table

Table 1, below, illustrates the information provided by the JCT staff in a typical distribution analysis. The lefthand column (the column labeled A in Table 1) lists the income categories across which the burden of proposed tax changes is distributed. Placement of taxpaying units into the income categories listed in the lefthand column is based on their income in the first year of the budget period. The components of income included in the JCT measure of expanded income used for classification of each filing unit are summarized in footnote (1) of all JCT distribution tables.

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[21] Certain lump-sum distributions from retirement plans (those for which five-year or 10-year averaging treatment is elected) may not be included in the JCT measure of economic income since these amounts are not included in AGI.

[22] This decision is an attempt to match taxes attributable to corporate income to the dividend and capital gains income earned by individuals' investments in corporate entities.

[23] In distributing the burden of changes in corporate tax rates, the JCT staff generally assumes that these are borne by individuals in proportion to their ownership of corporate capital. This is consistent with the short- to medium-term analysis of tax changes. For further discussion of this issue, see Part III.B.2.

[24] It should be noted that the expanded income measure is only one of many possible measures of economic income. For example, Joseph A. Pechman, *Who Paid the Taxes, 1966-85*, (Washington, D.C.: The Brookings Institution), 1985, pp. 11-14, lists several alternative measures of income used to measure the economic well-being of households.

Table 1.--Distributional Effects of a $500 Increase in the Personal Exemption, 1994-1998
(1993 Level)

A	B	C	D	E
Expanded Income Class (1)	Present Law Federal Taxes (2)	Present Law Average Tax Rate (3)	Proposed Change in Tax Burden	Burden Change as a Share of Income
	Billions	Percent	Millions	Percent
Less than $10,000	$9	10.4%	-$232	-0.27%
10,000 to 20,000	38	11.7%	-1,081	-0.33%
20,000 to 30,000	71	16.9%	-1,802	-0.43%
30,000 to 40,000	85	19.0%	-1,915	-0.43%
40,000 to 50,000	92	20.8%	-1,731	-0.39%
50,000 to 75,000	199	22.3%	-3,651	-0.41%
75,000 to 100,000	124	24.7%	-2,011	-0.40%
100,000 to 200,000	143	26.7%	-1,479	-0.28%
200,000 and over	168	30.3%	-195	-0.04%
Total, All Taxpayers	**$929**	**22.1%**	**-$14,097**	**-0.33%**

Source: Joint Committee on Taxation

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(1) The income concept used to place tax returns into income categories is adjusted gross income (AGI) plus: [1] tax-exempt interest, [2] employer contributions for health plans and life insurance, [3] employer share of FICA tax, [4] workers' compensation, [5] nontaxable social security benefits, [6] insurance value of Medicare benefits, [7] corporate income tax liability attributed to stockholders, [8] alternative minimum tax preference items, and [9] excluded income of U.S. citizens living abroad.

(2) Includes individual income tax, FICA and SECA tax, excise taxes, estate and gift taxes, and corporate income tax.

(3) Present law Federal taxes as a share of expanded income.

The first two data columns (the columns labeled B and C in Table 1) generally will be the same for all distribution tables produced in a given year. They provide a reference point for evaluating the distributional consequences of proposed tax changes illustrated in the rest of the table.

Column B provides a measure of total Federal taxes effectively paid under present law according to filing units within each income category. This measure includes the following taxes:

Tax:	*Attributed / Allocated To:*
Individual income tax	The individual paying the tax
Payroll tax	The wage earner (both the employee and employer portion)
Corporate income tax	Corporate stockholders after adjustment to exclude foreign owners of capital, pension funds, and non-profits
Estate tax	The income class of the deceased taxpayer
Excise taxes	Retail consumers of taxed products plus all consumers in proportion to the ratio of intermediate purchases of taxed products to total purchases of taxed products

Column C shows the average effective tax rate of each income class under present law. It is calculated for each income class by dividing the annuitized value of total taxes effectively paid by the annuitized value of total expanded income for individual filing units in that class. This measure is presented in the table to provide an order of magnitude for the share of the resources devoted to Federal taxes by each income group. As explained more fully below, the average effective tax rate is used as a proxy for a more precise calculation of the burden of the current tax system.

Some have suggested that the appropriate baseline for evaluation of a proposed burden change is the burden of the current tax system. While the JCT staff agrees that this would be a useful presentation, it is not confident that the present law burden can be determined with enough accuracy to warrant presenting such a measure in JCT distribution tables. Estimating the burden of a complex system that has evolved gradually over a long period of time presents severe problems that are not encountered in measuring the burden of a specific proposed change. To measure the burden of the current tax system, it would be necessary to compare incomes under the current system with what they would be in an economy with no taxes. There is insufficient consensus in the economic theory of tax incidence analysis to make such a comparison possible, and there is certainly no empirical evidence on incomes in an economy comparable in size to the United States economy with no taxes.

In addition, as discussed above, the burden of a tax may shift among different groups of taxpayers over time. Because of the gradual evolution of the existing system, the shifting process is also continuous, which makes the application of concepts of long-run versus short-run incidence analysis problematic. For example, the individual income tax code was substantially amended in 1981, 1982, 1986, and 1990. The current burden of the present-law system undoubtedly reflects varying stages of market adjustment to all these revisions. Sorting out all of these adjustments with enough precision for use in a measurement of the burden of the tax system would be prohibitively time-consuming and costly.

Finally, the average effective tax rate is used even though it does not attempt, for example, to account for the efficiency losses in the economy that result from the current system of taxation. An estimate of those efficiency losses would be required in an estimate of the burden of the tax system. In contrast, the efficiency losses that are due to behavioral responses to specific taxes are more identifiable for particular, incremental tax changes. They are included where appropriate in JCT staff burden estimates of tax changes.

As noted above, the time horizon for analysis of the burden of proposed tax changes is the manageable, five-year budget forecast period; all of the information presented in the data columns of the table is calculated on a five-year, annualized present value basis.

The estimated burden of proposed tax changes for each income class appears in column D. The tax change presented in the sample table is an increase of the personal exemption by $500 effective for 1994 and years thereafter. In column E, the estimated change in burden for each income class is divided by the total amount of income in each class.[25] This measure may be viewed as the change in the average effective tax rate as a result of the proposed change. It provides a scaling factor that allows the evaluation of the burden change relative to resources available for each income class.

[25] This total is calculated as the five-year, annuitized income of each taxpayer currently in the specified income class. Using annuitized income makes the denominator consistent with the numerator (annuitized burden).

II. THEORETICAL DISCUSSION OF TAX INCIDENCE

A. The Purpose of Distributional Analysis

A distributional analysis measures the effect of a tax change on the economic well-being of different groups of taxpayers. In other words, it measures how the economic burden of the tax is distributed across categories of taxpayers.

The distribution of the economic burden of a tax is referred to as the economic incidence of the tax. It is important to distinguish economic incidence from statutory incidence. The statutory incidence is borne by the people who are legally liable for the tax (generally those who are required to write the checks to the government). However, in a market economy, these people may not be the ones who suffer a loss of economic well-being due to the tax. The economic incidence of the tax is borne by the people who experience a loss of economic well-being as a result of the tax.

For example, distributors of motor fuels bear the statutory incidence of the motor fuels excise tax, because the law requires them to write a check to the government. However, as explained below, such a tax may cause the price of motor fuels to increase, so that the ultimate consumers of motor fuels may suffer a loss of economic well-being. If the tax causes the price of motor fuels to increase, consumers of motor fuels bear at least part of the economic incidence of the tax.

In its distributional analyses, the JCT staff attempts to determine the economic incidence of the relevant tax provisions. The statutory incidence of the tax is ignored. Throughout this pamphlet, the term "incidence" refers to economic incidence, unless otherwise noted.

To understand how the incidence of a tax is determined, it is necessary to review the economic theory of tax incidence.

B. The Economic Theory of Tax Incidence

In its preparation of distributional analyses, the JCT staff applies the economic theory of tax incidence. This theory, which arises from a study of supply and demand, has a wide range of applications. The discussion below refers to an excise tax on a good called "gadgets," which are supplied by "producers" and demanded by "consumers." However, the basic analysis can be applied to a tax on labor (such as the individual income tax or payroll taxes), which is supplied by workers and demanded by firms, or to a tax on capital, which is supplied by savers and demanded by firms. This analysis is applied to labor taxes in Part III.A, capital taxes in Part III.B, and excise taxes in Part III.D.

Supply and demand in a single market (partial equilibrium)

According to economic theory, the economic incidence of a tax does not depend on its statutory incidence. The economic well-being of consumers is affected by the price that they pay for a taxed good and the economic well-being of producers is affected by the net receipts that they receive for selling the taxed good. The price and net receipts are determined by the economic forces of supply and demand, not by the statutory provisions requiring particular parties to make the tax payments. The incidence of a tax therefore requires an analysis of supply and demand. For simplicity, it is assumed that the market is competitive, meaning that the number of producers selling the good is sufficiently large that no single producer can materially affect the market price.[26] In addition, the following discussion will analyze the tax change as having effects only in a single year.[27]

The supply curve for gadgets represents firms' aggregate willingness to produce gadgets at various prices. The curve measures the quantity that firms choose to produce at each price. The supply curve depends upon the costs of production, which are the amounts that firms must pay to producers (the suppliers of labor, capital and other factors of production used to produce gadgets). Generally, firms require higher unit prices to increase production profitably, so the curve slopes upward. This occurs because, as production increases, firms must make greater payments to producers, such as overtime wages for labor. In Figure 1, the curve SUPPLY is the aggregate supply curve for gadgets over a particular price interval.

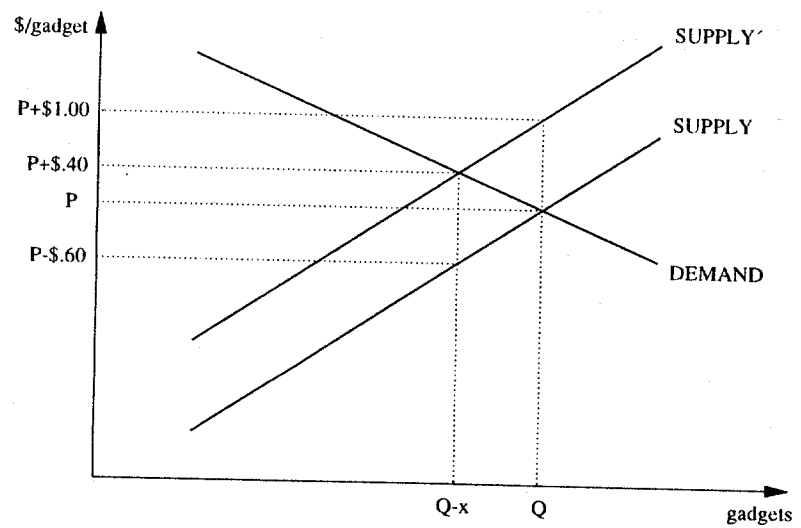

FIGURE 1

[26] The theory of incidence in a single competitive market is discussed by Joseph E. Stiglitz, *Economics of the Public Sector* (New York: W. W. Norton & Company), 1988, pp. 415-423 and Harvey S. Rosen, *Public Finance* (Homewood, Ill.: Irwin), 1988, pp. 269-276. The theory of incidence in a noncompetitive market is discussed by Stiglitz, pp. 423-426 and Rosen, pp. 276-278.

[27] Parts II.C and II.D generalize the analysis to multiple years.

The demand curve for gadgets represents consumers' aggregate willingness to pay for gadgets at various prices. The curve measures the quantity that consumers choose to buy at each price. Since consumers generally demand more of a good when prices are low, the demand curve is generally downward sloping. In Figure 1, the curve DEMAND represents aggregate consumer demand for gadgets over a particular price interval.

If there is no tax on gadgets, the market price for gadgets would be P per gadget. Consumers demand and producers supply Q gadgets. When an excise tax on gadgets is imposed, the market for gadgets is affected. If a tax of $1.00 per gadget is imposed on producers, they will not supply Q to the market unless the price of gadgets increases to P + $1.00. A tax imposed on the producer becomes part of the costs of production and thereby lowers the net return to the producer. The supply conditions indicate that producers will only supply Q gadgets if they receive, after tax, P per gadget. In Figure 1, the effects of the tax on producers' willingness to produce is shown by a shift in the supply curve to SUPPLY'. However, the demand curve has not shifted and is still given by DEMAND. If the price of gadgets is greater than P per gadget, consumers are not willing to purchase Q gadgets. In this example, for the quantity demanded to equal the quantity supplied (and the market to be in equilibrium), the price (gross of tax) must rise to P+$0.40 per gadget, at which consumers are willing to buy Q-X gadgets. Producers' net receipts then fall to P-$.60 per gadget, at which they are willing to supply Q-X gadgets.

If the $1.00-per-gadget excise tax were imposed on consumers rather than producers, the result would be the same. Consumers will buy the original number of gadgets only if the net-of-tax price falls to (P-$1.00) per gadget. This is illustrated in Figure 2, in which the tax shifts the demand curve downward from DEMAND to DEMAND'. For supply to equal demand, the net-of-tax price must fall to P-$0.60 per gadget, which will be the producers' net receipts per gadget. Including the tax, consumers pay P+$0.40 per gadget. Consumers demand and producers supply Q-X gadgets.

The economic equilibrium in the gadgets market is not affected by whether the tax is collected from consumers or producers. The quoted price differs only because it includes the $1.00 per gadget tax in the first case but does not include it in the second case.

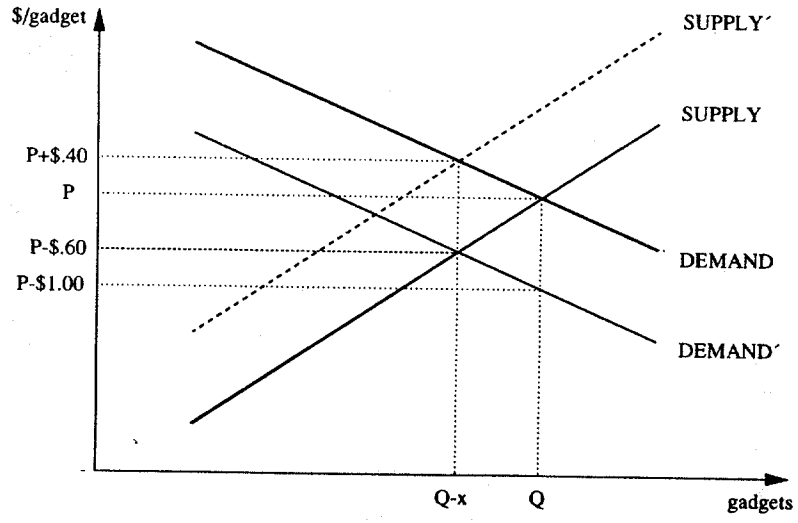

FIGURE 2

In this example, economic analysis indicates that both consumers and producers suffer a loss of economic well-being from the tax, regardless of the statutory incidence of the tax. Consumers suffer two distinct losses of economic well-being. First, consumers who paid P per gadget prior to the imposition of the tax now pay P+$0.40 per gadget. The tax clearly reduces their economic well-being by $0.40 for each gadget they buy. Second, at the higher price, consumers no longer purchase some gadgets which they had purchased at P per gadget prior to the imposition of the tax. This is also a loss of economic well-being, as these consumers switch to less-desired goods and services.

In Figure 3, the area of the rectangle AFGB represents the first source of loss of consumer well-being, that due to consumers paying more for each gadget that they continue to purchase. The area of the triangle BGE represents the second source of loss of consumer well-being, that due to some consumers foregoing the purchase of gadgets that they would have purchased in the absence of the tax. The area of the trapezoid AFEB represents the total loss in consumers' economic well-being from the tax.

Similarly, producers of gadgets suffer two distinct losses of economic well-being. First, they now receive net revenues of only P-$0.60 for each gadget they sell rather than the P per gadget that they received prior to the imposition of the tax. Second, because net revenues per gadget are lower, producers choose not to sell as many gadgets as they did previously. Consequently, producers lose potential profits because of lost sales.

In Figure 3, the area of the rectangle FDCG represents the first source of loss, that due to lower net receipts on the new level of sales. The area of the triangle GCE represents the second source

of loss, the excess of revenue over costs on the sales that are lost due to the tax. The area of the trapezoid FDCE represents the total loss in producers' economic well-being from the tax. The sum of the areas of these trapezoids, which is the total loss of economic well-being of consumers and producers, is the area of the polygon ADCEB.

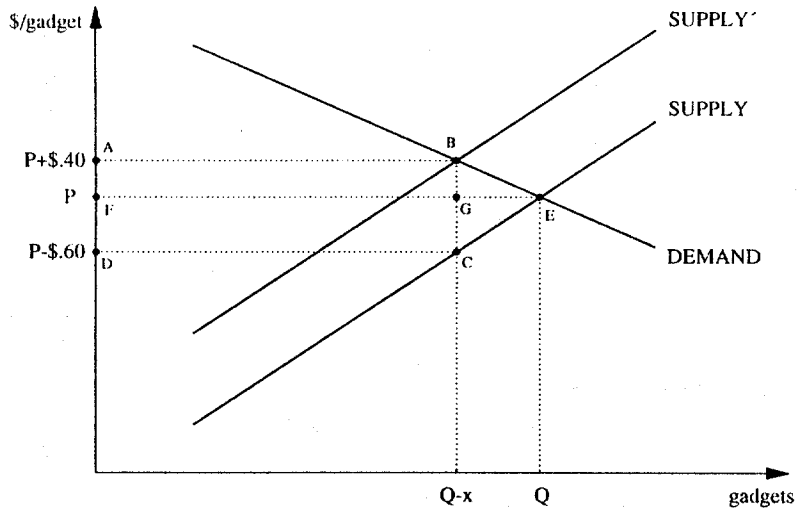

FIGURE 3

The importance of behavioral response

When a tax is imposed, the division of the loss of economic well-being between consumers and producers depends upon their behavioral responses to price changes.[28] In general, the larger portion of the loss will be borne by the group whose behavior is the least responsive to price changes.

Consider the case in which the quantity of gadgets demanded by consumers is very sensitive to the gross price they pay per gadget but the quantity of gadgets supplied by producers is not very sensitive to their net receipts per gadget. Then, the effect of the tax is primarily to lower the producers' net receipts per gadget, with only a slight increase in the gross price per gadget consumers pay. Because the quantity of gadgets demanded is so sensitive to price, the slight increase in the gross price per gadget paid by consumers reduces the quantity demanded by the same amount as the large reduction in producers' net receipts per gadgets lowers the quantity supplied (which is less sensitive to price). In this case, producers bear most of the burden of the tax.

[28] Throughout this pamphlet, behavioral changes are defined as changes in quantities that the taxpayer can control, such as production, consumption, saving or labor supply. They do not include changes in prices.

The results are reversed if the quantity of gadgets demanded by consumers is not very sensitive to the gross price per gadget they pay but the quantity of gadgets supplied by producers is sensitive to their net receipts per gadget. Then, the effect of the tax is to greatly increase the gross price per gadget paid by consumers while only slightly reducing the producers' net receipts per gadget. Because the quantity of gadgets supplied by producers is so sensitive to price, the slight reduction in their net receipts per gadget reduces the quantity supplied by the same amount as the large increase in consumers' gross price per gadget reduces the quantity demanded (which is less sensitive to price). In this case, consumers bear most of the burden of the tax.

In one extreme case, if consumers do not reduce their purchases of gadgets as the price of gadgets rises, then the entire incidence of the tax falls upon consumers. In the opposite extreme case, if producers do not change production in response to changes in their net receipts, then the entire incidence of the tax falls upon producers.

Economists measure the behavioral responses of consumers and producers by calculating the elasticity of demand and the elasticity of supply. The elasticity of demand is the percentage by which the quantity demanded falls if the price paid by consumers rises by one percent.[29] The elasticity of supply is the percentage by which the quantity supplied rises if producers' net receipts per unit rise by one percent. If the elasticity of demand for a good is high relative to its elasticity of supply, most of the incidence of a tax on the good falls upon producers. If the elasticity of supply of a good is high relative to its elasticity of demand, most of the incidence of a tax on the good falls upon consumers.[30]

Consumers' and producers' behavioral responses are likely to vary over time. In general, both demand and supply will be more elastic in the long run than in the short run, because some behavioral changes can only occur after the passage of some time. Consider an increase in the motor fuels excise tax. In the short run, consumers can reduce fuel use by driving fewer miles. In the long run, consumers can also buy more fuel-efficient cars and relocate to reduce commuting distance. Due to these additional behavioral changes, the tax will cause a greater reduction in gasoline demand in the long run than in the short run. Similarly, in the short run, producers can reduce gasoline supply by altering refinery runs. In the long run, the supply response will be larger because producers can also open, close, or remodel refineries.

If behavioral responses are different in the short run and in the long run, the incidence of a tax will also be different. Economic theory defines the long run as the time interval in which individuals can fully adjust to the change but does not identify a precise length

[29] Under this definition, the demand elasticity is a positive number. Sometimes, the demand elasticity is defined to be the percentage increase in quantity demanded for a one percent price increase. This definition of the demand elasticity yields the same number but with a negative sign.

[30] These effects can be mathematically described. Let ε_s denote the elasticity of supply and ε_d denote the elasticity of demand. Then, a tax of one dollar per unit causes the gross-of-tax price to rise by $\varepsilon_s/(\varepsilon_d+\varepsilon_s)$ dollars per unit and the producers' net receipts to fall by $\varepsilon_d/(\varepsilon_d+\varepsilon_s)$ dollars per unit.

of time. The relevant time interval is likely to differ across goods and may be different for demand and for supply.

The JCT staff generally makes incidence assumptions based upon a short-run or medium-run response, to maintain consistency with its choice of a five-year horizon (as discussed below in Part II.C). This issue is specifically discussed with respect to the corporate income tax in Part III.B(2)(a).

Difference between tax revenue and tax burden

The burden of a tax (the loss of economic well-being) is not the same as the revenue collected from the tax. In Figure 3, the revenue raised by the tax is the area of the rectangle ADCB, while the loss of economic well-being is the area of the polygon ADCEB, which is larger. Economists refer to the loss of economic well-being in excess of the government's tax revenue as the "excess burden" or "deadweight loss" of the tax. In Figure 3, the area of the triangle BCE is a measure of the excess burden resulting from the tax.[31]

The previous analysis considered the effects of introducing a new tax. However, many legislative proposals that are analyzed by the JCT staff provide for changes in preexisting taxes. The excess burden per dollar of additional revenue can be quite large when a preexisting tax is increased. This point is illustrated by Figure 4. In

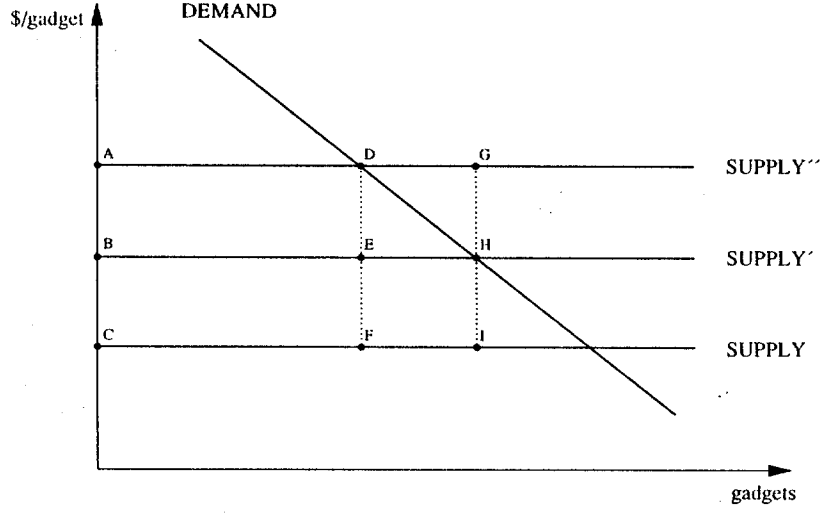

FIGURE 4

[31] The deadweight loss from a tax change includes transactions costs and other burdens of behavioral adjustment incurred by taxpayers.

the absence of taxes, the supply curve, which is assumed to be horizontal for simplicity, is SUPPLY. A preexisting tax has shifted the supply curve to SUPPLY′ and the tax increase being analyzed will further shift the curve to SUPPLY″. The revenue already being raised by the preexisting tax is equal to the area of the rectangle BCIH. After the tax increase, the new level of revenue is the area of the rectangle ACFD. The excess burden of the tax increase is equal to the area of the trapezoid DFIH, which is large relative to the increase in revenue from the tax increase.

Since the excess burden of the tax increase arises from the behavioral response of consumers and producers, its magnitude relative to the revenue increase depends upon the extent of those behavioral responses, which are measured by the demand and supply elasticities of the taxed good. If consumers do not change their demand for the good in response to changes in the price per unit (the elasticity of demand is zero) or if producers do not change their production of the good in response to changes in their net receipts per unit produced (the elasticity of supply equals zero), then the revenue increase and the loss of economic well-being resulting from the tax increase are identical and there is no excess burden. In that case, the revenue increase and the loss of well-being are both equal to the tax rate increase multiplied by the fixed output of the good. In general, the excess burden per dollar of revenue is larger when the elasticity of either demand or supply is further away from zero.

The change in taxpayers' economic well-being from a tax increase can be viewed as a combination of three components:

(1) The increase in tax revenue that would result if output of the taxed good did not change. This is sometimes referred to as the static revenue change. In Figure 4, this is the area of the rectangle ABHG.

minus—

(2) The reduction in tax revenue due to the reduction in output caused by the tax. In Figure 4, this is the area of the rectangle DFIG.

plus—

(3) The excess burden of the tax increase, which is the loss of economic well-being that producers and consumers incur from the decrease in output. In Figure 4, this is the area of the trapezoid DFIH.

The correct measure of the economic burden due to the tax increase is (1) minus (2) plus (3). In Figure 4, the burden is equal to the area of the trapezoid ABHD.

However, in distributional analyses, the JCT staff generally includes only (1) as the measure of the burden from a tax change. In other words, the JCT staff uses the static revenue increase to approximate the decrease in taxpayers' economic well-being. This methodology overestimates the loss of economic well-being due to a tax increase and understates the improvement in economic well-being due to a tax reduction. However, it is easier to implement and requires less information than the theoretically correct approach. In Figure 4, the JCT staff would approximate the economic burden of the tax increase as the area of the rectangle ABHG. This area differs from the correct economic burden by the area of the triangle DHG.

This approach differs from that used by the JCT staff to prepare revenue estimates. JCT staff revenue estimates of a tax change measure the actual revenue change, (1) minus (2).[32] Therefore, whenever a tax change is expected to induce a behavioral response, the revenue change presented in the JCT staff revenue estimate will diverge from the burden distributed in the JCT staff distributional analysis. This divergence is appropriate because they measure different economic concepts. Using the actual revenue change in the distributional analysis would grossly mismeasure the loss of economic well-being for many tax changes.

This point can be seen in Figure 4. The actual revenue increase differs from the correct measure of the economic burden by the amount of the excess burden induced by the tax increase. In Figure 4, the error from using the actual revenue change to measure the loss of economic well-being is the area of the trapezoid DFIH. This error is much larger than the error from using the static revenue increase (the area of the triangle DHG).

The superiority of the static revenue change (relative to the actual revenue change) as an approximation to economic burden is not attributable to any special features of Figure 4. Instead, this conclusion generally holds for changes in the rate of a preexisting tax. (A situation where this may not be true is discussed below.) The static revenue change and the actual revenue change have similar degrees of accuracy only in the special case when the introduction of a new tax is being considered.[33] For changes in the rate of a preexisting tax, the static revenue change generally is a superior approximation to the change in economic well-being.

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[32] A more complete discussion of the JCT staff's treatment of behavioral response in revenue estimates is provided by Joint Committee on Taxation, *Discussion of Revenue Estimation Methodology and Process*, pp. 6–8.

[33] This can be seen in Figure 3, in which (1) is the area obtained by multiplying the tax rate (AD) and the initial output (EF), (2) is the area obtained by multiplying the tax rate (AD) times the output reduction (EG) and (3) is the area of the triangle BEC. The error from using the actual revenue change is the area of the triangle BCE while the error from using the static revenue change is the sum of the areas of the triangle above BE and the triangle below EC.

This point can be illustrated by considering the taxation of realized capital gains. Suppose that the tax rate on realized capital gains is increased and that the amount of realized capital gains falls in response to the higher tax rate. If the decline is large enough, tax revenues can actually fall due to the tax increase. (This arises if (2) is larger than (1).) However, the tax burden must have increased because investors with capital gains are faced with a less desirable set of options. The fact that they pay less taxes does not mean that they are better off; instead, the decline in tax payments arises because investors have changed their behavior, which actually reduces their economic well-being.[34]

While the static revenue change generally is a reasonable estimate of the change in burden, tax changes may be proposed for which the static revenue measure may be a very inexact measure of burden. For example, one might propose that all corporations filing returns include their nine-digit zip code in their address, and that those that did not do so would be subject to a $1,000 fine. If the current practice of corporations filing returns was to include only their five-digit zip code, the static measure of burden would be quite large ($1,000 times the number of corporations). However, corporations can almost costlessly comply by calling the nearest post office, suggesting that the burden is not nearly as large as a static estimate would suggest. More generally, when the demand curve for a good is infinitely elastic (flat), or nearly so, small tax increases can eliminate consumption of the good entirely. A large tax increase would have identical effects, and should be measured as imposing the same burden. However, static estimates of the burden of the two taxes would differ significantly. In such instances, the JCT staff may exercise its judgement and adjust the burden from the static revenue estimate.

To present meaningful estimates of the change in well-being, the JCT staff therefore generally distributes the static revenue change in its distributional analyses.

Effects in other markets (general equilibrium)

The preceding analysis provided a simplified view of the theory of tax incidence and of the JCT staff's distributional analyses. However, this analysis is incomplete because it considers only the specific market for the taxed good. To obtain a complete picture of the effects of a tax, it is necessary to consider its impact on markets for other goods and services.

In general, the previous analysis suggested that a tax on a good has two potential effects, an increase in the price of the taxed good and a reduction in the returns received by the factors that produce the taxed good (the suppliers of the labor and capital that firms use to produce the taxed good). However, economic theory suggests that each of these effects will have an impact elsewhere in the economy.

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[34] See Joint Committee on Taxation, *Explanation of Methodology Used to Estimate Proposals Affecting the Taxation of Income from Capital Gains*, pp. 5, 47. Also see Jane G. Gravelle and Lawrence B. Lindsey, "Capital Gains," *Tax Notes*, January 25, 1988, p. 401 and Gerald E. Auten and Joseph J. Cordes, "Cutting Capital Gains Taxes," *Journal of Economic Perspectives*, 5, Winter 1991.

Consider the increase in the taxed good's price. As the taxed good becomes more expensive relative to other goods and services,[35] consumers are likely to respond in a manner that affects other prices in the economy. Consumers may increase their demand for goods and services that are substitutes for the taxed good, which may increase both the price and the quantity produced of those goods and services. Conversely, consumers may reduce their demand for goods and services that are complementary to the taxed good, which may reduce both the price and the quantity produced of those goods and services. For example, a tax on liquor may increase demand for beer, wine, and soft drinks and reduce demand for shot glasses. Economists use general equilibrium incidence analysis to study the effects of a tax on all markets in the economy.

Now, consider the reduction in factor returns. If labor in the liquor industry receives a lower return due to the tax, it is likely that suppliers of labor will move to other industries. The increased supply of labor in those industries may reduce the return on labor there. In general, if a factor of production, such as labor or capital, can move freely between industries, economic theory predicts that it will receive the same return in all industries in the long run. This prediction implies that, in the long run, any burden on a factor will be experienced by that factor throughout the entire economy. In the short run, however, the burden may be limited to the taxed industry.

A reduction in wages and other factor returns is a likely result of any tax on a good. Economic theory suggests that the reduction in factor returns may be greatest for those factors that are used most heavily in producing the taxed good. For example, if the production of liquor requires a greater amount of skilled labor than the production of other goods and services, a tax on liquor may reduce the return to skilled labor (throughout the economy) by a larger proportion than it reduces the return to other forms of labor.

The various changes in relative prices and the reduction in factor returns can also interact in complicated ways. For example, if the tax on liquor reduces the relative income of suppliers of skilled labor, then it will tend to reduce the demand for any goods and services for which they have strong demand. Conversely, however, to determine which factors experience the largest reductions in returns, it is necessary to consider not only the extent to which these factors are used to produce the taxed good (as mentioned above), but also the extent to which they are used to produce the complements and substitutes that are affected by the tax.

As this discussion indicates, several economic parameters influence tax incidence in the general equilibrium framework, including the elasticities of demand for goods and services and the extent to which different factors are used by the various industries. Unfortunately, these parameters often cannot be reliably quantified. Several economists have performed general equilibrium analyses of the incidence of the United States tax system,[36] but data limitations

[35] The theory of tax incidence makes no prediction concerning how the general price level will change. The increase in the taxed good's relative price may occur through an increase in its nominal price or a fall in the nominal price of other goods and services or both. This point is further discussed in Part III.C.

[36] Examples include Arnold C. Harberger, "The Incidence of the Corporation Income Tax," *Journal of Political Economy*, 70, June 1962; John B. Shoven and John Whalley, "A General

forced them to make many simplifying assumptions. Furthermore, their results were sensitive to the values they assumed for the key parameters discussed above.[37]

In its distributional analyses, the JCT staff generally measures a simplified version of these effects. For certain products, it is reasonable to assume that the elasticity of demand is very low or that the elasticity of supply is very high, or both. In those cases, the JCT staff assumes that the price of the taxed good, relative to all other goods and services, increases by the full amount of the tax. In general, data limitations prevent the JCT staff from identifying particular goods and services that are complements or substitutes to the taxed good. Instead, the JCT staff assumes that the prices of the untaxed goods and services are unchanged, relative to each other. The discussion accompanying Figure 4 explained how the JCT staff measures the burden resulting from price increases.

In other cases, the JCT staff may conclude that the price increase is smaller than the amount of the tax increase. This implies that factor returns, relative to the prices of other goods and services, must decline. The JCT staff's assumptions about the distribution of this decline are determined by data availability and by evidence concerning the speed with which factors move across industries.

If it is reasonable to assume that factors will move quickly across industries, the JCT staff assumes that factor returns fall throughout the economy. If reliable data indicates that factor uses in the taxed industry differ significantly from the economy-wide average, the JCT staff assumes that the reduction in returns is proportionately greater for factors that are used more intensively in the taxed industry; otherwise, the JCT staff assumes that all factor returns fall by the same proportion. If only limited movement of factors across industries is expected to occur during the five-year horizon, the JCT staff assumes that only the factors employed in the taxed industry suffer a reduction in returns.

In determining how changes in factor incomes affect individual well-being, the JCT staff follows an approach similar to that outlined in the discussion accompanying Figure 4. The burden of a reduction in a factor return is measured by multiplying the reduction by the quantity of the factor that was supplied prior to the decline in the return. For example, the burden of a reduction in the wage rate would be measured by the fall in wage income that would occur if labor supply remained unchanged.

C. General Timing Questions: Choice of Horizon

The preceding discussion implicitly has analyzed the tax change as having effects only in one year. Most provisions of the tax code affect individuals over time. The measurement of the burden of

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Equilibrium Calculation of the Effects of Differential Taxation of Income from Capital in the U.S.," *Journal of Public Economics*, 1, November 1972; Charles L. Ballard, Don Fullerton, John B. Shoven and John Whalley, *A General Equilibrium Model for Tax Policy Evaluation* (Chicago: University of Chicago Press), 1985.

[37] For example, in Shoven and Whalley, "A General Equilibrium Calculation of the Effects of Differential Taxation of Income from Capital," the authors simplified the United States economy by examining only two sectors (corporate and noncorporate) and two kinds of consumers (rich and poor). They also assumed that the tax system was proportional and that all demand elasticities were equal to one.

such provisions should be done in a way that makes burdens and benefits from different years comparable. For example, a proposal that both reduces taxes this year and increases taxes next year should not be viewed as increasing the well-being of individuals by the amount of the initial tax reduction.

Present value calculations

After the annual burdens imposed by a provision have been determined, it is necessary to aggregate the effect of the annual burdens. In general, economic theory indicates that individuals prefer current consumption to an equal amount of future consumption. Similarly, economic theory indicates that individuals experience a greater loss of well-being from a current burden than from a later burden of equal dollar magnitude. If this is true, then simply adding burdens over time gives too much weight to later burdens.

The correct approach is to calculate the present value of the burden. The present value of the burden is obtained by calculating the burden in each future year into the indefinite future and applying an appropriate discount rate to this stream of annual burdens. The JCT staff does not use this infinite-horizon approach, however, because of the difficulties discussed below. Instead the JCT staff aggregates burdens over the relevant (generally five-year) budget window.

Problems with infinite-horizon calculations

Inconsistency with annual income classifier.—As discussed in Part IV, the JCT staff's distributional analyses classify individuals by an annual measure of economic income. It would not be meaningful to compare the present value of an individual's lifetime burden of a tax change to his or her income in a single year. Instead, each individual's lifetime burden should be compared to the present value of his or her lifetime income. However, as discussed in Part IV, lifetime income cannot be easily measured and the JCT staff uses an annual income measure as a classifier.

Sensitivity to discount rate.—The present value of a burden that occurs in the distant future is extremely sensitive to the discount rate that is used. For example, a $1000 burden that occurs 50 years in the future has a present value of $368 if the discount rate is two percent per year but has a present value of only $7 if the discount rate is 10 percent per year. Because the selection of a discount rate is essentially subjective, it would be undesirable to present results that are too sensitive to this selection.

Lack of reliable long-term economic forecasts.—The burden imposed by a tax provision in a future year generally depends upon the values of particular economic variables that year. Distributional analysis therefore requires the use of economic forecasts. Because few long-term economic forecasts are available and because these provide little detail, burdens in the distant future cannot be accurately estimated.

Treatment of future generations.—Tax proposals affect future generations, as well as generations currently alive. If an infinite horizon is used, the effects of proposals on future generations

would have to be included in the analysis.[38] It is not clear, however, that burdens on future generations should be discounted at the same rate as future burdens on individuals currently alive. The discount rate for individuals currently alive can be inferred from the choices they make between current and future consumption but it is difficult to determine the current value of future generations' consumption, since they cannot choose to consume today. The appropriate intergenerational discount rate depends upon a value judgment concerning the obligations that each generation has to its descendants. Economists cannot readily make this judgment.

Furthermore, it is unclear how the income classifier should be applied to future generations. If economic growth continues, future generations will be wealthier than current generations. Even relatively poor members of future generations might have incomes and living standards that are high compared to current levels. It is not clear how these future individuals should be grouped for purposes of distributional analysis.

Policy credibility.—Some legislative proposals provide that policy changes will take effect at a future date. If these changes are politically unpopular, the individuals potentially affected by them may believe that the changes will be repealed or modified prior to their effective date. Arguably, the distributional analysis should not include effects of the future changes which may not take effect. However, the JCT staff cannot readily determine the political viability of future policy options. This problem is more severe when policy changes in the distant future are being considered.

Due to these problems, an infinite horizon is unsuitable for practical distributional analysis. With a shorter horizon, the annual income classifier is more meaningful, the calculations are less sensitive to the discount rate, reasonably reliable economic forecasts are available, special issues concerning the treatment of future generations can be avoided, and policy decisions in the distant future do not have to be forecast. It is not obvious, however, which shorter horizon should be used.

Possible shorter horizons

Single year.—An extreme example of a short horizon is the choice of a particular single year. However, the use of a single-year horizon would often exclude important future events (e.g. the phase-in of a proposal) from the analysis. Also, the analyst would have to choose a single year upon which to base the distributional analysis, trying to ensure that the treatment of different proposals is comparable. For example, if a temporary provision is to be in place for one year, it seems reasonable that the distributional calculations should be based on that year. However, an alternative provision with similar annual effects may be phased in over a number of years. If the analyst only looked at one year of the phase-in, there would be a danger of grossly miscalculating the actual burden. Cer-

[38] Significant attempts at such analysis include Alan J. Auerbach, Jagadesh Gokhale, and Laurence J. Kotlikoff, "Generational Accounts: A Meaningful Alternative to Deficit Accounting" in David Bradford (ed.), *Tax Policy and the Economy*, 5, (Cambridge: The MIT Press) 1991 , and Laurence J. Kotlikoff, *Generational Accounting: Knowing Who Pays, and When, for What We Spend*, (New York: The Free Press), 1992.

tainly, a comparison of the two provisions would be very misleading.

An alternative rule for single year analysis would be to base the calculations on the year in which the law is fully phased in. The JCT staff used this rule for distributional analyses undertaken before May 1, 1992. However, this approach has several problems. For instance, even if a provision is scheduled to take effect at a future date, it can immediately affect individuals when it is announced, through the capitalization effect (discussed below in Part II.D) or through behavioral responses that reflect the full effect of the proposal.

In addition, this approach has difficulty with all temporary provisions, because the fully phased in version of a temporary provision is no provision. However, ignoring temporary provisions is unjustifiable, because individuals are significantly affected by many of them. The opposite approach (used by the JCT staff in the past) takes the year prior to the expiration of a provision as the time when the proposal is fully phased in. This method overstates the burden or benefit associated with temporary proposals.

The five-year window.—To ensure comparability between proposals which result in streams of burdens with different time profiles while retaining tractability, it is desirable to use a multi-year horizon to examine the distributional consequences of proposals. The JCT staff currently uses a five-year window for revenue calculations and for consistency generally employs the same time frame for distributional analyses. This approach is a compromise between the otherwise ideal infinite horizon approach and the single-year method.

Burdens are calculated for each of the five years in the selected window and their present value computed. This sum is then effectively averaged over the five-year horizon, resulting in an annual measure of the five-year burden. Specifically, the benefit or burden of a tax change is the annual change (held constant except for growth in the economy) whose present value over the five-year window equals the present value of the provision's effects during the five-year window.[39] The growth rate of the economy is taken from the Congressional Budget Office (CBO) baseline and the discount rate is a weighted average of the short-term and long-term Applicable Federal Rates.[40]

To clarify this approach, consider its application to three versions of a tax reduction: one which is immediate and permanent; one which is temporary; and one which is postponed. For this example, assume that the economy (and the annual benefit from the tax reduction) grows steadily at five percent per year and that the discount rate is 10 percent per year.

Immediate and permanent reduction.—Consider a permanent reduction in marginal tax rates that reduces an individual's tax burden by $100 in 1993. Because of the assumed growth rate, that individual's tax burden is reduced by $105 in 1994, $110 in 1995, $116 in 1996, and $122 in 1997. The JCT staff calculates the reduc-

[39] See Appendix A for relevant formulae.

[40] When the burden is stated as a percentage of income, the income is measured as the five-year, annuitized income of the taxpayer. This makes the denominator (annuitized income) consistent with the numerator (annuitized burden).

tion in the 1993 tax burden (with subsequent reductions increasing at the economy's growth rate) that has a present value over the 1993-1997 window equal to the present value of the actual tax reductions during that period. In this case, the answer is $100 (implying subsequent reductions of $105, $110, $116 and $122, respectively), which is the tax reduction actually received in 1993. Because the tax change is immediate and permanent, the answer is the same as if only 1993 were considered.

Temporary reduction.—Now, suppose instead that the cut in marginal rates is effective only in 1993. The taxpayer's gain is $100 in 1993 but $0 in each of the four subsequent years. With a discount rate of 10 percent, this one-year tax reduction has the same present value over the five-year window as a permanent tax reduction that equals approximately $22 in 1993 and grows five percent per year thereafter. The JCT staff would report the taxpayer's benefit as $22.

Postponed reduction.—Finally, assume that the tax reduction does not take effect until 1997. The taxpayer's benefit is $122 in 1997 but $0 in each of the first four years of the budget period. An immediate permanent tax reduction of approximately $18 in 1993, growing by five percent per year thereafter, would provide the same present value benefit to the taxpayer over the five-year window. In this case, the JCT staff would report the benefit as $18.

The use of the five-year window is somewhat misleading in the last case. The annuitized value of the fifth year's burden over the full five years underestimates the economic burden of the provision. In effect, the permanent provision is analyzed as if it were temporary. Nevertheless, to maintain consistency with the revenue-estimation process, the JCT staff generally uses the five-year window for distributional analyses.

However, the JCT staff departs from the five-year horizon in its analysis of certain provisions that change the timing of tax payments. For example, recent tax provisions have required corporations to increase estimated tax payments from 90 percent to 97 percent of current year liability (or 100 percent of previous year's liability). The primary effect of these changes is to accelerate tax payments, shifting some payments from years outside the five-year window to years within the window. This would be listed as a significant burden if it were distributed in accordance with the general rules described above. However, it is clear that the taxpayers' only economic burden from the acceleration is the loss of interest that they could have earned on the taxes that are now paid earlier. In its distributional analyses, when data permit, the JCT staff includes only this loss of interest.

After the horizon has been chosen, burdens and benefits must be assigned to specific years. For many proposals, this assignment is simple, but for some provisions, such as savings and investment incentives, it is problematic. For example, while tax benefits from Individual Retirement Accounts (IRAs) may accrue outside the window, some of them are a consequence of IRA contributions made within the five-year window. It is not clear whether these benefits should be attributed to the within-window year when the contributions are made or to the beyond-window year when the tax saving

is received. This general issue, which is independent of the choice of horizon, will be discussed in more detail in Part III.

Example: Itemized deduction limitation and personal exemption phaseout

The tax code limits certain itemized deductions for certain taxpayers with adjusted gross income (AGI) over $108,450 for 1993 (this dollar threshold is adjusted for inflation). Personal exemptions are phased out for taxpayers with AGI in 1993 over $108,450 (single taxpayers), $162,700 (married taxpayers filing joint returns), and $135,550 (head of household returns). Under current law, the itemized deduction limitation will expire after December 31, 1995 and the personal exemption phaseout will expire after December 31, 1996. A proposal to make these provisions permanent would increase revenue in the final two years of the current five-year window, which includes fiscal years 1993 through 1997 inclusive. Assuming that the burden of the taxes attributable to these provisions is borne by the individuals making the tax payments, the JCT staff constructs a five-year annuity equivalent in present value to the extra taxes paid. This annual burden over the five years is reported in Table 2. The burden imposed by taxes paid after fiscal 1997 is not included in the analysis.

Table 2.- - Distributional Effects of Extending the Limitation of Itemized Deductions and the Personal Exemption Phaseout, 1994-1998
(1993 Level)

Expanded Income Class (1)	Present Law Federal Taxes (2)	Present Law Average Tax Rate (3)	Proposed Change in Tax Burden	Burden Change as a Share of Income
	Billions	Percent	Millions	Percent
Less than $10,000	$9	10.4%	$0	0.00%
10,000 to 20,000	39	11.9%	0	0.00%
20,000 to 30,000	72	17.0%	0	0.00%
30,000 to 40,000	86	19.1%	0	0.00%
40,000 to 50,000	93	20.9%	0	0.00%
50,000 to 75,000	201	22.3%	0	0.00%
75,000 to 100,000	120	24.6%	1	0.00%
100,000 to 200,000	142	26.6%	403	0.08%
200,000 and over	168	30.2%	2,426	0.44%
Total, All Taxpayers	**$930**	**22.1%**	**$2,830**	**0.07%**

Source: Joint Committee on Taxation

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(1) The income concept used to place tax returns into income categories is adjusted gross income (AGI) plus: [1] tax-exempt interest, [2] employer contributions for health plans and life insurance, [3] employer share of FICA tax, [4] workers' compensation, [5] nontaxable social security benefits, [6] insurance value of Medicare benefits [7] corporate income tax liability attributed to stockholders, [8] alternative minimum tax preference items, and [9] excluded income of U.S. citizens living abroad.

(2) Includes individual income tax, FICA and SECA tax, excise taxes, estate and gift taxes, and corporate income tax.

(3) Present law Federal taxes as a share of expanded income.

D. Other Tax Incidence Issues

This section examines four other issues that arise in the theory of tax incidence and describes the manner in which the JCT staff addresses them.

Timing of the burden of consumption taxes

Because the JCT staff has decided to measure only the burdens that are deemed to occur within a five-year horizon, the burden that is allocated to an individual depends on the time at which the burden is attributed to the individual. To obtain an appropriate allocation of the burden of consumption taxes, the JCT staff distributes their burden in a manner somewhat more complicated than that discussed in Part II.B. The simple method described in Part II.B (multiplying the price increase by the amount of initial consumption) effectively attributes the burden of consumption taxes to the time period in which the consumption occurs. However, the JCT staff believes that it is more appropriate to attribute the burden of consumption taxes to the time period in which the consumer earned the income that finances the consumption. This approach does not reflect any change in the assumptions concerning who bears the burden; it changes only the amount of the burden that is deemed to occur within the five-year horizon. The reasons for this approach and the manner in which it is implemented are discussed in Parts III.C and III.D.

Lump-sum taxes

The discussion of incidence in Part II.B applies to taxes that are levied on current or future economic activity. The analysis is quite different if the government levies a tax based on past economic behavior or on some other variable that the taxpayer cannot currently alter.

One example would be an unanticipated tax on firms proportional to the amount of output that they produced at some past date. Since this tax is not based on current production, it does not change the current cost of production and does not alter the firm's current supply curve. Furthermore, since the firm did not anticipate the tax when it engaged in the past production, the firm's supply curve at that date was also unaffected. (The firm would have reduced production at that date if it had realized that the tax would be imposed, but, by assumption, the firm did not have that knowledge.)

Since the tax does not alter the supply curve at either date, it does not change the market price at either date. The burden of the tax is borne solely by the producers. Since taxpayers do not alter their behavior to escape the tax, it also has no excess burden.[41]

[41] In practice, however, a tax on past production may change behavior by affecting expectations about future taxes. If producers believe that, at some future date, a tax may be levied on their current production, they may reduce their current production, increasing the current price. Current consumers then might bear part of the burden of this tax, even though it has not yet been imposed by the government.

In general, if the magnitude of a tax or subsidy cannot be altered by changing current or future behavior, economists refer to the tax or subsidy as lump-sum. The unexpected tax based on past behavior that is discussed above is an example of a lump-sum tax. Other examples include a tax that requires each individual to pay an equal amount (a head tax) or a tax that bases each individual's liability on characteristics that the taxpayer cannot alter, such as race or age.

A tax provision can also be lump-sum with respect to particular taxpayers if its magnitude cannot be changed by a marginal change in their behavior. For example, consider the OASDI payroll tax rate, which is a 12.4-percent tax on the first $57,600 of earned income (1993 amount, adjusted each year for changes in average wages). If a taxpayer has earned income in excess of this amount, the tax is lump-sum with respect to that taxpayer, because its magnitude cannot be changed through marginal changes in behavior. The tax liability would continue to be $7,142.40, even if the taxpayer slightly increased or reduced his or her labor supply. However, the OASDI payroll tax is not lump-sum with respect to taxpayers who have earned income less than $57,600, because their tax liability will change if they alter their labor supply decisions.

Other tax provisions may be lump-sum. A deduction for the first $2,000 per year of IRA contributions might offer a lump-sum subsidy with respect to a taxpayer who is already saving $2,000 or more per year for retirement purposes.

Capitalization of tax burden

A number of taxes can alter the expected future returns earned on assets. For example, consider a tax increase that reduces a particular corporation's net receipts, beginning many years in the future. It may appear that anyone who holds shares of the corporation's stock during that future period will bear the burden of the tax increase. However, economic theory states that individuals who buy shares of the corporation's stock after the tax increase becomes public knowledge will not bear the burden. Because all potential buyers of these shares know that the corporation's net receipts will be reduced by the tax increase, they will not buy the stock unless its price declines by enough to offset the anticipated lower net receipts.[42] Although the new purchasers receive lower net receipts in future years, this loss is offset by the lower price they paid for the stock.

Instead, the burden of the tax increase described above is borne by the holders of the stock on the date that the tax increase becomes public knowledge. (This is true even if the tax increase will not be implemented until some future date.) At the time these stockholders purchased their shares, they did not anticipate the tax increase, so the price they paid for the stock did not reflect the reduction in corporate cash flows that the tax increase will cause.

[42] Economists assume that the demand for stock in a particular company is infinitely elastic, because other stocks in the same risk class are good substitutes. The burden of the tax is therefore borne by sellers of the stock, not the buyers.

After the future tax increase becomes public knowledge, these stockholders cannot avoid the burden. If they continue to hold their shares, the tax increase will reduce their net income. If they sell their shares, the tax increase will reduce the price they will receive.

Economists refer to this effect on the stock's price as capitalization; they say that the tax burden has been capitalized into the price of the stock. Capitalization occurs whenever a tax affects the profitability of an asset.

According to economic theory, the fall in the asset's value should equal the present discounted value of the future tax burdens on the asset. In general, a temporary tax will cause a smaller reduction in the asset's value than a permanent tax, if all other features of the two taxes are identical.

As discussed in Part III, changes in corporate income taxes and value added taxes can result in capitalization effects, because they change the tax burden on existing assets.

Further analysis of behavioral response

Unfortunately, the analysis of behavioral responses is not as simple as suggested in Part II.B. Consumers' and producers' behavior, and hence the ultimate incidence of the tax, can depend upon the manner in which the government uses the tax revenues. Returning the revenue to consumers or using it to reduce other taxes, subsidize other goods, or provide public services can alter the supply and demand of the original taxed good and, therefore, the incidence of the tax.

The simple measure of the response of demand or supply to a price change is called the *uncompensated* elasticity. If the price change is due to a tax increase and the tax revenue is given back to consumers in a lump-sum manner, then the demand response is measured by the *compensated* elasticity, since the rebate of the revenues compensates the consumer for the price increase. For example, if an excise tax is imposed on a good and its price increases, then the uncompensated effect of the price increase is to reduce the demand by a certain amount. However, if the tax revenue is returned to consumers, they will probably increase their demand for the good to some extent, since they have more money to spend. In general, the increase in demand caused by the return of the tax revenues will not be as large as the initial decrease in demand caused by the price rise, so the compensated response will be in the same direction but smaller than the uncompensated response.

Similarly, if the revenue is used to provide public services, then the uncompensated response to a tax change may not be suitable for establishing economic incidence. If the tax on motor fuels is increased, then the uncompensated response is a reduction in motor fuels consumption. But if the revenue raised by the tax increase is used to build better roads, then motor fuels consumption could actually increase as individuals switch to private automobiles from other means of transportation.

In estimating behavioral responses, the JCT staff generally does not consider the effects of the use of the revenues. This practice is required by data limitations and because the JCT staff does not model the effects of spending programs.

III. INCIDENCE OF PARTICULAR TYPES OF TAXES

This part of the pamphlet applies the principles elucidated in Part II to specific types of taxes. It is important to keep in mind that the burdens of taxes are always borne by individuals. In some of the discussion, the individuals who bear the burden are identified according to the kinds of inputs (labor, capital, land, or natural resources) they provide to the production of goods and services. In other places, the individuals who bear the burden are identified according to whether they are consumers or producers of particular goods and services.

A. Labor Taxes

The major labor taxes in the United States are payroll taxes (for Social Security, Medicare, and unemployment insurance) and the individual income tax. The following discussion of the distributional effects of labor taxes applies to both the payroll tax and broad-based changes in the individual income tax, such as changes in tax rates or in the level of the standard deduction or personal exemptions.[43]

In general

In most analyses of the incidence of the U.S. tax system, the entire burden of a tax on labor is assumed to fall upon the individual supplying the labor.[44] As discussed earlier (see Part II), the sharing of the burden of a tax on labor will actually depend upon the elasticities of labor supply and demand.

The JCT staff assigns the entire burden of labor taxes to labor. Such treatment follows from an assumption that the aggregate amount of labor supplied by workers is unresponsive to changes in the after-tax wage rate (that is, in the aggregate, the labor supply elasticity is zero[45]). For payroll taxes, the JCT staff assigns to the employee the burden of both the employee's and the employer's share of the tax. For the portion of the individual income tax attributable to labor income, the JCT staff assigns the burden to the individual who earned the income.

Although employers are required to pay half of the Social Security payroll tax on their employees' wages, employers will not bear the burden of the tax if wages adjust so that the sum of wages plus

[43] Broad-based changes in the individual income tax are treated similarly to labor taxes for the portion of the individual income tax assessed on labor income. On the margin, such individual income tax changes will affect labor supply decisions in a manner similar to payroll tax changes.

[44] For example, Joseph A. Pechman and Benjamin A. Okner, *Who Bears the Tax Burden?* (Washington, D.C.: Brookings Institution), 1974; Pechman, *Who Paid the Taxes, 1966-1985*; and Edgar K. Browning and William R. Johnson, *The Distribution of the Tax Burden* (Washington, D.C.: American Enterprise Institute), 1979.

[45] Whether one should be concerned with the uncompensated or the compensated labor supply elasticity is discussed in more detail above in Part II.D, page 39.

the employer share of the tax is the same as the amount of wages that would be paid in the absence of the tax. To measure that burden correctly, one needs to increase the income of the employee to reflect that part of the payroll tax that is nominally paid by the employer.[46] For example, if an employee receives gross wages of $20,000, the employee and the employer each pay a payroll tax of $1,530 (7.65 percent of $20,000). The assumption that labor bears the entire burden of the payroll tax implies that in the absence of the tax the employee would have received wages of $21,530. The employee thus bears tax at a 14.2 percent rate (= ($1,530 + $1,530)/ $21,530). In previous distribution tables, the JCT staff assigned both the employee's and employer's share of the payroll tax to the employee, but it did not add the employer's share of the tax to the employee's income. That asymmetry has been corrected for JCT staff distributional analyses; for purposes of determining the income of taxpayers, the employer's share of payroll taxes is added to the employee's income. (See Part IV.C, pages 89–93, for a further discussion.)

The usual approach of assuming the burden to fall entirely on labor is based on the broad coverage of labor taxes and the observed inelasticity of aggregate labor supply. In the United States, the two major taxes on labor income, the individual income tax and payroll taxes, apply to most occupations. The coverage of the Social Security payroll tax has been increased over time so that by 1990, over 97 percent of civilian employees and 87 percent of civilian earnings were covered by the tax.[47] Thus there are few opportunities for workers to attempt to escape taxation by moving to untaxed occupations.[48]

With limited opportunities to avoid labor taxation through the choice of work in an untaxed sector, the remaining margin for escaping the burden of the labor tax is through the consumption of leisure. If labor supply is elastic, then workers would respond to a labor tax by a reduction in the hours they are willing to work. In a partial equilibrium model, one would therefore observe some portion of the burden of the tax being borne by employers.[49] If labor supply elasticities are sufficiently close to zero, then the burden of a labor tax will be largely borne by labor regardless of labor demand. As benchmark calculations, suppose that the labor supply elasticity is 0.1. Then, if the labor demand elasticity is 1.0, 91 percent of the tax burden falls on labor.[50] If labor demand elasticity

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[46] This approach treats the Social Security program as a tax-and-transfer program in which current employees are taxed to pay for benefits to current retirees. Current employees are not treated as paying taxes today in order to receive future benefits, as would be the case under a contribution-based retirement plan. (For further discussion of this issue, see Part IV.C, pages 89–93.)

[47] *1992 Green Book*, p. 115. The reference to civilian employees includes both paid employees and self-employed individuals.

[48] One such opportunity is the presence of an "underground economy" of legal (and illegal) activities characterized by cash payments not reported to the tax authorities.

[49] See, for example, Mark R. Killingsworth, *Labor Supply*, (Oxford: Cambridge University Press), 1983 and Jerry A. Hausman, "Taxes and Labor Supply," in Alan J. Auerbach and Martin Feldstein, (eds.), *Handbook of Public Economics*, vol. 1, (Amsterdam: North-Holland), 1985.

[50] Using the result shown in footnote 30 in Part II.B., page 25, if the labor supply elasticity is ε_s and the (absolute value of the) labor demand elasticity is ε_d, a wage tax of t will cause net-of-tax wage payments to employees to fall by $t\varepsilon_d/(\varepsilon_d+\varepsilon_s)$. Therefore the portion of the wage tax that will be borne by the employees is $\varepsilon_d/(\varepsilon_d+\varepsilon_s)$.

is 0.5, 83 percent of the tax burden falls on labor. If labor demand elasticity is 0.2, two-thirds of the tax burden falls on labor.

The general conclusion that labor bears the full burden of taxes imposed upon it must be qualified. Wages may not be able to adjust in the short run to unanticipated changes in the taxation of labor. If wages are set according to a long-term labor contract, then the burden of an unanticipated change in the payroll tax during the period the contract is in force will be shared by the employer and employee. Because the amount of wages subject to this qualification is roughly the total wages negotiated under long-term contracts divided by the number of years of the contracts, the importance of this qualification is rather small[51] and the JCT staff does not attempt to allocate some of the burden of the payroll tax to employers in the short-run. Furthermore, to the extent that employers faced with long-term labor contracts can react to an increase in the payroll tax by reducing the size of their workforce in the short term, a portion of the tax burden will still be shifted to labor.[52]

Minimum wage laws may provide an additional reason why wages will not be able to adjust fully to a change in labor taxation. If an employee receives a wage at or near the minimum wage, the employer may not be able to pass on the entire burden of increased labor taxes through a downward adjustment in the employee's wages. Minimum wage laws are unlikely to be a binding constraint for most workers, so the JCT staff does not treat them as an important qualification when considering broad changes in the individual income tax or payroll tax.[53]

Targeted wage incentives

In the case of targeted wage incentives, such as employment tax credits targeted to particular groups of workers or to particular geographic areas, the argument for inelastically supplied labor may be weaker. If the credit is available for workers who are employed in a defined area even if they have "immigrated" into that area, and if that defined area is relatively small, then the increased supply of workers may compete away the benefit of the credit. That is, assuming wages are free to adjust, the gross wage rate will fall by the full amount of the credit, leaving the net-of-credit wage unchanged from the level that prevailed prior to the introduction of the credit. In essence, the supply of labor will be completely elastic and the entire amount of the credit will accrue to the benefit of the employers.

Although the supply of labor is assumed to be inelastic for the market as a whole, it need not be the case that the labor supply of workers in a segment of the broader labor market is inelastic. If a credit is available for a certain defined set of workers, then one needs to look at the supply curve of labor for that particular group

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[51] For example, according to unpublished data of the Bureau of Labor Statistics, as of January 1, 1993, 5.7 million nonagricultural, private sector workers were covered by collective bargaining agreements affecting at least 1,000 workers and lasting more than one year. This number represents less than seven percent of the nonagricultural, private-sector payroll.

[52] In this case, laid-off workers bear the burden of the tax increase because in the absence of the tax increase they would have supplied labor services to the employer.

[53] For changes in taxes that are targeted to workers who would receive wages at or near the statutory minimum, the possibility that employers may bear some of the burden of the tax change becomes more important. The approach to targeted wage incentives is discussed in the section immediately following.

of workers. An example of an incentive targeted to a particular group of workers is the 10-percent income tax deduction for working spouses that was part of the tax code from 1981 to 1986. Because the labor supply elasticities for second earners are generally found to be larger than for primary earners,[54] the benefit of such a targeted tax credit could be shared by employers and employees. The JCT staff uses relevant econometric labor supply evidence in determining how to split the benefit of such targeted tax changes.

Other issues in individual income tax changes

As noted above, broad changes in individual income tax rates or exemption amounts that affect the portion of the individual income tax assessed on labor income are treated by the JCT staff as labor taxes for the purpose of distributional analyses. Therefore, such tax changes are considered to be borne entirely by the filers of the individual income tax returns.

Similar reasoning applies in distributing the burden or benefit of narrower provisions affecting some component of wage payments. For example, the burden of a proposal limiting the income exclusion for employer-provided health insurance would be assigned to workers receiving such health benefits from their employers. Although such a provision would not affect all employees, for those who are affected, the provision would lead to the same changes as would an income tax increase.

For changes in specific deductions allowed under the individual income tax, the burden or benefit of such changes generally is assigned to the individuals whose tax liabilities are changed, because the change is treated as a change in the amount of tax benefit the individual receives from the deduction. For example, an increase in the allowable level of charitable contributions results in an increase in the tax benefit for those individuals making specified donations. Proposals affecting specific deductions operate in a similar manner to changes in excise taxes in that a change is made in the price of a particular activity.[55] (In the case of the charitable donations deduction, the price of charitable giving is affected.) The JCT staff generally distributes the burden or benefit of excise tax changes to the consumers of the good or service being taxed (see Part III.D, pages 60–66, for a further discussion), and changes in specific deductions are treated similarly.

B. Taxes on Capital

The tax system taxes the return to capital both at the individual level, through the personal income tax, and at the corporate level, through the corporate income tax.

1. Taxation of capital income at the individual level

a. The incidence of individual capital income taxes

Individual income from capital can take the form of interest payments, dividends, rents, royalties, and capital gains. In general, the personal income tax does not differentiate income from capital from

[54] See, for example, Killingsworth, *Labor Supply*.

[55] When a taxpayer faces a marginal individual income tax rate of t, the price of an activity allowed an income tax deduction is reduced from $p to $p(1 – t).

other types of income. Increases in the personal income tax rates generally increase the tax rate on both labor and capital income.

The incidence of capital income taxes at the individual level is uncertain. If the tax is borne entirely by capital, then an increase in the level of capital income taxes will have no effect on the pre-tax rate of return received by capital owners, and the after-tax rate of return will decline by the amount of the tax. In this case, the tax burden on owners of capital arising from an increase in taxes on capital would equal the increase in taxes paid. The tax is not borne by capital if an increase in capital income taxes causes the pre-tax rate of return to rise, so that the after-tax rate of return is unchanged. In this case, the tax burden would fall on other factors, such as labor.

The incidence of capital income taxes depends on the elasticities of demand and supply for capital. The elasticity of demand for capital depends on the substitutability between capital and other inputs, such as labor, as well as the elasticity of demand for products that use capital as an input. In a closed economy,[56] the supply of capital is equal to the total amount of savings. The elasticity of supply of capital depends on the responsiveness of savings to the rate of return to capital. If people change their saving behavior in response to changes in the after-tax return to saving, then some of the tax burden from increased taxation of capital income may be shifted to other factors such as labor (wages will fall if capital intensity decreases). If saving is not responsive to changes in the after-tax rate of return, capital bears the full burden of the tax. Empirical tests of the responsiveness of saving to changes in the net return have yielded a wide range of results. Some tests find that personal saving responds strongly to increases in the after-tax rate of return,[57] while others find a small or even a negative response.[58]

In an open economy, capital from abroad is also available to finance domestic investments. Because foreign savers generally are not subject to the United States individual income tax, the rate of return demanded by foreign savers will be unaffected by increases in United States individual income taxes.[59] The existence of this supply of foreign funds and the increasing mobility of capital make it unlikely that increases in United States capital taxes will lead to increases in the pre-tax rate of return to capital, meaning that United States capital owners bear the full burden of individual income taxes on capital.[60]

In light of the above considerations, the JCT staff distributes the burden of capital income taxes to the owners of capital. When individual tax rates increase, the JCT staff distributes the burden of the increased taxes to those who pay the taxes. When capital in-

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[56] A closed economy is one that has no economic transactions with the economies of other countries.

[57] For example, see Michael Boskin, "Taxation, Saving, and the Rate of Interest," *Journal of Political Economy*, 86, April 1978.

[58] For example, see George von Furstenberg, "Saving," in Henry J. Aaron and Joseph A. Pechman (eds.), *How Taxes Affect Economic Behavior*, (Washington, D.C.: Brookings Institution), 1981.

[59] Some earnings on United States investments held by foreign savers are subject to a United States withholding tax.

[60] This assumes that United States investors cannot escape United States individual income taxes by investing abroad.

come is excluded from tax, the JCT staff distributes the benefit to those whose taxes are reduced.

b. Specific problems in distributing changes in individual capital income taxes

Deciding how to distribute the tax burden of capital income tax changes often involves more than choosing an incidence assumption. The incidence assumption dictates which taxpayers are assigned the burden, but calculating the magnitude of the burden is also difficult. In many cases, capital income tax changes also involve difficult issues of timing and behavior.

Changes in the tax treatment of capital gains

Tax cuts on capital income generally reduce the tax burden on owners of capital. However, because capital gains income is taxed on realization (i.e., when assets are sold) rather than on accrual (i.e., when asset values increase), changes in tax payments on capital gains income will generally not provide a good measure of changes in tax burden.

Because reductions in taxes that apply to capital gains income (either tax cuts that apply to all capital income or tax cuts that apply only to capital gains income) induce increased realizations, it is possible that in the first few years following a tax cut, taxes paid will increase. Taxes paid can be split into two components: the taxes paid at a reduced rate on assets that would have been sold even in the absence of a tax cut and the taxes paid on the induced realizations. Because taxpayers choose whether to realize gains, they must believe that selling their assets and paying capital gains taxes will make them better off than simply holding the asset. The increased taxes paid as a result of the increased realizations is not an increase in tax burden.

Capital gains are taxed only on realization and are not taxed at all if the assets are not sold before death. Taxpayers can defer or escape tax by holding on to assets rather than selling them. This incentive produces the "lock-in" effect. Taxpayers may want to sell their assets with accrued capital gains (to rebalance their portfolios, for example), but choose not to because of the tax consequences. The economic benefit taxpayers receive from deferral is reduced by the cost of holding a suboptimal portfolio.[61]

Reducing the taxes on capital gains reduces the lock-in effect by reducing the value of deferral (since the potential tax liability is smaller). If taxpayers respond to the lower tax rates by selling more assets, it must be because the cost of holding on to those assets is greater than the new value of deferral (given new, lower tax rates), but lower than the old value of deferral (under higher tax rates). Therefore, the benefit taxpayers receive on the induced realizations is, at most, the difference between the initial and new values of deferral.

On the other hand, to the extent that taxpayers increase realizations following a reduction in capital gains taxes because they fear that the reduced tax rates will not be permanent, rather than be-

[61] The upper bound on this cost is the value of deferral (because if the cost of holding a particular portfolio were greater than the value of deferral, the taxpayer would sell the portfolio).

cause of the reduction in the lock-in effect, it is unclear whether assigning a tax benefit to the increased realizations is appropriate.

Because calculating the tax benefit on induced realizations is very difficult and because the benefit is likely to be small, the JCT staff ignores this benefit and distributes only the changes in tax burden on the capital gains that would have been realized in the absence of the tax cut. This convention has the effect, however, of underestimating the benefits of a tax cut on capital gains income.

Changes in the tax treatment of savings—IRAs and pensions

Deductible Individual Retirement Arrangements (IRAs) allow taxpayers to deduct contributions to IRAs from gross income in the year contributed, but require taxpayers to include in gross income the entire amount withdrawn (including earnings) in the year withdrawn. Proposed "back-end" IRAs do not provide a deduction for amounts contributed to such an IRA, and permit taxpayers to exclude all the proceeds from gross income when withdrawn. As long as a taxpayer's marginal tax rate is the same at the time of the IRA contribution as at the time of IRA withdrawal, deductible and back-end IRAs provide the same economic benefit: income earned on assets is effectively exempt from tax.[62]

However, the cash flows associated with the two types of IRAs are quite different. In the year of contribution, the tax liability of taxpayers who contribute to deductible IRAs falls by the contribution amount times the marginal tax rate, whereas the tax liability of taxpayers who contribute to back-end IRAs is essentially unchanged. (The only change in taxes paid during the contribution year with respect to a back-end IRA is the exemption from tax on income earned on the IRA assets in the first year. This exemption also is provided to earnings on assets held in deductible IRAs.) The reduction in tax liability associated with the deductible IRA is a result of a change in the timing of tax payments, because, although the tax liability is reduced in the year of the contribution, the tax liability is increased in the year of the withdrawal. As with other pure timing changes, the reduction in taxes paid is not distributed. The tax benefit of an IRA is equal to the tax savings on the inside buildup in the IRA.[63]

Distributing the benefits of IRAs involves other timing issues. The benefit of changes in the IRA rules may be significantly smaller inside the five-year budget window than outside the budget window. Consider a provision that would permit all taxpayers to contribute to IRAs. In the early years, the amount invested in IRAs would be relatively small, because taxpayers are only allowed to invest a fixed amount (generally $2,000) per year. Therefore, the tax savings on the interest earned will be relatively small. In later years, when taxpayers have invested substantial sums in IRAs, the tax benefits may be significantly bigger. Because the JCT staff attempts to measure the change in the tax burden *inside* the budget

[62] For a discussion of the value of deductible, back-end and nondeductible IRAs, see Joint Committee on Taxation, *Description and Analysis of S. 612 (Savings and Investment Incentive Act of 1991)* (JCS-5-91), May 14, 1991.

[63] The benefit of a back-end IRA is equal to the tax exemption on all earnings on the IRA assets, but the benefit of a deductible IRA is equal to the tax exemption on (1 - marginal tax rate) times the earnings. This is because part of the earnings on the deductible IRA represent interest to the government on the taxes foregone in the year of the IRA contribution.

window, rather than the present-value change, the JCT distributional analysis ignores the larger benefits that accrue outside the budget window.

Because present-law IRA provisions, as well as various proposals to modify IRAs, generally allow penalty-free withdrawals when a certain age is attained, or after a specified holding period, the tax benefit of the IRA is reduced by the cost of holding the funds for the required period. For those who would have held the funds the prescribed period anyway, the holding-period requirement imposes no extra cost. For those who may need the funds in the near future, the cost of the holding-period requirement may be greater than the tax benefit of the IRA, and these individuals may choose not to contribute to IRAs even if they have the funds. Determining the cost of the holding-period requirement is important not only for determining the benefits of introducing IRAs, but also for determining the benefits of changes in the holding period requirement, such as proposals that would allow penalty-free withdrawals for first-time homebuyers or the unemployed.

Because of the difficulty of calculating the cost of the holding-period requirement, the JCT staff does not account for it explicitly. When holding-period requirements are loosened, the estimate of the benefit will measure the tax savings on the additional IRA contributions that result from the loosening of the requirement, but will not measure the increased value of existing IRAs. This clearly overstates the benefits for new IRA contributors (who may only marginally prefer investing their money in IRAs over investing in a taxable but more flexible investment vehicle), and understates the benefits to existing IRA owners.

2. Taxation of capital income at the corporate level

a. The incidence of the corporate tax

The corporate income tax taxes corporate gross receipts less deductible costs, where deductible costs include interest payments (meaning the return to debt is not taxed at the corporate level), labor and other input costs, and depreciation of capital assets.

The burden of the corporate tax could be passed on to labor, in the form of lower wages, to consumers, in the form of higher prices, or to other capital, in the form of lower rates of return to capital. Because the corporate tax is a tax on a type of capital (corporate equity), the incidence of the corporate tax is likely to be similar to the incidence of the individual income tax on capital. However, there are two important distinctions between the corporate income tax and the individual income tax. First, the corporate income tax is levied only on corporate capital, not all capital.[64] Second, the corporate income tax is levied on corporate income generated in the United States and on the earnings of United States corporations, and not on all capital income.

Investors can choose to invest in noncorporate capital, debt, or corporate capital. In order for them to want to invest in corporate capital, the risk-adjusted after-tax rate of return to corporate cap-

[64] The general equilibrium effects of the corporate tax were first analyzed by Harberger, "Incidence of the Corporate Tax." In the Harberger model, the total capital stock is fixed, but capital and labor are fully mobile between sectors.

ital must equal the risk-adjusted after-tax rate of return to other forms of investment. Thus, in the long run, changes in the rate of return to corporate capital generally also will change the return to noncorporate capital.

The corporate income tax is imposed not only on the returns to newly invested capital, however, but also on the returns to existing corporate capital. In the short run, changes in the corporate income tax primarily affect the after-tax returns on existing corporate capital. Thus, during the five-year budget window, the burden of a change in the corporate income tax will fall predominantly on the owners of corporate equity, but may also affect the after-tax rate of return received by all investors in the economy.

The long-run incidence of the corporate tax is somewhat less clear than the short-run incidence. The corporate income tax taxes the income of United States corporations and all corporate income generated in the United States. Unlike individual capital taxes, which are levied on all capital income earned by United States residents, the corporate tax can be avoided by investing in noncorporate capital or in foreign firms that operate abroad. This potential to avoid the corporate tax means that changes in the corporate tax are more likely to affect wages than changes in the individual income tax on capital. However, because investing abroad may be quite costly, it is likely that capital will bear at least some of the corporate income tax. Furthermore, moving capital abroad takes time. In the short and medium run, capital is relatively immobile and changes in the corporate tax are likely to lower the return to capital.

Because the JCT staff attempts to measure the burden of tax changes during the five years of the budget window, the JCT staff assigns the burden of certain changes in the corporate tax to owners of corporate capital.[65] A relatively small fraction of the burden of the tax may fall on investors in noncorporate equity during the five-year budget window. However, the distribution of ownership of corporate capital is similar enough to the distribution of other types of capital that assigning the burden of the tax only to owners of corporate capital will not have a large effect on the distributional analysis.

b. Specific problems in distributing changes in the corporate tax

As with the distribution of individual capital taxes, distributing specific changes in the corporate income tax system can be fairly complicated. Many of the issues concerning timing and behavior that arise in the case of individual capital taxes are also problematic for corporate income taxes. Furthermore, the incidence of specific changes to the corporate income tax may be quite different than the incidence of changes in the rate of corporate income tax. Two specific issues (expensing and investment tax credits) are explored below.

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[65] Certain tax proposals might change corporate tax payments without really being a tax on corporate capital. Examples of these types of provisions include changes in the deductibility of employee benefits and creation of certain employment credits. The benefits or burdens of proposals of this type would not be distributed according to capital ownership, but would be distributed like labor income tax changes.

Investment incentives: expensing and investment tax credits

Investment incentives reduce the tax on the earnings from new investment. Expensing allows taxpayers to deduct the cost of their investments in qualified property from their gross income in the year the investment is made. From an economic perspective, expensing effectively exempts investment earnings from tax.[66] Investment tax credits (ITCs) provide a tax credit to businesses for some fraction of the cost of their investment in certain depreciable assets. ITCs provide exemption from tax on some share of the earnings, depending on the rate of the tax credit as well as the present value of depreciation allowances.

Investment incentives may change both the timing and the total amount of tax payments. In order for the distribution of the tax incentives to be invariant to the timing of tax payments, the JCT staff calculates the benefit of investment incentives as the reduction in taxes on earnings on investments as the earnings accrue. For example, the benefits of expensing are calculated as the taxes saved on the earnings of the expensed investment, even though actual tax payments only decline in the year the expensed investment is undertaken. This method is consistent with the treatment of IRAs as well as the treatment of consumption taxes.[67]

The incidence of investment incentives depends on the exact nature of the incentives. Investment incentives that are provided to all new investments will not provide a benefit, even in the short run, to the owners of existing capital. In a closed economy, the investment incentives will increase the rate of return available to investors in all new capital, i.e. savers, and reduce the amount received by sellers of assets, i.e. dissavers.[68] Thus, investment incentives at the business level may have very similar effects to saving incentives at the individual level. In these cases, the JCT staff distributes the benefits of investment incentives on the basis of individual saving.

On the other hand, "investment incentives" that are provided to only a limited range of investments may not raise the return available to savers. For example, when favorable tax treatment is provided to investment only up to a certain dollar amount, the marginal return on capital is unlikely to change, and the rate of return available to savers will not increase. When the investment incentives are not capped, but are provided to only a limited set of investments (investment in a single industry, for example), then, at least in the short run, savers are also unlikely to benefit. In these

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[66] Because the value of an asset is equal to the present value of the asset's earnings, allowing a one time tax deduction for the value of the asset (expensing) provides the same present value benefit as exempting all of the asset's earnings from tax.

[67] The following section demonstrates that income taxes with certain investment incentives may be equivalent to broad-based consumption taxes.

[68] In a small open economy, the long run effects of investment incentives will be to induce capital to flow in from abroad, thereby benefiting labor, not capital. In the short run, however, in an open economy the owners of the investment being provided favorable tax treatment are likely to benefit from the investment incentives.

It is unclear whether the United States is best described as an open or a closed economy. While capital is clearly mobile internationally, there is still a strong correlation between saving and investment rates across countries (see, Martin Feldstein and Charles Horioka, "Domestic Saving and International Capital Flows," *Economic Journal*, 90, June 1980, and Philippe Bacchetta and Martin Feldstein, "National Saving and International Investment," in B. Douglas Bernheim and John B. Shoven (eds.), *National Saving and Economic Performance*, (Chicago: The University of Chicago Press), 1991,) which one would not expect if capital were perfectly mobile.

cases, the JCT staff distributes the benefits of investment incentives to the actual owners of the investments.

C. General Consumption Taxes

General consumption taxes include value added taxes and sales taxes and apply to a broad range of goods and or services at a single rate.[69] The JCT staff has studied the distributional impact of general consumption taxes because, even though the United States does not currently impose such taxes directly at the federal level, such measures are frequently proposed and debated. Furthermore, other aspects of the existing tax system, such as savings and investment incentives, have economic effects similar to those of general consumption taxes. For example, individual retirement accounts, in exempting earnings on qualified savings from tax, should impose in similar burdens to consumption taxes (which also exempt earnings from savings). The methodology developed below allows consistent treatment of these and other provisions.

The JCT staff measures the burden of consumption taxes as income is earned. As explained below, this method (1) allows consistent treatment with most other tax provisions, and (2) yields a stream of burdens over time that reduces the mismeasurement of burden relative to income caused by the restriction of the analysis to the five-year window. To distribute the burden of any tax, it is necessary to determine *which* individuals bear the burden of the tax and *when* the individuals are deemed to bear the burden. This observation is used to motivate and explain the income-based method for the distribution of general consumption taxes below.

Who bears the burden of the tax?

A consumption tax can lead to increases in the general price level in the economy or to reductions in nominal wages and profit rates. For wage earners, the distinction is unimportant, because they will suffer the same reduction in buying power whether their nominal wage falls or the prices they face increase. In either case, their real wage falls. However, the distinction is important for individuals with income fixed in nominal dollars—those with government transfers and those receiving or paying interest. For example, individuals whose income consists only of non-indexed government transfers are burdened if prices rise, but not if wages fall. Whether a consumption tax leads to nominal wage and profit declines or to price increases will depend on the monetary policy of the Federal Reserve, and cannot be predicted on the basis of economic theory. The distributional effects of consumption taxes under both alternatives are explored below.

When are individuals deemed to bear the burden of the tax?

Although it would be ideal to distribute the lifetime burden of tax changes, the JCT staff restricts its distributional analyses to the five-year budget period.[70] This restriction means that the way

[69] Specific excise taxes are discussed in section III.D. These taxes are levied on specific commodities rather than on a broad base. Examples include Federal motor fuels and cigarette excise taxes.

[70] See Part II.C.

tax burdens are assigned over time matters. The JCT staff has developed a method that distributes the burden of consumption taxes when income is earned rather than when taxes are paid. This method produces a distribution analysis that is consistent with both the treatment of other taxes and with the measure of well-being used to classify individuals.

When consumption taxes lead to price increases, the real value of wages and accumulated savings falls. When consumption taxes lead to declines in wages and profits, both the nominal and the real value of income falls. Thus, a consumption tax has the same effects on taxpayers' buying power as would a tax on wages and existing capital.[71] This equivalence means that a consumption tax can be distributed either as a tax on income or as a tax on consumption. To be consistent with the distribution of other tax changes, the JCT staff distributes the burden of consumption taxes as the burden of equivalent taxes on certain types of income.

It is only if individuals save or borrow that allocating the burden of a consumption tax when income is earned yields different results from allocating the burden when consumption occurs. When individuals do not save or borrow, consumption is equal to after-tax income, and the two methods yield the same answers. When individuals save, consumption is less than after-tax income, and when individuals borrow, consumption is greater than after-tax income.

Consider an individual who is temporarily unemployed and has very low income, but can consume out of savings. Consumption taxes paid will represent a very high fraction of income for this person, even though the well-being of the individual relative to an annual measure of lifetime income does not fall significantly. This problem could be addressed by measuring the burden not as a fraction of income but of consumption; however, this approach is not taken here.[72] The approach taken by the JCT staff is to measure the burden not as the additional cost to the individual of consumption due to the tax, but as the reduction in the value of any income that is received. Measuring the burden in this manner may more closely measure the real burden than calculating it on the basis of consumption relative to income.

Equivalent income-based taxes

In order to distribute consumption taxes as income is earned, it is necessary to determine what type of income taxes would have the equivalent effects as the consumption tax being proposed. This section outlines the principles underlying this methodology.

A broad-based consumption tax is equivalent to a tax on wages plus a tax on income from existing capital (but exempting income from new investment). To see this, suppose a consumption tax is introduced which increases the general price level in the economy. The real value of an individual's present and future wages will fall immediately, as will the value of any accumulated savings. Thus, the individual would be identically affected if nominal wages were cut and some of the accumulated capital were taxed by the government. Since, in competitive markets, the value of existing capital

[71] The equivalence between consumption taxes and taxes on certain types of income is discussed in further detail below.

[72] See Part IV for an extensive discussion of the income classifier.

assets is equal to their (expected) future stream of income, taxing the old capital is equivalent to taxing the income generated from that capital. This establishes the equivalence between a broad-based consumption tax and a tax on wages and the income generated by "old capital"—that is, any capital existing at the time of the introduction of the tax. This equivalence is shown more rigorously in Appendix B.

Notice that under the tax on wages and income from old capital, the returns to new investment are not taxed. Similarly, by taxing consumption at different times uniformly, a broad-based consumption tax effectively exempts the returns to savings from the tax base.[73] In a closed economy, savings and investment are equal, confirming the equivalence of the taxes.[74] As a tax on all income, with income from new investment exempt, the tax is equivalent to a business transfer tax (BTT). A BTT is levied on gross receipts at the business level, with expensing (i.e., immediate depreciation) of all costs, including new investment, but with no deduction for wages.[75]

Nominal price adjustment

The equivalence between a broad-based consumption tax and a tax on wages and the returns to old capital allows a meaningful income-based allocation of the burden of the consumption tax over time. It also highlights the importance of specifying which nominal prices adjust in response to the consumption tax. Since nominal price levels are determined in part by the independent actions of the Federal Reserve, they cannot generally be predicted in advance. For example, while it is usually assumed that a consumption tax increases the prices of taxed goods, it also is conventional to expect that a wage tax reduces nominal after-tax wages, and a tax on existing capital reduces its value. These assumptions are valid only if the Federal Reserve reacts differently to economically equivalent tax changes. Because such divergent policy responses are possible, distributional analyses require knowledge of which will occur. This is because different nominal price adjustments have different distributional effects on recipients of some government transfers and payors and recipients of fixed interest obligations.

When prices rise, the value of all income falls, unless the income is specifically indexed to changes in the price level. For example, an individual living entirely on an indexed Social Security pension will not be affected by a uniform price increase.[76] Similarly, an individual receiving Medicare services will be partially protected against the price rise, because the in-kind transfer of health care

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[73] For example, taxing consumption in future years at a higher rate than presently would reduce the return to savings. Taxing current consumption at a higher rate would subsidize savings.

[74] In an open economy, foreign holders of United States assets will be hurt by a tax on old capital, but not by a consumption tax which increases the general domestic price level. Because foreigners are not included in the JCT's distributional analysis, this problem with the closed economy assumption is reduced.

[75] Expensing of new investment with taxation of gross receipts is equivalent to the exemption of the earnings from new investment from tax, with no deduction allowed. Note that the full equivalence of the BTT and the consumption tax is valid only if all saving is channeled through the business sector.

[76] This assumes that fraction of the pension which is taxed, and the applicable tax rate, are fixed.

is effectively indexed.[77] A further source of indexation which partially protects individuals from price increases is the indexation of income tax brackets. To the extent that bracket limits are increased as prices rise, nominal income tax payments are reduced, offsetting the negative impact of the consumption tax. The benefits of this indexation are not uniformly distributed across individuals.

If, on the other hand, nominal wages and the returns to old assets fall, only certain types of income are affected. Recipients of fixed nominal transfers are not hurt by the tax. Such transfer payments include both indexed payments mentioned above, as well as non-indexed government transfers such as Aid to Families with Dependent Children (AFDC). In addition, any private contracts with fixed nominal payments are unaffected by the tax. In particular, holders of existing bonds receive the same nominal interest payments as before, since the introduction of the tax does not change any contractual agreements between issuers and holders. Capital income can be divided into financial- and non-financial capital income. If prices rise, the value of all capital income is reduced, but if factor returns fall, only income from existing non-financial assets is reduced in value.

The reason bond-holders are unaffected by the consumption tax while owners of physical assets are burdened is that the returns to bond investment can be directly consumed. That is, the output of a bond is cash, the consumption value of which does not change if prices do not increase. On the other hand, owners of physical capital are hurt by the tax when factor returns fall. The value of output from such capital is reduced, because the owners are liable for the consumption tax when the produced goods are sold.

Distributing consumption taxes

The two major issues in the distribution of consumption taxes, timing (should the tax burden be allocated when income is earned or when consumption financed by that income occurs?) and nominal price adjustments (do prices rise or do nominal wages and profits fall?) yield four potential methods for distributing a consumption tax. The following labels are useful for distinguishing between the four approaches:

(p,C)—prices are assumed to rise, and the burden is assigned as consumption occurs (the traditional method of distributing a consumption tax);

(p,Y)—prices are again assumed to rise, but the burden is assigned over time as income is earned;

(w,C)—wages (and the returns to old capital) are assumed to fall, goods prices remain fixed, and the burden is assigned as consumption occurs; and

(w,Y)—wages (and the returns to old capital) fall, and the burden is assigned as income is earned.

In order to perform the distributional analysis using these four methods, it is necessary to have detailed information on consumption as well as income by income class. The traditional data set used to measure consumption, the Consumer Expenditure Survey,

[77] Food stamps are another example, since the nominal value of food stamps available to individuals is indexed to the price of a designated basket of food.

shows large amounts of dissaving at the bottom of the income spectrum, and very high saving rates at the top. Many analysts believe that this observed pattern of saving rates is inaccurate and results from problems with the data set.[78] Furthermore, the Consumer Expenditure Survey does not have reliable information on individuals with income greater than $100,000. The JCT staff has used a different data set, the Survey of Consumer Finances, to calculate saving rates, and use these saving rates to impute consumption. Like other analysts that have used this method, a small amount of dissaving is observed in the lowest income group, rather than the huge dissaving found from the Consumer Expenditure Survey. Using this method of imputing consumption reduces the measured regressivity of consumption taxes using the traditional (p,C) method.

Table 3 presents a distributional analysis of a five-percent broad-based consumption tax using each of the four methods. These results are depicted graphically in Figure 5. Measured as a percentage of expanded income (defined and discussed in Part IV), the burden is most regressive if measured using the (p,C)-method. Individuals in the lowest income class (those with economic income less than $10,000) are hit hard when prices rise, since most of their transfers, particularly AFDC, are not indexed. They are less severely affected if factor returns fall. Because low-income individuals only dissave a very small amount, the burdens measured

Table 3 Burden of a five percent broad-based consumption tax as a percentage of pre-tax income.

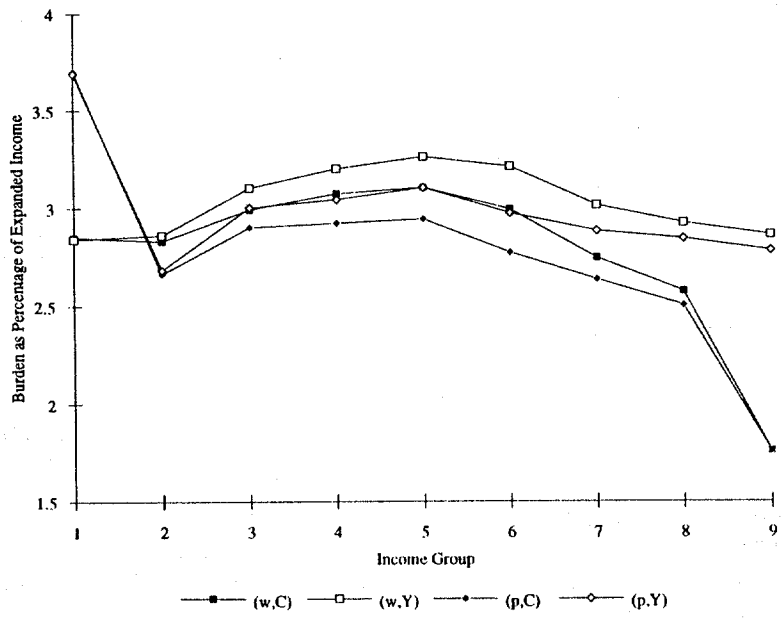
	Distribution Method			
Adjusted Income Class	(p,C)	(p,Y)	(w,Y)	(w,C)
$0-$10,000	3.70	3.69	2.84	2.85
$10,000-$20,000	2.66	2.68	2.86	2.83
$20,000-$30,000	2.90	3.00	3.10	2.99
$30,000-$40,000	2.92	3.04	3.20	3.07
$40,000-$50,000	2.94	3.10	3.26	3.10
$50,000-$75,000	2.77	2.97	3.21	2.99
$75,000-$100,000	2.63	2.88	3.01	2.74
$100,000-$200,000	2.50	2.84	2.92	2.57
$200,000 and over	1.76	2.78	2.86	1.76

[78] See, for example, Joyce Yanchar and Susan Haltmaier, "The Pros and Cons of Alternative Energy Taxes" in DRI/McGraw-Hill, *Review of the U.S. Economy*, March 1993, pp 46-52, Barry Bosworth, Gary Burtless, and John Sabelhaus, "The Decline in Saving: Evidence from Household Surveys," *Brookings Papers on Economic Activity*, 1:1991, pp. 183-241, and John Sabelhaus, "What Is the Distributional Burden of Taxing Consumption?", mimeo, Congressional Budget Office, December, 1992.

under the (p,C)- and (p,Y)-methods coincide, as do those using the (w,C)- and (w,Y)-methods. This is because the only difference between the income- and consumption-based methods of allocating burdens over time is in their treatment of savings, and if savings are very low, the difference is negligible. The most important determinant of the burden on the poor is thus whether prices rise or factor returns fall. They are generally much worse off if prices rise, and the method of burden allocation over time is relatively unimportant.

Figure 5

Burden of a 5% Broad Based Consumption Tax



The role of savings in distinguishing between the two methods of temporal allocation is significant in the highest income group. There, the (p,C)- and (w,C)-methods yield approximately equal burden measures, as do the (p,Y)- and (w,Y)-methods. However, the consumption-based methods show a much smaller burden than the income-based measures, since much of total saving is done by individuals with incomes above $200,000. Under the consumption-based method, these individuals effectively receive a deduction for

the full amount of their savings when they occur, while the income method only attributes a deduction for the annuitized value of the new savings.[79]

In the central income range, the burden is relatively flat as measured by all methods. Using either the consumption- or income-based method, the burden is generally less when prices rise than when factor returns fall. This is due to the fact that the burden is measured net of any other reductions in taxes. In particular, income tax brackets (including the exemption and standard deduction) are indexed to the general price level, so that when prices rise the amount of income tax paid falls. (This indexation does not change the income tax liability of individuals in the highest income classes significantly.) Similarly, for a given type of nominal price adjustment, the consumption-based method measures a lower burden than the income-based method since savings in these groups are positive. The small degree of progressivity observed around the second income class for all methods derives from the fact that these individuals receive proportionately more indexed Social Security payments (as well as other non-indexed benefits) than those with higher incomes.

Overall, the income methods measure consumption taxes as being less regressive than the consumption methods. In fact, the (w,Y) method is relatively flat over the income spectrum. Many researchers recently have contested the traditional view that consumption taxes are very regressive. One approach taken by some researchers is to calculate present values of consumption as a fraction of permanent income.[80] Others have looked at consumption taxes paid as a fraction of consumption,[81] rather than as a fraction of pre-tax income. These researchers have pointed out that consumption taxes paid as a fraction of current income may overstate the regressivity of consumption taxes because people smooth their consumption—those in their high earning years will be doing a lot of saving to finance consumption in retirement, and those with temporarily high or low income (large capital gains or temporary unemployment) will have disproportionately low or high consumption relative to income. A lifetime perspective significantly reduces the regressivity of the consumption tax. The method utilized by the JCT staff also implicitly uses a lifetime perspective, because while it does not calculate lifetime income, it does use the lifetime budget

[79] The consumption method allocates the burden of consumption as consumption occurs. This can be thought of as allowing a deduction for savings against income tax liability as these savings occur. The income method does not allocate the full benefit of the deduction for the savings at the time they occur, but imputes to the individual an equivalent annuity stream. This is consistent with the treatment of front-ended IRAs, where the benefit is measures not in terms of the up-front deduction, but in terms of the exemption from tax on the future earnings.

[80] See James Davies, France St. Hilarie, and John Whalley, "Some Calculations of Lifetime Tax Incidence", *American Economic Review*, 74, September 1984.

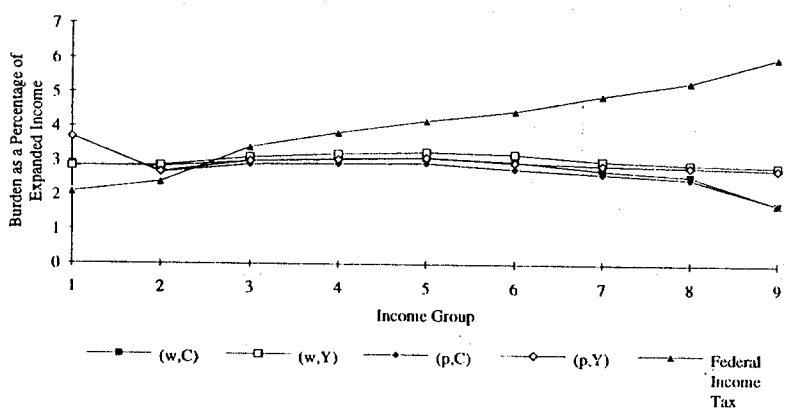
[81] See, for instance, James Poterba, "Lifetime Incidence and the Distributional Burden of Excise Taxes", *American Economic Review*, 79, May 1989, pp. 325-330, and Congressional Budget Office, "Federal Taxation of Tobacco, Alcoholic Beverages, and Motor Fuels", June 1990.

constraint to convert consumption taxes into taxes on certain types of income.

Finally, it is worth comparing the distribution of a consumption tax with that of the existing Federal income tax. This is shown in Figure 6, where one-fifth of the income tax liability, as a fraction of income, is graphed.[82] It is clear that while the degree of regressivity of the consumption tax varies depending of the distribution methodology employed, all methods show it to be substantially more regressive than the existing Federal income tax. There are a number of reasons for this difference. First, the Federal income tax has a progressive rate structure. Second, the Federal income tax does not exempt savings. Finally, the Federal income tax generally taxes all income net of deductions, whereas a consumption tax permits the deduction of both savings and all other Federal, State, and local taxes (since consumption is equal to after-tax income minus savings).[83] The ratio of consumption to pre-tax income is higher for lower-income people than for higher-income people both because lower income people save less, and because they face lower taxes. As a fraction of after-tax income, or as a fraction of consumption, the consumption tax would appear far less regressive than as a fraction of pre-tax income.

Figure 6

Comparison of Distributions of the Burdens of a 5% Broad Based Consumption Tax and the Federal Income Tax



JCT methodology

For the reasons discussed above, the JCT staff uses the income-based method of distribution in allocating broad-based consumption taxes. This method provides a more accurate annual measure of

[82] Scaling the income tax burden in this fashion allows easy comparison of the relative progressivity of the different taxes on the same graph.

[83] For example, a five-percent increase in income taxes would be levied on pre-tax income, but, assuming no savings, a five-percent consumption tax would apply only to after-tax income. If savings were positive, the tax would apply to an even smaller base.

the impact of such taxes, which is desirable given the decision to restrict analysis to the five-year window. It also means that the distributional impact of consumption taxes can be more meaningfully compared with that of other provisions of an income nature. In particular, the approach is consistent with the treatment of IRA provisions (see footnote 78), investment incentives, and other individual and corporate income tax provisions which affect the taxation of savings.

Choosing between the (p,Y)- and (w,Y)-methods for distributing a broad-based consumption tax is particularly difficult because it involves predicting the response of the monetary authorities to tax policy changes.[84] International experience shows that with the introduction of consumption taxes, mostly in the form of value added taxes, nominal prices do increase somewhat, but not by the full amount of the tax, though it is difficult to tell if these price increases are due to the tax change or other economic influences.[85] Unless there are convincing reasons to assume otherwise, the JCT staff assumes the Federal Reserve will accommodate the policy change and allow prices to rise, and uses the (p,Y)-method of distribution.

Less comprehensive consumption taxes

One of the fundamental properties of a broad-based consumption tax is the full exemption of savings from tax. Many other tax provisions provide less generous, but qualitatively similar, treatment of savings. These include narrow-based consumption taxes (which exclude some goods and/or services from the tax base), specific excise taxes, corporate expensing provisions (corporate cash-flow taxes) and investment tax credits (ITCs). The two investment incentives have been discussed in Part III.B. The general procedure for dealing with narrow-based consumption taxes is to convert them to equivalent broad-based consumption taxes, and use the methodology described above. This approach, which ensures that taxes that are labelled differently but have similar economic effects are distributed similarly, is briefly described below.[86]

Narrow-based consumption taxes.—In practice consumption tax bases rarely cover all goods and services. This is usually due to administrative constraints, distributional concerns, and political expediency. The narrow-based consumption tax must still cause the wage rate and return to capital to fall relative to the general price level in the economy.[87] In addition, the prices of the taxed goods relative to untaxed goods may change. To the extent that the relative price of taxed and untaxed goods differ by the amount of the tax (so that "consumers bear the tax"), the following methodology is used. The possibility of less than full relative goods price changes is discussed in more detail in the following section on specific excise taxes.

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[84] This choice also would arise when choosing between the two consumption-based methods of distribution, and does not represent a problem confined to the income-based method.

[85] See Alan A. Tait, *Value Added Tax: International Practice and Problems*, (Washington, D.C.: International Monetary Fund), 1988.

[86] The method of distributing specific excise taxes is dealt with in more detail in the next section.

[87] This can be manifest either as an increase in the general nominal price level, or a decrease in nominal wages and capital returns, as discussed above.

By invoking the general assumption (for the purposes of distributional analysis) that individuals' consumption patterns do not change in response to tax changes,[88] it is possible to view a narrow-based consumption tax which raises the relative price of taxed goods by the full amount of the tax as having equivalent effects to a broad-based tax at a lower rate. For example, it is argued that a 10-percent tax on half of an individual's consumption has the same impact on that person's well-being as a five-percent tax on all consumption. While this is precisely correct only in very special circumstances, the approximation is in line with the overall treatment of behavioral responses, and allows an easy means of consistently analyzing a range of consumption taxes.

Of course, one reason narrow-based consumption taxes have potentially different distributional consequences than do broad-based taxes is that individuals in different income classes may consume proportionately more, or less, of the taxed goods. This important aspect is incorporated into the analysis by treating individuals in each income class as if they faced a broad-based tax at a rate equal to the nominal rate (10 percent in the example above) multiplied by their share of consumption of the taxed goods. For example, if the consumption of the taxed goods makes up one half of total consumption of one income group, but only one tenth of that of another, the first group is treated as facing a broad-based tax of five percent, and the second as facing a broad-based tax of one percent. Each group is then analyzed separately, using the appropriate effective broad-based tax rate.

Specific excise taxes.—If only one good is included in the tax base, the methodology described in the previous paragraph can still be employed. The effective tax rate for each income class is then just the nominal rate multiplied by the share of consumption for individuals in that class devoted to the taxed good. (Further issues relating to specific excise taxes are discussed in the next section, D.)

D. Excise Taxes

Specific excise taxes are levied on single goods, either in ad valorem terms (i.e., as a percentage of the price of the good), or on a per unit basis (i.e., as a fixed money amount per quantity of the good). The tax may be levied on all purchases of the particular good, both by individual consumers, and as inputs into production by businesses. It is convenient to first discuss the distribution of excise taxes which are levied only on final consumption, and then to extend the analysis to excise taxes levied on consumers and producers. Finally, excise taxes which result in benefits are discussed.

Conceptual issues

Excise taxes on final consumers only

To the extent that an excise tax is levied only on final consumers, it is a tax on consumption. This means that the issues of timing and price adjustments of the previous section on broad-based consumption taxes should be addressed. An important difference

[88] See sections II.B and III.D for discussions of behavioral effects.

between broad-based consumption taxes and specific excise taxes is that the behavioral responses of individual consumers to the tax, in terms of the way consumption is divided between different goods, may be greater for specific excise taxes. This subsection thus addresses the issue of behavioral responses, and if and how they should be taken into account in distributional analyses. This is important for the measurement of the size of the economic burden imposed by the tax. Timing and price adjustment issues are then discussed, in the context of specific excise taxes. As in the case of broad-based consumption taxes, these issues relate to the assignment of the burden over time, and to the treatment of transfer payments.

Accounting for behavioral responses by taxpayers.—With the imposition of an excise tax, one expects consumers to reduce their purchases of the taxed good in response to the initial increase in its price relative to other goods. The initial reduction in demand also may lead to reduced profits and wages for the producers of the good. To the extent that the tax-inclusive price of the good increases, the consumer is hurt, while a fall in the net-of-tax price received by the producer reduces profits and/or wages. The degree to which the burden is shared between consumers and producers depends on the relative strengths of their behavioral responses. The consumers' burden is discussed here in some detail, and that of producers addressed briefly below.[89]

As discussed in detail in Part II.B, above, an important issue is whether to measure the burden of a tax change using the amount of the good consumed prior to the imposition of the tax or using the smaller amount consumed after the price increase. When an excise tax causes consumers to alter their behavior, the changed behavior generally contributes to the total burden of the tax. Consequently, measuring the burden by reference to the revenue raised, which is based upon the final (after imposition of the tax) consumption understates the total burden. On the other hand, not all of the behavioral response of consumers is a burden, because consumers generally may choose to avoid the tax through purchase of other, non-taxed goods. Consequently, measuring the burden as taxes payable on the initial level of consumption overstates the burden, and the appropriate measure generally lies between these two levels. In cases where there is little behavioral response (that is, when the elasticity of demand is small), the difference between before-tax and after-tax consumption is small.

The JCT staff generally estimates the burden of specific excise taxes using static revenue changes. This is because it is difficult to estimate the behavioral responses of individuals in each income class separately, even though the aggregate effect on demand for the taxed good may be approximately known. The assumption that individuals do not substitute other goods for the taxed good also allows the distribution of the burden over time in a way consistent with the treatment of broad-based consumption taxes. This issue is discussed more fully below.

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[89] Consumers are hurt to the extent that the price of the taxed good rises relative to others. However, the average price level in the economy may rise or remain constant, depending on the monetary policies of the Federal Reserve.

Related to the issue of behavioral response is the difference between short-run response and long-run response. As discussed in Part II.B, the incidence of any tax may be substantially different in the short run than it is in the long run. For example, most analysts believe that in the short run the demand for motor fuel is relatively unresponsive to modest changes in price, while in the long run consumers are much more responsive because they can alter their driving patterns and the type of car they drive.[90] Also, the short run and long run are not the same for all goods. They depend upon how quickly behavior can be adjusted. For one taxed good the short run might be measured in months, while for another it might be measured in years.

Distributing the burden over time.—Because consumption choices are assumed to be unaffected by specific excise taxes for the purposes of distributional analyses, such taxes can be treated as related broad-based consumption taxes. For example, if a good making up 10 percent of an individual's consumption is taxed at 10 percent, the burden will be the same as a one-percent tax on all consumption. If the good constitutes 50 percent of the consumption of another individual, the 10-percent tax will be equivalent to a five-percent tax on all of the consumption. In general, the distribution of the burden of specific excise taxes thus depends on the intensity with which each income group consumes the taxed good. For a particular excise tax, the JCT staff calculates an equivalent broad-based consumption tax for each income class, and measures the burden on each class using the methods developed in the previous section. As a general rule, it is assumed that the tax leads to an increase in the price of the taxed good, while the prices of other goods remain fixed. The burden is allocated as income is earned, so that in general, the (p,Y)-method is employed.

Burdens on producers.—If the tax is not fully passed on to consumers, wages and returns to capital will fall. While the workers and capital owners in the particular industry will experience the initial impact of the reduction in incomes, these effects will spread throughout the economy in the long run. If these long-run effects occur rapidly, the JCT staff ignores the transitory adjustments of factor prices. However, if the adjustments occur slowly, the burden on producers is assigned to factors employed in the relevant industry. Also, the impact on wages and capital returns will differ depending on the relative intensity of labor and capital in production in the industry producing the taxed good relative to that in other industries. However, the data requirements for the analysis of differential factor impacts are demanding and not often met. Therefore, if the price of the taxed good relative to other goods were not expected to increase by the full amount of the tax, the burden of the implied fall in factor returns would be distributed uniformly to all factors in the affected part of the economy (which can be either

[90] For examples of studies of the price elasticity of nonbusiness demand for gasoline, see: Carol A. Dahl, "Consumer Adjustment to a Gasoline Tax," *The Review of Economics and Statistics*, 61, August 1979; Robert Archibald and Robert Gillingham, "An Analysis of the Short-Run Consumer Demand for Gaoline Using Household Survey Data," *The Review of Economics and Statistics*, 62, November 1980; and Robert Archibald and Robert Gillingham, "A Decomposition of the Price and Income Elasticities of the Consumer Demand for Gasoline," *Southern Economic Journal*, 47, April 1981.

the particular industry or the whole economy, depending on the speed of adjustment).

Consumption by businesses

Inputs used by businesses may also be subject to excise taxes. For example, the communications excise tax is imposed on consumers of telephone services, many of which are businesses. If it is determined that consumers of the taxed good bear the burden of the tax, then how should the tax borne by business consumers be distributed? The tax is a cost of producing the business's output, so to the extent that the price of the good or service reflects its costs, the tax is passed on to the ultimate consumer of the output. Thus, if higher telephone bills result in higher grocery prices, the burden of that portion of a change in the telephone tax that falls upon grocery stores would be distributed to households according to their expenditures on groceries. Alternatively, if the market does not permit the business to pass on its increases in costs, the owners or employees of the business will bear the telephone tax. The JCT staff therefore distributes the burden of excise taxes in two steps. First, it distributes the burden due to direct consumption of the taxed good, using the method described above. Then, depending on the available data, it distributes the burden borne by individuals due to their consumption of goods which use the taxed goods as inputs. While this second stage may be quite difficult due to poor data on the uses of the taxed good in production, some rough approximations are possible. For example, it can be assumed that the burden of the telephone excise tax due to business use is borne by all other consumption, since virtually all businesses use telephone services.

A related and difficult issue is how to distribute excise taxes paid by governments or tax-exempt organizations. The tax may be passed on to taxpayers in the form of higher taxes, to recipients of government services in the form of reduced government services, or to government workers in the form of lower wages than would otherwise be received.[91]

Distributing the burden of specific excise taxes that provide direct benefits

While all taxes finance benefits (i.e., pay for government services), some specific excise taxes are designed to achieve socially beneficial behavioral outcomes and other excise taxes have their revenues dedicated to provide specific benefits. An example of the former is environmental taxes and an example of the latter is the tax on motor fuels dedicated to the Highway Trust Fund.[92]

Environmental taxes.—Some economic activities have adverse effects on the environment or health of the population at large. The true cost to society of such activities includes not only the producer's internal costs for labor, fuel, etc., but also the environmental cost. If the direct consumers of goods and services produced by such activities are not required to compensate those who suffer these ad-

[91] For a discussion of tax-exempt organizations, see Part III.F.3, below.

[92] Similar analysis applies to taxes on motor fuels dedicated to the Airport and Airway Trust Fund, the Aquatic Resources Trust Fund (motorboats), and the Inland Waterway Trust Fund. The present-law tax on ozone-depleting chemicals is an example of an environmental tax.

verse health or environmental effects, the total social cost may exceed the private cost faced by the market participants. In such cases, a so-called "negative externality" exists, since some costs of the activity are borne by individuals external to the market (for example, those affected by pollution who neither produce nor consume the particular good). In this situation, it is natural to expect that too much of the externality creating activity will occur, and that some form of government intervention would improve well-being.

One option is for the government to control directly the activity under consideration, by setting standards and limits on the amount of damage caused. Such approaches are common. Alternatively, the government could force the producer to bear the external cost of the activity by levying a tax equal to its (marginal) additional social cost. Such a tax would clearly hurt the producer or, if the tax could be passed on, the consumer of the goods produced. However, the individuals who previously suffered environmental or health costs will be better off, and the net gain may be positive. Ideally, the increase in prices of produced goods, the reduction in profits of polluters, and the reduction in environmental and health damages should be distributed. However, in practice, the JCT staff does not distribute the improvement in environmental quality or health. This is mainly because these benefits are usually very hard to measure. On the other hand, to the extent that benefits accrue to individuals with varying incomes in specific geographic areas, the distribution of the benefit by income class may not be particularly instructive for policy makers. Appendix C presents a graphical analysis of these issues.

Taxes as user fees.—Some people view the motor fuels taxes as payments for the provision of highways, much as the fees collected at highway toll booths pay for the construction and maintenance of a toll highway. As a benefit tax, it may not be appropriate to say that the taxpayer is burdened by the tax when he or she receives a direct benefit in return. To the extent that such benefits arise from governmental expenditures, such as highway construction and repair, these benefits would be measured as part of an expenditure incidence analysis. As noted in Part I.A, above, the JCT staff generally does not attempt to measure expenditure incidence.[93]

Practical issues in distributing the incidence of excise taxes and other consumption taxes

Individual income tax data generally do not include information on consumption. Such information must be imputed and matched to income tax records from alternative data sources, such as the Consumer Expenditure Survey. There are limitations to such imputations. For example, the Consumer Expenditure Survey, like many consumption surveys, is "top coded". This means that the survey may not identify the amount of income of individual consumers with incomes above $100,000. As a result, there may not be data on consumption by certain income or demographic groups. Some question the accuracy of consumption surveys. The Consumer Ex-

[93] As discussed in Part II.B, above, benefits received may affect the taxpayers' behavioral responses to a tax change, further complicating the incidence analysis.

penditure Survey from 1983-84 reports consumption spending at 80 percent of that reported in the national income and product accounts,[94] a level that is unsatisfactory for distribution analysis without adjustment. Also, for some products, data on consumption may not exist. For example, data on the purchase of ozone-depleting chemicals that could be used to distribute the change in burden of the excise tax on these goods are virtually non-existent.

Approach of the JCT staff in distributing changes in burden resulting from changes in specific excise taxes

Where sufficient data exist to make valid statistical imputations of consumption, the JCT staff attempts to distribute the change in the burden that arises from changes in specific excise taxes. Generally, the change in burden is distributed by measuring the tax change relative to the level of consumption prior to the change in the tax. That is, the measure of burden does not account for behavioral change. As discussed in the case of general consumption taxes, the burden is distributed through time to consumers as they earn income. As a general rule, the burden of the tax is distributed entirely to consumers (with no loss attributed to producers), either directly based upon their own purchases of the taxed good or indirectly based upon their purchases of goods produced by businesses that use the taxed good as an input. However, the possibility of distributing some burden to producers, in the form of reduced factor incomes, is reserved. As noted above, these assumptions are most accurate when the behavioral change in response to the tax is small. Specific excise taxes paid by governments or exempt organizations are not distributed.

As an example, Table 4, on the following page, distributes the change in burden which would result from an increase in the motor fuels excise tax of five cents per gallon.[95]

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[94] For a discussion of the quality of consumption survey data, see Barry Bosworth, Gary Burtless, and John Sabelhaus, "The Decline in Saving: Evidence From Household Surveys."

[95] Such a proposal was enacted as part of the Omnibus Budget Reconciliation Act of 1990.

Table 4.--Distributional Effects of a Five Cent per Gallon Motor Fuels Tax

(1993 Level)

Expanded Income Class (1)	Present Law Federal Taxes (2)	Present Law Average Tax Rate (3)	Proposed Change in Tax Burden	Burden Change as a Share of Income
	Billions	Percent	Millions	Percent
Less than $10,000	$9	10.4%	$0,230	0.26%
10,000 to 20,000	39	11.9%	478	0.15%
20,000 to 30,000	72	17.0%	609	0.14%
30,000 to 40,000	86	19.1%	573	0.13%
40,000 to 50,000	93	20.9%	567	0.13%
50,000 to 75,000	201	22.3%	953	0.11%
75,000 to 100,000	120	24.6%	499	0.10%
100,000 to 200,000	142	22.6%	397	0.07%
200,000 and over	168	30.2%	283	0.05%
Total, All Taxpayers	**$930**	**22.1%**	**$4,589**	**0.11%**

Source: Joint Committee on Taxation

(1) The income concept used to place tax returns into income categories is adjusted gross income (AGI) plus: [1] tax-exempt interest, [2] employer contributions for health plans and life insurance, [3] employer share of FICA tax, [4] workers' compensation, [5] nontaxable social security benefits, [6] insurance value of Medicare benefits,and [7] corporate income tax liability imputed to stockholders, [8] alternative minimum tax preference items,and [9] excluded income of U.S. citizens living abroad.

(2) Includes individual income tax, FICA and SECA tax, excise taxes, estate and gift taxes, and corporate income tax.

(3) Present law Federal taxes as a share of expanded income.

(4) Imposes a five cent per gallon increase in motor fuels taxes.

E. Wealth Taxes (Estate and Gift Taxes)

The Federal unified estate and gift tax is a tax on the transfer of wealth. Unique issues arise in analyzing the distribution of the tax burden when wealth is used as a tax base.

Conceptual issues in distributing the incidence of taxes on wealth

Taxes on flows versus taxes on stocks

Income taxes, payroll taxes, and excise and other consumption taxes generally tax economic activity as it occurs. Income and consumption represent ongoing, current economic activity by the taxpayer.[96] Accumulated wealth, on the other hand, does not cor-

[96] Economists call income and consumption "flow" concepts. In simple terms, a flow can only be measured by reference to a unit of time. Thus, one refers to a taxpayer's annual income or monthly consumption expenditures.

respond to any ongoing, current economic activity.[97] Wealth depends upon previous economic activity either by the current wealth holder or other individuals. For example, current wealth can result from accumulated saving from income or from bequests received.

Because wealth is the accumulation of flows of saving over a period of years, taxes on wealth are not directly comparable to taxes on income or consumption which may represent only current, rather than accumulated, economic activity. For example, assume that a taxpayer receives wage income of $10,000 per year, saves all of this income, and the savings earn an annual return of five percent. At the end of five years, the accumulated value of the taxpayer's investments would be $58,019. Assume that the wealth is transferred at the end of the fifth year. If a 10-percent tax were imposed on wage income, one would conclude that a burden of $1,000 was imposed annually. If a 10-percent tax were imposed on the transfer of wealth, one would conclude that a burden of $5,801.90 was imposed at the end of the fifth year. If, after paying the wage tax, the taxpayer had invested the remaining $9,000 each year to earn five percent, at the end of five years the taxpayer's holding would be $52,217.10. This is the same value that would remain under the wealth tax ($58,019.00 less $5,801.90). Thus, it is misleading to say that the burden of the wage tax is $1,000 in each year while the burden of the transfer tax is $5,801.90 in the fifth year.

The timing of payment of the wealth tax is important. As the above example reveals, the conceptual problem is that, to interpret the burden of taxes on wealth (a stock) in a manner comparable to the burden of taxes on income or consumption (flows), an explicit assumption is required to convert the stock to a flow. One could observe that the value $5,801.90 is the future value of $1,000 invested annually at five percent for five years. One could then compare the burden of the two taxes for the five-year time period. However, such a solution raises severe practical difficulties. At the time of transfer by gift or bequest, the transferred wealth may have been accumulated over different time periods, making any consistent comparison to income earned over a fixed time period very difficult. Theoretically, one could compute the present value of all income or consumption taxes paid by a taxpayer and make a comparison to taxes on transfers of wealth. As discussed in Part II.C, such calculations of lifetime taxes, income, and consumption have their own difficulties.

Another alternative is to annualize the tax paid on the wealth transfer. For example, wealth of $1 million would generate annual income of $50,000 if invested in an infinitely lived annuity to yield five percent. One could convert a $100,000 tax liability, which a 10-percent tax on the transfer of $1 million creates, into the annualized (at five percent) equivalent of $5,000.[98] While such an annualization would make taxes on stocks of accumulated wealth more comparable to taxes on annual flows of income, it would de-

[97] Economists call wealth a "stock" concept. A stock of wealth, such as a bank account, may generate a flow of income, such as annual interest income.

[98] A five-percent annuity of shorter duration would pay out more than $50,000 annually as the principal is drawn down. The comparable annualized tax equivalent would be greater than $5,000.

pend on the choice of annualized yield chosen and the horizon over which the annualization is calculated.

The preceding paragraph illustrates another conceptual difficulty. Suppose the taxpayer with wealth of $1 million had an annual wage income of $50,000. If the taxpayer transfers the $1 million and incurs a $100,000 tax liability, is it appropriate to measure that $100,000 tax liability relative to the taxpayer's current wage income of $50,000, or should the taxpayer's wage income have been grossed up by the potential $50,000 annual yield on the accumulated wealth?[99] This is another example of the issue of income measurement discussed in Part IV.

Wealth taxes as taxes on capital

Taxes on accumulated wealth are taxes on the stock of capital held by the taxpayer. As a tax on capital, issues similar to those discussed in Part III.B arise.[100] Some economists believe that an individual's bequest motives are important to understanding saving behavior and aggregate capital accumulation. If estate and gift taxes alter the bequest motive, they may change the tax burdens of taxpayers other than the decedent and his or her heirs. It is an open question whether the bequest motive is an economically important explanation of taxpayer saving behavior and level of the capital stock. For example, theoretical analysis suggests that the bequest motive may account for between 15 and 70 percent of the United States' capital stock.[101] Others, question the importance of the bequest motive in national capital formation.[102] Furthermore, it is also an open question whether estate and gift taxes encourage or discourage saving.

Generational incidence of wealth taxes

An additional conceptual difficulty is whether the tax would be borne by the generation of the transferor or the generation of the transferee. The design of the gift tax illustrates this conceptual difficulty. A tax is assessed on the transferor for taxable gifts. Assume, for example, a mother makes a gift of $1 million to her son and incurs a gift tax liability of $500,000. From one perspective, the gift tax could be said to have reduced the mother's current economic well-being by $500,000. However, it is possible that, in the absence of the gift tax, the mother would have given her son $1.5 million, so that the gift tax has reduced the son's economic well-

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[99] Similarly, if a taxpayer saves over his or her lifetime and subsequently uses the accumulated savings to purchase a good subject to consumption taxes, the taxpayer could have a consumption tax liability that exceeds his or her current income.

[100] Part III.B discusses whether taxes on capital are borne by the owners of capital in the short run and the long run.

[101] See, Laurence J. Kotlikoff and Lawrence H. Summers, "The Role of Intergenerational Transfers in Aggregate Capital Accumulation," *Journal of Political Economy*, 89, August, 1981. Also see, Laurence J. Kotlikoff, "Intergenerational Transfers and Savings," *Journal of Economic Perspectives*, 2, Spring, 1988. For a discussion of these issues in the context of wealth transfer taxes see, Henry J. Aaron and Alicia H. Munnell, "Reassessing the Role for Wealth Transfer Taxes," *National Tax Journal*, 45, June, 1992. For a recent attempt to calculate the share of the aggregate capital stock attributable to the bequest motive, see Thomas A. Barthold and Takatoshi Ito, "Bequest Taxes and Accumulation of Household Wealth: U.S.-Japan Comparison," in Takatoshi Ito and Anne O. Krueger (eds.) *The Political Economy of Tax Reform* (Chicago: The University of Chicago Press), 1992.

[102] Franco Modigliani, "The Role of Intergenerational Transfers and Life Cycle Saving in the Accumulation of Wealth," *The Journal of Economic Perspectives*, 2, Spring, 1988. In this article, Modgiliani argues that 15 percent is more likely an upper bound.

being by $500,000. It also is possible that the economic well-being of both had been reduced. Of course distinctions between the donor and donee generations may not be important to distributing the burden across income classifications if both the donor and donee have approximately the same income.[103]

Practical issues in distributing the incidence of taxes on wealth

Reliability of data relating to wealth

Data on wealth holdings are not as copious as data on income or consumption. Furthermore, there are substantial differences among existing surveys. For example, the Federal Reserve's 1983 Survey of Consumer Finances computed total net worth in the United States to be $10.5 trillion. The University of Michigan's 1984 Panel Study in Income Dynamics computed total net worth to be $8.25 trillion. The Bureau of the Census's 1984 Survey of Income and Program Participation computed total net worth to be $6.4 trillion.[104] The range of these estimates makes inferences on wealth holding somewhat open to question. There are relatively few analyses of the distribution of wealth holdings.[105] Studies of wealth holdings generally do not attempt to match the wealth holdings to the current income of the taxpayer. Similarly, data on the income of the recipients of gifts or bequests are lacking.

Tax data on wealth and income

For addressing these issues, tax return data are superior in some respects, and inferior in other respects. Estate tax return data compiled by the IRS's Statistics of Income Division is a sample of 7,000 returns representing over 40,000 decedents for whom returns were filed. The highly regarded 1989 Survey of Consumer Finances[106] has a sample size of only 3,000, and those 3,000 were selected to represent the entire population, not solely the decedent population. While it is technically feasible to match a decedent's estate tax return with his or her income tax returns from preceding years, it is a time-consuming task that the JCT staff has not undertaken as of this date. Also, the JCT staff presently does not determine the

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[103] Researchers have found that the correlation of income between parents and children is less than perfect. For recent analysis of the correlation of income among family members across generations, see Gary R. Solon, "Intergenerational Income Mobility in the United States," *American Economic Review*, 82, June 1992, and David J. Zimmerman, "Regression Toward Mediocrity in Economic Stature," *American Economic Review*, 82, June 1992.

[104] For a discussion of data quality see Richard T. Curtin, F. Thomas Juster, and James N. Morgan, "Survey Estimates of Wealth: An Assessment of Quality," photocopy, University of Michigan prepared for Conference on the Measurement of Saving, Investment, and Wealth Conference on Research in Income and Wealth, Baltimore, Maryland, March 27-28, 1987.

[105] For some exceptions, see Martin H. David and Paul L. Menchik, "Changes in Cohort Wealth Over a Generation," *Demography*, 25, August 1988; Paul L. Menchik and Martin H. David, "The Effect of Income Distribution on Lifetime Savings and Bequests," *American Economic Review*, 73, September 1983; and Edward N. Wolff, "Estimate of Household Wealth Inequality in the U.S., 1962-1983," *The Review of Income and Wealth*, 33, September 1987. For a recent preliminary analysis, see Arthur B. Kennickell and R. Louise Woodburn, "Estimation of Household Net Worth Using Model-Based and Design-Based Weights: Evidence from the 1989 Survey of Consumer Finances," photocopy, Board of Governors of the Federal Reserve System and Statistics of Income Division, Internal Revenue Service, April 1992.

[106] For a description of the 1989 Survey of Consumer Finances, see Arthur B. Kennickell and Janice Shack-Marquez, "Changes in Family Finances from 1983 to 1989: Evidence from the Survey of Consumer Finances," *Federal Reserve Bulletin*, 78, January 1992, and Arthur B. Kennickell and R. Louise Woodburn, "Estimation of Household Net Worth Using Model-Based and Design-Based Weights: Evidence from the 1989 Survey of Consumer Finances."

income of the recipient of the gift or bequest.[107] One also may question the quality of the data contained on estate and gift tax returns. Some have argued that returns report a small fraction of the value of decedents' estates.[108] The estate and gift tax data also are limited to those who file tax returns, generally estates valued in excess of $600,000. If a proposal were made to increase the number of estates filing returns by, for example, reducing the unified credit, existing estate tax data would need to be supplemented with other data to support a distributional analysis.

In order to compensate for these shortcomings, the JCT staff takes income tax data on dividend income, interest income, and other reported items of capital income and capitalizes these income flows into approximations of the stock of wealth held by the taxpayer. With information on the age of the taxpayer and death rates by age, potential estate tax liability can be distributed across income classes. However, such an approach has its own limitations. For example, income tax data do not provide information on accrued, but unrealized, capital gains. This increases the difficulty of accurately imputing total wealth to each taxpayer. Similarly, while there may be information on the income tax return about home ownership by taxpayers who itemize (the mortgage interest deduction), there is no information on the value of the property.[109]

An additional practical concern in matching this data is whether it is appropriate to use the decedent's income in the year of death or income in some prior year as the relevant measure of income. If the year of death is used, reported income may understate economic well-being to the extent that the income reported reflects less than a total year's income. Some analysts also question whether income measured as much as a full year prior to death accurately reflects the economic well-being of an individual who is planning to make a bequest, because such an individual may plan to reduce current cash income in favor of purchasing assets that do not provide current cash income to bequeath. This is a further example of the difference between using measures of current income and measures of permanent income discussed in Part IV.B.

The approach adopted by the JCT staff

Because proposals to change estate and gift taxation may be designed to affect individuals who do not have to file estate and gift tax returns under present law, for its distributional analysis the JCT staff uses primarily data from the Survey of Consumer Finances supplemented by both estate and income tax data. The JCT staff assigns the burden of the estate tax to the decedent based

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[107] Preliminary unpublished work by the Office of Tax Analysis of the United States Treasury and the Statistics of Income Division of the Internal Revenue Service has prepared data which matches the income of recipients of bequests and the size of the inheritance received. The work does not match gifts to recipients. The JCT staff will study this work as it progresses.

[108] See George Cooper, *A Voluntary Tax? New Perspectives on Sophisticated Tax Avoidance*, (Washington, D.C.: The Brookings Institution), 1979. Also, see B. Douglas Bernheim, "Does the Estate Tax Raise Revenue?" in Lawrence H. Summers (ed.), *Tax Policy and the Economy*, 1, (Cambridge, Mass.: The MIT Press), 1987; and Alicia H. Munnell with Nicole Ernsberger, "Wealth Transfer Taxation: The Relative Role for Estate and Income Taxes," *New England Economic Review*, November/December 1988. These studies pre-date the enactment of chapter 14 of the Internal Revenue Code. The purpose of chapter 14 is to improve reporting of asset values in certain transfers.

[109] While reported property taxes could provide such information, in practice it would require knowledge of the tax rates and assessment practices of thousands of jurisdictions.

upon the decedent's income in the year preceding the year of death. The JCT staff does not gross up the decedent's income for the potential annual yield of accumulated wealth because it would be inconsistent with the income concept used in classifying taxpayers discussed in Part IV.A.

As an example of the implications of these decisions, Table 5 below distributes the burden created by reimposing the top two marginal tax rates of pre-1993 law (53 and 55 percent) through 1997, which have declined to 50 percent after 1992 under present law.[110]

Table 5.--Distributional Effects of Estate and Gift Rate Increase

(1993 Level)

Expanded Income Class (1)	Present Law Federal Taxes (2)	Present Law Average Tax Rate (3)	Proposed Change in Tax Burden	Burden Change as a Share of Income
	Billions	Percent	Millions	Percent
Less than $10,000	$9	10.4%	$0	0.00%
10,000 to 20,000	39	11.9%	0	0.00%
20,000 to 30,000	72	17.0%	0	0.00%
30,000 to 40,000	86	19.1%	0	0.00%
40,000 to 50,000	93	20.9%	0	0.00%
50,000 to 75,000	201	22.3%	0	0.00%
75,000 to 100,000	120	24.6%	0	0.00%
100,000 to 200,000	142	22.6%	64	0.01%
200,000 and over	168	30.2%	383	0.07%
Total, All Taxpayers	**$930**	**22.1%**	**$447**	**0.01%**

Source: Joint Committee on Taxation

(1) The income concept used to place tax returns into income categories is adjusted gross income (AGI) plus: [1] tax-exempt interest, [2] employer contributions for health plans and life insurance, [3] employer share of FICA tax, [4] workers' compensation, [5] nontaxable social security benefits, [6] insurance value of Medicare benefits,and [7] corporate income tax liability imputed to stockholders, [8] alternative minimum tax preference items,and [9] excluded income of U.S. citizens living abroad.

(2) Includes individual income tax, FICA and SECA tax, excise taxes, estate and gift taxes, and corporate income tax.

(3) Present law Federal taxes as a share of expanded income.

(4) Imposes a marginal tax rate of 53 percent on taxable transfers over $3 million. Imposes a marginal tax rate of 55 percent on taxable transfers in excess of $3 million. The phase out of the graduated rates and unified credit applies with respect to cummulative taxable transfers between $10 million and $21,040,000.

[110] The pre-1993 law top rates (53 and 55 percent) would be reinstated under H.R. 2264 (title XIV of the Omnibus Budget Reconciliation Act of 1993) as passed by the House of Representatives on May 27, 1993.

F. Special Tax Incidence Issues

1. Tax provisions affecting pass-through entities

Numerous provisions of the Internal Revenue Code relate to pass-through entities such as partnerships, subchapter S corporations, regulated investment companies (RICs), and real estate investment trusts (REITs). Despite their importance in the economy, relatively little analysis has been undertaken of the incidence of changes in the tax law affecting such organizations.

Conceptual issues in analyzing the incidence of tax provisions affecting pass-through organizations

The legal status of pass-through entities requires them to pass through the tax characteristics of their economic activities (e.g., the revenue earned and costs incurred by the entities) to the individual taxpayers who own the entities. Those individual taxpayers are responsible for any tax liabilities that arise. Consequently, for many tax proposals that affect pass-through entities, the analysis of incidence is the same as that applied directly to individuals. For example, since the dividend income reported by holders of RICs is equivalent to dividend income reported by individuals who directly hold corporate shares, the economic incidence of a proposal to change the taxation of dividend income would not depend upon the extent to which dividends are reported by RIC shareholders.

However, some proposed changes in tax laws may alter the pass-through entities themselves, rather than the income produced by the assets they hold on behalf of individual taxpayers. For example, a proposal to increase the number of shareholders who may own shares in an S corporation does not affect directly the assets held by S corporations, but rather may encourage more businesses to organize as S corporations. The change in burden from such proposals would depend upon how the proposals affect the pace and composition of business formation. Economic theory does not offer much guidance about the factors that affect business formation.[111] It might not be possible to make an informed judgment regarding the incidence of such proposals.

Practical issues in analyzing the incidence of tax provisions affecting pass-through organizations

The practical ability to distribute changes in the tax burden that might arise from changes in the treatment of pass-through entities varies with the type of entity. RICs, for example, hold only stocks and securities. Partnerships, on the other hand, are not of such uniform character. Some partnerships invest in financial instruments, others in real estate, others in natural resources, and still others operate businesses. While a taxpayer who reports RIC income implicitly indicates the nature of the underlying investment, a taxpayer who reports partnership income may offer little specific

[111] For a review of the theoretical literature on business formation, see, William A. Brock and David S. Evans, *The Economics of Small Business: Their Role and Regulation in the U.S. Economy* (New York: Homes and Meier), 1986. Also see, Richard Kihlstrom and Jean-Jacques Laffont, "A General Equilibrium Entrepreneurial Theory of Firm Formation Based on Risk Aversion," *Journal of Political Economy*, 59, August 1979, and Robert E. Lucas, "On the Size Distribution of Business Firms," *Bell Journal of Economics*, 9, August 1978.

information about the nature of the underlying investment.[112] Consequently, it is not generally possible to identify those taxpayers who may be affected by a change in, for example, the taxation of income from natural resource partnerships. Thus, asset ownership by pass-through entities may create additional practical problems for distribution analysis in addition to those discussed in Part III.B.1, above.

The approach adopted by the JCT staff

As a general rule, because of the dearth of analysis of the factors that cause business formation or lead businesses to choose particular legal forms, the JCT staff does not attempt to distribute the change in tax burdens that may rise from proposals to alter the character of pass-through entities themselves. As discussed in Part III.B, above, the JCT staff generally distributes changes in taxes that affect the income from capital to all owners of capital. Ownership of capital by partnerships, mutual funds, and other pass-through entities generally is assigned to the taxpayers who own the entities. More narrow proposals are distributed, when possible, as if the assets of the pass-through entity were held directly by the individuals who own the pass through entity.

2. Tax provisions affecting pensions

In general

Employer contributions to qualified pension plans[113] are deductible currently by the employer (within limits) but not included in income of the employee until received. Qualified plans are broadly classified into two categories: defined contribution plans and defined benefit plans. Under a defined contribution plan, each plan participant has his or her own account and the amount of benefits is determined by the account balance. In contrast, under a defined benefit plan, benefits are based on a formula specified in the plan. An example of a typical formula is one percent of final average compensation multiplied by the participant's years of service.

Pension plans present two difficult questions for distributional analysis. First, how should the pension contributions and earnings on pension assets be included in the income classifier? Second, what is the incidence of changes in the pension laws?[114]

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[112] For example, individual income tax return data do identify income as passive or active, but otherwise report aggregates of income from partnerships and S-corporations. Partnership return data do contain more detailed information about the underlying investments that generate the income reported on individual income tax returns. However, at present, the JCT staff does not match partnership return data to individual returns. Such a matching is a difficult undertaking.

[113] The qualification rules include minimum participation rules that limit the age and service requirements an employer can impose as a requirement of participation in a plan; coverage and nondiscrimination rules designed to prevent qualified plans from discriminating in favor of highly compensated employees; vesting and accrual rules which limit the period of service an employer can require before an employee earns or becomes entitled to a benefit under a plan; limitations on the contributions made on behalf of and benefits of a plan participant; and minimum funding rules designed to help ensure the solvency of defined benefit plans. In addition, the Code requires that plans be maintained for the exclusive benefit of participants and beneficiaries.

[114] Distributing the tax benefit associated with existing pension assets would be very difficult as well. Because the JCT staff does not distribute the existing burden of the tax system, however, this issue is not discussed here.

Distributing pension contributions and earnings

Employer contributions to pension plans may be viewed as a substitute for cash wages, like other employer-provided fringe benefits. From this perspective, employer contributions should be included in the measurement of employee income. However, pension plan contributions are not perfect substitutes for wages. For example, most pension plans impose a years-of-service requirement before an employee is fully vested. Thus, even for defined contribution plans, where the contribution made on behalf of the participant is easy to quantify, there is some probability that the pension contribution made on behalf of an employee will be allocated to other employees, or will reduce an employer's required contribution.[115]

The value of defined benefit plan contributions are even harder to quantify. With defined benefit plans, the employer contributions are determined by an actuarial assessment of plan assets and earnings and participant characteristics in order to insure adequate funding for the plan. The value of the contribution is unlikely to equal the value of the incremental pension benefit earned by the employees in a given year. For example, if the assets in a pension plan earned higher rates of return than expected, an employer may choose not to contribute anything to a plan in a given year. An alternate way to measure employees' implicit compensation would be to estimate the employee's incremental pension benefits (accruals) using the rules governing the pension plan. However, tax data do not report pension accruals, so data limitations preclude following this method.

Because calculating the value of pension benefits at the time they are earned is so difficult, the JCT staff has decided to include pension benefits in income when they are distributed, rather than when they are earned.[116] The effect of this decision is to understate economic income for persons in their prime earning years (when contributions to retirement plans are made) and overstate the income of retired taxpayers (when the entire amounts distributed are treated as income).

To the extent that pension assets belong to employers, the value of these assets will be reflected in the share prices of firms. When individuals sell their shares, they receive capital gains income. This capital gains income is included in our income classifier. Thus, the portion of pension assets that belong to employers also is captured in the JCT income classifier, though not perfectly since capital gains are measured on realization rather than on accrual.

Distributing the tax burden of pension law changes

Although it is generally believed that the tax benefits provided to pension plan contributions accrue to the plan participants, it is not clear that the burden associated with changes in pension rules should be distributed to workers. For example, consider the 1990

[115] Forfeitures from employees who leave before they are fully vested are either allocated to other plan participants or reduce required employer contributions, depending on the terms of the plan.

[116] Because IRAs and defined contribution plans have such similar economic effects, the JCT staff follows this methodology for IRAs as well (see Part IV.C). However, the JCT staff does not treat social security taxes and social security benefits in this manner. See Part IV.C for a discussion of the differences between social security and employer pensions that led to this decision.

increase in the excise tax applying to pension plan reversions.[117] Employers that wanted to withdraw funds from overfunded pension plans were subject to increased tax. At least part of the burden of this tax was likely borne by shareholders. However, to the extent that increasing the reversion tax reduced the probability that a firm would provide a defined benefit pension plan, part of the burden was borne by workers. Similarly, consider a proposal to increase PBGC (Pension Benefit Guaranty Corporation) premiums.[118] Again, part of the burden of this premium would be borne by shareholders, but to the extent that the increased premium acted as a deterrent to pension sponsorship, employees would also bear some of the burden.

The approach adopted by the JCT staff

The JCT staff does not distribute the burden of pension law changes when the incidence of the change is uncertain. However, some changes are easier to distribute. For example, the burden of rules that affect the taxation of distributions from pension plans is likely to be borne by the pension beneficiaries. When possible, the JCT staff does distribute the burden of these law changes.

3. Tax provisions affecting nonprofit organizations

Numerous provisions of the Internal Revenue Code relate to nonprofit organizations. Most prominent, of course, are the provisions granting such organizations exempt status and enabling some taxpayers to make tax-deductible charitable contributions to some nonprofit organizations. In addition, such organizations may pay income tax on their unrelated business income (UBIT), issue tax-exempt bonds, participate in investments eligible for the low-income housing tax credit, and qualify for special treatment under other provisions of the Code. Despite the importance of nonprofit organizations in the economy, relatively little analysis has been undertaken into the extent to which individuals bear a burden or receive a benefit from the tax treatment of such organizations.

Conceptual issues in analyzing the incidence of tax provisions affecting 501(c)(3) organizations [119]

Potential beneficiaries of tax expenditures for section 501(c)(3) organizations.—As is the case with any tax or subsidy, there are many potential beneficiaries of the tax expenditures targeted to 501(c)(3) organizations. For example, the statutory beneficiary of the deduction for charitable contributions is the taxpayer who itemizes. To the extent that the taxpayer receives a tax benefit for a gift that would have been made in the absence of deductibility, the statutory incidence corresponds to the economic incidence. As dis-

[117] When excess assets from a defined benefit pension plan revert to an employer, the employer pays an excise tax that is designed to recover the tax benefits that were provided to those assets. The excise tax was set at 10 percent in 1986, and raised to 15 percent in 1988. The excise tax is currently 50 percent or 20 percent, depending on the circumstances.

[118] The PBGC collects annual premiums from sponsors of defined benefit plans, in exchange for which it guarantees minimum benefits for plan participants in the event the plan terminates without sufficient funds to satisfy benefit obligations.

[119] While this discussion will concentrate on 501(c)(3) organizations, generally referred to as "charities", the analysis generally applies to all organizations exempt under Code section 501.

cussed in Part II.B, above, this applies if the donor's supply of funds to charities is totally inelastic.[120]

When the supply of such funds is not totally inelastic, one expects some of the economic incidence to fall elsewhere, perhaps on the charitable organizations that receive (demand) the funds. However, to say that the charitable organizations receive an economic benefit does not, in itself, tell one how to distribute this benefit across individuals in the population. The recipients of the services offered by the organization may benefit. They may receive services that they would otherwise not have received, or they may receive services at a reduced price. For example, as a result of a tax expenditure, a soup kitchen may be able to offer meals to more needy individuals or a health clinic may be able to offer medical services to its clientele at a lower price. Alternatively, employees or others who provide services to the 501(c)(3) organizations may be the beneficiaries of the tax expenditures targeted to 501(c)(3) organizations. For example, as a result of a tax expenditure, the soup kitchen or the health clinic may choose to pay its employees higher wages.

The UBIT also illustrates that it is not obvious who bears the benefit or burden of tax provisions affecting 501(c)(3) organizations. Generally speaking, the UBIT is imposed by applying the corporate income tax to certain unrelated activities of 501(c)(3) organizations. The discussion of Part III.B.2 above, argued that the corporate income tax may be borne widely throughout the economy. Similarly, the UBIT burden theoretically could be spread quite widely throughout the economy. Yet another alternative arises if tax benefits targeted at 501(c)(3) organizations alter the economic well-being of for-profit enterprises that offer similar or competing services to those provided by the 501(c)(3) organizations.[121] Furthermore, to the extent that 501(c)(3) organizations provide services that otherwise would be provided by the government, taxpayers as a whole may be the beneficiaries of tax-exempt treatment (and bear the burden of any UBIT imposed).

There is no consensus among economists on the incidence of benefits received by 501(c)(3) organizations. Moreover, a general conclusion is not appropriate, because of the differences in the markets in which the many different 501(c)(3) organizations operate. For example, one would expect the supply and demand conditions affecting charitable hospitals to be markedly different from those affecting art museums. Similarly, the incidence of tax benefits received by a charitable hospital should be expected to be different from the incidence of tax benefits received by an art museum.

The incidence of tax provisions not specifically targeted at 501(c)(3) organizations.—Related to the question of the incidence of tax expenditures targeted at 501(c)(3) organizations is the question of the incidence of other tax provisions that may alter the economic conditions of 501(c)(3) organizations. For example, Part III.B.2, above, discussed the possibility that the incidence of the corporate

[120] A general discussion of how the JCT staff analyzes the incidence of deductions under the individual income tax is in Part III.A, above.

[121] For discussion of this point see, Dennis Zimmerman, "Nonprofit Organizations, Social Benefits, and Tax Policy," *National Tax Journal*, 44, September 1991 and Richard Steinberg, "'Unfair' Competition by Nonprofits and Tax Policy," *National Tax Journal*, 44, September 1991.

income tax may or may not fall upon the owners of corporate capital. Many 501(c)(3) organizations own substantial holdings of corporate equity and debt. If the corporate income tax is said to be borne by the owners of capital, how should the portion of the tax that is represented by the ownership of corporate capital by 501(c)(3) organizations be distributed? As discussed above, one might argue that the consumers of the services provided by the 501(c)(3) organization, the employees of the 501(c)(3) organization, or society as a whole are the "owners" of the 501(c)(3) organization's corporate holdings and should be deemed to bear the burden of the 501(c)(3) organization's share of the corporate income tax.

Practical issues in analyzing the incidence of tax provisions affecting 501(c)(3) organizations

The empirical economic literature offers little guidance in assessing the incidence of tax provisions affecting 501(c)(3) organizations.[122] The existing work has concentrated on the efficiency of the itemized deduction for charitable contributions or restricted the analysis to specific groups of charitable organizations.

The analysis of the itemized deduction for charitable contributions generally attempts to measure the elasticity of the supply of funds donated to charities by individuals.[123] While this work has not reached a consensus on aggregate taxpayer behavioral response, it has suggested that the response is likely to vary by type of charitable organization. Such a finding complicates the possibility of practical implementation of an incidence analysis for tax proposals affecting 501(c)(3) organizations by increasing the data requirements and computational complexity.

In an example of the analysis of a specific category of 501(c)(3) organization, an economist attempted to measure the economic effect of subsidies to nonprofit theater companies, opera companies, and symphony orchestras. He found that the subsidies increased the number of performances, lowered ticket prices, increased attendance, and increased the compensation of the employees.[124] However, he did not place strong reliance on the results, stating that data limitations permitted only a highly simplified model to be estimated.[125] The General Accounting Office (GAO) studied the charitable activities of nonprofit hospitals.[126] The GAO found substantial variance in the provision of uncompensated care and other subsidized community services such as health screening, health education and health research. Such varying activities make it difficult to identify the beneficiaries of tax exemption. In addition,

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[122] One of the few attempts to assess the incidence of tax provisions affecting the nonprofit sector is Charles T. Clotfelter, editor, *Who Benefits From the Nonprofit Sector?* (Chicago: The University of Chicago Press), 1992. In summarizing the analysis of the volume, Clotfelter writes (p.22), "There is great diversity within the nonprofit sector, and no overarching conclusions about distributional impact can be made."

[123] For a survey of this literature, see Charles T. Clotfelter, *Federal Tax Policy and Charitable Giving*, (Chicago: University of Chicago Press), 1985.

[124] Dick Netzer, *The Subsidized Muse: Public Support of the Arts in the United States*, (New York: Cambridge University Press), 1978.

[125] Dick Netzer, "The Distribution of the Benefits of Nonprofit Institutions: Arts and Cultural Institutions." Paper presented at the Allied Social Science Associations, Washington, D.C., December 30, 1990. See also, Dick Netzer, "Arts and Culture," in Charles T. Clotfelter (ed.), *Who Benefits from the Nonprofit Sector?* (Chicago: The University of Chicago Press), 1992.

[126] United States General Accounting Office, *Nonprofit Hospitals: Better Standards Needed for Tax Exemption* (GAO/HRD-90-84), May 1990.

there has been little empirical analysis of certain categories of 501(c)(3) organizations such as religious and social service organizations.

Aside from the dearth of knowledge about how to distribute the burden or benefit of tax provisions affecting 501(c)(3) organizations, existing data may not permit an accurate distribution. Individual tax data, for example, do not match organizations receiving contributions to deductions taken. Data assembled by umbrella groups do not necessarily cover all charitable organizations and do not always correspond to totals reported by other sources.

The approach adopted by the JCT staff

With respect to the tax deduction for charitable contributions, the JCT staff assumes that the demand for such funds is sufficiently elastic relative to the supply of funds that the benefit or burden of a change in the deduction falls entirely on the individual taking the deduction. The lack of either theoretical or empirical guidance leads the JCT staff to not distribute other tax provisions that affect nonprofit organizations. Thus, for example, the burden of changes in the corporate income tax are not distributed to the extent that nonprofit organizations own corporate equity and debt.

4. Tax provisions affecting non-U.S. persons

The United States asserts jurisdiction to tax all income, whether derived in the United States or elsewhere, of United States citizens, residents, and corporations, with credits for foreign income taxes paid generally permitted to offset United States tax on foreign-source income.[127] In addition, the United States taxes foreign persons[128] with a sufficient U.S. nexus on income these persons derive from U.S. sources.[129] A significant number of recent tax proposals have been designed to change the tax burdens of foreign persons. Examples include proposals to alter the current methods used in determining appropriate transfer prices for transactions between related parties, and to change the taxation of gains realized by foreign persons on certain investments. In addition, there are a number of proposals, such as a value-added tax and reforms intended to achieve some level of integration of individual and corporate taxation, that, while not primarily targeted at foreign persons, have potentially large effects on them.[130]

Given the intent and effect of these proposals, it is understandable that there have been expressions of interest as to how they affect foreign persons. This section discusses the possible inclusion of non-U.S. persons in the distributional analyses performed by the JCT staff. It is concluded that for reasons of consistency and sim-

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[127] For a discussion of United States taxation of foreign investment by United States citizens, residents, and corporations, see Joint Committee on Taxation, *Factors Affecting the International Competitiveness of the United States*, Part Two (JCS-6-91), May 30, 1991.

[128] As used here, the phrase "foreign persons" refers to non-resident alien individuals who invest or do business in the United States either directly or through foreign or domestic entities.

[129] For a discussion of the United States tax rules affecting investment in the United States by foreign persons, see Joint Committee on Taxation, *Background and Issues Relating to the Taxation of Foreign Investment in the United States* (JCS-1-90), January 23, 1990.

[130] Some of these effects may be unexpected. For example, it has been suggested that, under certain conditions, an across-the-board increase in capital taxes may lead to a capital inflow. See Harry Grubert and John Mutti, "International Aspects of Corporate Tax Integration: The Contrasting Role of Debt and Equity Flows," unpublished manuscript, 1992.

plicity, the JCT staff generally will not provide distributional information about the effects that proposals have on foreign persons.

Conceptual issues in analyzing the incidence of tax provisions affecting non-U.S. persons

The primary manner in which United States tax laws affect non-U.S. persons is through the non-U.S. person's ownership of capital that is located in the United States. The conceptual issue is to what extent capital owned by foreign persons bears a burden from taxation by the United States. Capital owned by foreign persons is indistinguishable from capital owned by domestic persons. Consequently, the primary conceptual issues in analyzing the incidence of tax provisions affecting non-U.S. persons is no different from those discussed in Part III.B. The burden of taxation of income from capital owned by foreign persons may be borne by labor, the foreign persons, or the owners of all capital in the United States.[131]

In international markets, exchange rate adjustments make it difficult to assess the burden of United States taxation. For example, suppose taxes were changed in a way that encouraged foreign investment in the United States. Assuming that this led to no benefits to United States labor, a simple analysis might conclude that the distributional effect was to provide a benefit to foreign persons. However, capital flows to finance the increased foreign investment would increase the demand for dollars in the foreign exchange market. The dollar would appreciate in value. A stronger dollar makes the price of goods produced in the United States more expensive relative to foreign-produced goods. As a result, a burden may be borne in United States export industries as their profits and employment might decline and a benefit may accrue to importers.[132]

An additional concern in the international context is the possibility that United States tax changes affecting foreign persons may be balanced subsequently by the treatment accorded to United States investors overseas.[133] This reciprocity could occur through responses such as retaliatory legislation advanced by other nations or the invocation of treaty-granted rights. As a result, what appears to be a tax burden imposed on foreigners may redound to United States taxpayers as well. However, the potential for reciprocity probably varies significantly across proposals and nations, depending upon investment flows, overall economic stature, and other factors. Even if reciprocity operates as theorized above, it would be difficult to implement it as an operating principle in distributional analyses.[134]

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[131] As discussed in Part III.B, at footnote 68, such a determination of burden would depend upon the extent to which capital is internationally mobile.

[132] Lawrence H. Summers, "Comments on Joel Slemrod, 'Effect of Taxation with International Capital Mobility,'" in Henry J. Aaron, Harvey Galper, and Joseph A.Pechman (eds.), *Uneasy Compromise: Problems of a Hybrid Income-Consumption Tax*, (Washington, D.C.: The Brookings Institution), 1988.

[133] For example, it has been suggested that the decline in the United States statutory corporate income tax rate resulting from the Tax Reform Act of 1986 triggered (or followed) declines in corporate income tax rates abroad.

[134] For revenue estimating purposes the JCT staff generally does not use the reciprocity approach, at least for the prospective five-year budget window for which revenue estimates are provided, and therefore such an approach to distributional analyses could lead to possible confusion about the revenue estimates.

Practical issues in distributing the burden of tax provisions to non-U.S. persons

There are practical difficulties to distributing the burden of United States taxes to foreign persons. Because United States tax payments by foreign persons may affect their tax payments to the country in which they reside (the "home" country), it is unclear to what extent a United States tax change would affect foreign persons, or which foreign persons ultimately would be affected. Foreign persons may experience changes in home country taxes that partially or completely offset United States tax changes.

For example, one might believe that foreign-owned corporations operating in the United States obtain a competitive advantage over their U.S.-owned competitors because of the current methods of transfer pricing determined to be appropriate by the Internal Revenue Service. Suppose a proposal aimed at the foreign owners of corporations operating in the United States is introduced to revise the acceptable pricing methods. Because of the operation of the foreign tax credit mechanism under foreign law (which may or may not treat the United States tax as a creditable foreign tax), the revenue estimate associated with this proposal may not represent the burden imposed on these foreign owners, due to the possibility that foreign tax authorities may reduce their tax collections to compensate for the change in United States taxes directly or indirectly paid by foreign persons. Alternatively, foreign persons that pay foreign tax and are affected by such a proposal may achieve tax reductions by mutual agreement of the United States and foreign tax authorities, under which one competent authority agrees to adjust income inclusions or deductions for its tax purposes so that they correlate with the deductions or income inclusions permitted or required by the other competent authority.[135]

An accurate distributional analysis would require the JCT staff to predict how the foreign tax burden imposed on foreign persons would change as a result of United States legislation, a prediction which would be quite speculative unless the United States and affected foreign governments agreed how to share the change, or the results of a competent authority decision were predictable in advance. Thus, with respect to the transfer pricing proposal cited above, it would be unclear how much this proposal would improve the competitiveness of U.S.-owned firms operating in the United States, and providing information on the static effect of the proposal on foreign persons may be misleading as to magnitude and/or targeting.

Some inquirers simply want to know the overall tax burden imposed on foreign persons by a particular proposal, even if this information is provided outside of the standard format. However, the provision of a summary statistic relating to United States income or activities of foreign persons generally would be inappropriate for the following reasons. First, what might be deemed foreign at one level may ultimately involve some United States taxpayers. For example, some United States investors own shares in foreign corpora-

[135] Such agreements are arrived at after the two competent authorities negotiate over the tax treatment of a single group of associated enterprises. Procedures for such negotiations and agreements are made available by United States income tax treaties.

tions that operate either through subsidiaries or directly in the United States; care would have to be taken not to double count tax burdens associated with this type of ownership. However, the ultimate owners of foreign entities may not be easily determined.[136] To the extent that a tax change affects returns to capital or prices it may lead to an offsetting change in exchange rates. This would make it difficult to measure the value of the burden. Another difficulty with providing a summary statistic indicating the effect that a proposal has on foreign persons is that, because of the limited time horizon of both the distributional analysis and revenue estimates, this number may not allow for potential reciprocity on the part of other nations.

The approach adopted by the JCT staff

Primarily for reasons of practicality, the JCT staff will continue to adhere to its current approach *vis-a-vis* foreign persons in its distributional analyses. Thus, detailed or summary reference to changes in the tax burdens of foreign persons is excluded. As described in more detail below in Part IV, the distributional analyses produced by the JCT staff focus on domestic individuals or family units, which generally consist of United States citizens and residents. The rationale for employing this approach, aside from practicality, is that it focuses the analysis on United States citizens and residents, the group with whose well-being Members of Congress and others are most likely to be concerned.

[136] For example, corporations may issue bearer shares, making determination of ultimate ownership impossible unless information is voluntarily provided by shareholders.

IV. DISCUSSION OF THE INCOME CLASSIFIER

A. In General

Economics is the study of the allocation of resources. This allocation of resources determines the well-being of individuals. Well-being is usually measured by economists with reference to utility. "Utility" is a term economists use to conceptualize welfare or preferences. If, in the comparison of two equal-cost alternatives—A and B—an individual prefers A, then it is said that A provides the individual with more utility; the individual values A more than B. One's preferences among equal cost alternatives reveal which alternative offers the most utility or value.

Utility can only be observed indirectly, through an individual's choices, for example, so there is a need for a measurable proxy. The dollar value of income and the dollar value of total consumption over a specified period of time are often used as proxies for utility. Observable concepts like income and consumption, although easily measurable, do not fully capture the concept of an individual's well-being. A person's income, for instance, does not convey job satisfaction.

Despite the incomplete picture of utility that income provides, many economists believe that it is an appropriate measure of utility because it measures an individual's potential command over resources (goods and services). There is, however, no consensus on the specification of income that best reflects utility.

One of the most well-known concepts of income used by economists is the Haig-Simons definition.[137] Haig and Simons maintained that income, defined as the individual's increase in purchasing power during the tax year, most closely reflects utility. Haig-Simons income is defined as the "total value of rights exercised in the market, together with the accumulation of wealth in that period."

One can also measure Haig-Simons income as annual personal income (imputed income from durable goods consumption plus cash receipts for wages, interest, dividends, etc.) plus accrued capital gains (change in the value of assets held at the beginning of the tax year). This is equivalent to the consumption-based definition above when changes in net worth are taken into account. Haig and Simons argued that distinctions based on the sources of income (labor income, capital income) or uses (consumption or savings, accruals or realizations) are irrelevant in the formulation of the tax base. All increases in purchasing power—regardless of their source—are part of Haig-Simons income.

[137] Robert M. Haig, "The Concept of Income: Economic and Legal Aspects" in Robert M. Haig, (ed.), *The Federal Income Tax*, (New York: Columbia University Press), 1921, and Simons, *Personal Income Taxation*.

There are numerous specifications that attempt to measure "economic income," which would include the annual flow of all resources at the command of an individual. Haig-Simons income represents only one attempt,[138] though most variations attempt to capture Haig-Simons. Economists often use Haig-Simons income as the basis for distributional studies, because this concept most completely reflects command over economic resources.[139]

The definition of income used to classify taxpayers into groups for the purpose of examining distributional issues is referred to as an income classifier. The choice of income definition to be utilized in a particular study will be determined by data availability, as well as by the goals of the research. The JCT staff uses an income specification that, like Haig-Simons, attempts to measure economic income. The JCT income classifier does not fully reflect economic income, however, because it is constructed from limited data sources. The classifier employs adjusted gross income as a base, and expands upon AGI (as detailed below) by including certain income items excluded from this definition. Consequently, the income classifier used by the JCT is referred to as "expanded income."

Most studies of the distribution of resources in an economy are based on an annual measures of income. Some analyses, however, attempt to measure well-being, not by annual income, but by other empirical concepts. Consumption and average lifetime income represent two commonly used alternative measures of well-being. The following section discusses the advantages and disadvantages of representing well-being by annual income, average income, lifetime income, and consumption.

B. Alternative Classifications of Economic Well-Being

Current-year vs. lifetime or permanent income

The "life-cycle hypothesis" suggests that there is a correlation between an individual's current expenditures, current income and expectations of future income as the individual moves from school, through the working years, and into retirement. The income measure upon which the individual's consumption decisions are based under this hypothesis is referred to as "permanent income".[140] Many economists argue that permanent or average lifetime income provides a better measure of a person' s long-term economic well-being than an annual measure of income. These economists note several advantages that permanent income has over current income as a measure of economic well-being.

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[138] For example, see Frank Cowell, "The Structure of American Income Inequality," *Review of Income and Wealth*, 30 September, 1984. Cowell defined income as labor income plus capital income plus transfers. Also, see Joel Slemrod, "Taxation and Inequality: A Time-Exposure Perspective", in James M. Poterba (ed.), *Tax Policy and the Economy*, 6, (Cambridge: The MIT Press), 1992. Slemrod defines income as adjusted gross income plus excluded capital gains plus excluded dividends plus adjustments minus net tax liability.

[139] Victor Thuronyi, "The Concept of Income", *Journal of Taxation and Investment*, 9, Winter, 1992.

[140] Franco Modigliani (with R. Brumberg), "Utility Analysis and the Consumption Function, in K.K. Kurihara (ed.), *Post Keynesian Economics*, (New Brunswick, New Jersey: Rutgers University Press), 1954, and Milton Friedman, *A Theory of the Consumption Function*, (Princeton: Princeton University Press), 1957, are associated with the development and empirical testing of the permanent income and life cycle hypothesis. Modigliani's version of this theory addresses the saving-spending pattern of an individual's finances as he or she ages and moves from work to retirement.

Because people can save and consume out of accumulated savings, annual income may fluctuate more than annual consumption. For instance, individuals experiencing brief periods out of the labor force may have temporarily low incomes without having to change consumption patterns much. Similarly, individuals may have some years in which income is much higher than usual earnings. Using current year income may be a misleading measure of well-being in that it would make the individual having such a year appear to be better off or worse off than would a permanent income measure.

Under the life cycle hypothesis, current year income generally follows a pattern throughout an individual's life cycle. In general, income is low in the beginning years of working life, rises throughout the working years, and then declines with retirement. A household in its peak earnings years will also be saving for retirement, and will have both high current labor income and high asset income. Yet this same household will have reduced labor income and lower asset income once it reaches retirement and begins to decumulate assets. Although the household that saved during working years may be no worse off in terms of consumption of goods and services (well-being) during retirement, classifying the household using current income may result in it being placed in a relatively high income category while working but a relatively low category in retirement.

How large are these effects? Some analysts have reported that mobility among income quintiles is substantial, but that the effect of short-term fluctuations in income is larger than the effect of life-cycle fluctuations.[141] Given this finding, a better measure of economic well-being than current year income might be average income over the life-cycle.

However, it is not clear that average lifetime income is an appropriate measure of economic well-being in all situations. Lifetime income measures current well-being only if people have the ability to smooth their consumption by borrowing and saving. College students with little current income but with expectations of high earnings in the future might have a high level of current well-being if they can borrow against their future income. However, if they cannot borrow, or can only borrow at exorbitant rates, then they might have a low level of current well-being, even though their permanent income is high. Similarly, if someone enjoyed a high income in the past but spent it, then although lifetime well-being might be high, the individual's current economic well-being might be low. Whether the tax system should view this person as having high or low economic well-being depends on which concept of well-being (current or average lifetime) is preferred.

Income from transitory sources (e.g., lottery winnings, assets sales) may exhibit great variation from year to year. Because of transaction costs associated with selling assets, people may choose to sell large dollar values of assets at one time in order to spread a fixed transaction cost over a large volume of assets. Using a current year income measure, individuals selling assets with large amounts of accrued capital gains might appear to be better off in

[141] For example, see Poterba, "Lifetime Incidence and the Distributional Burden of Excise Taxes," and Office of Tax Analysis, U. S. Treasury Department, "Household Income Mobility During the 1980's: A Statistical Assessment Based on Tax Return Data," June 1, 1992.

the year they sell assets than they are in years where no such sales occur. As a result, annual measures of income may overstate economic well-being in the year in which transitory income is realized.

The JCT staff has decided to use a single-year measure of income in its distributional analyses, despite the potentially distorting effects of transitory income realizations. Income measures that try to average annual income over a period of years require data sets that follow tax-return units over potentially lengthy periods of time. This type of data set is referred to as panel data. Although the IRS has compiled small panel tax return data sets, there is no panel data source available that accurately represents the population with enough detail for the purpose of analyzing proposed tax legislation.[142]

Table 6 illustrates the difference in the distribution of a single-year income measure and a multi-year measure of income. Table 6 is a contingency table which presents the distribution of persons in the each decile of 1989 expanded income across deciles of five-year average expanded income.[143] The row labels refer to deciles of single-year income.[144] The column labels refer to deciles of five-year average expanded income. The cell entries across each row present the percentage of observations in the corresponding decile of 1989 expanded income that fall into each decile of five-year average income. For example, in the first row, 70 percent of the persons in the first income decile according to 1989 expanded income also belonged to the first decile of five-year average income and 17 percent fell into the second decile of average income. At the end of this row, the table reveals that noone (in fact, approximately one tenth of one percent) in the first decile of income in 1989 belonged to the top three deciles of five-year average income. These observations represent taxpayers whose yearly income varies from year to year.

The cells along the diagonal of this table represent the group whose ranking by annual income decile is the same as their ranking by decile of five-year average income. Observations in these cells report incomes which remain fairly constant over the years. For these persons, annual income and permanent income are closely correlated. Cells immediately next to the diagonal represent taxpayers whose relative income ranking varied little when ranked by one-year income or five-year income. If an annual income measure is a good classifier for analyzing distributional issues, most observations would fall into the same decile of single-year and five-year

[142] In 1987, the SOI initiated a panel of individuals' returns beginning with the 1987 tax year. Delivery of edited and weighted data for the first several years is expected early in 1994. JCT staff do not plan to use the panel to develop models. Rather they plan to introduce the longitudinal characteristics of the panel into their model which will continue to be based primarily on the annual SOI cross-sectional sample. Introducing longitudinal characteristics to the model is particularly important in such areas of tax policy as capital gains, where measuring the effects of policy on individual behavior over time may be quite different from measuring changes in aggregates. JCT staff also expect to incorporate longitudinal characteristics in its model within the next few years. For a discussion of this panel data, see Susan Hostetter, "Managing Multiple Uses of Panels," *1992 Proceedings of the Section on Social Statistics*, American Statistical Association, 1992.

[143] This table is based on information in the Sale of Capital Assets (SOCA) Panel, a panel data set compiled as part of the Statistics of Income project to study capital gains activity. The SOCA panel records the tax returns of 13,000 tax-paying units between 1985 and 1989. Because of its emphasis on capital gains, this data set tends to over-represent wealthy taxpayers.

[144] The upper bounds of 1989 expanded income deciles in the Sales of Capital Assets Panel: $8,119; $12,495; $16,736; $20,693; $25,918; $32,538; $40,345; $48,854; $66,360. Five-Year average income decile breakpoints are: $9,012; $13,222; $17,744; $21,820; $27,891; $34,466; $42,699; $51,792; $68,685.

average income, that is, along the diagonal of the matrix. Table 6 reveals that, in these data, annual income is reasonably representative of permanent income. In each row, a majority of observations falls into the diagonal cell or immediately next to the diagonal cell. This table supports the argument that, for most taxpayers, single-year income measures are reasonably good indicators of permanent income.[145]

Table 6.-1989 Expanded Income by Five-Year Average Expanded Income Deciles

1989 EXPANDED INCOME DECILE	FIVE-YEAR AVERAGE EXPANDED INCOME DECILES[1]									
	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
1st	70	17	9	1	1	1	1	0	0	0
2nd	20	54	15	4	3	1	1	2	0	0
3rd	4	18	42	22	7	2	4	0	0	0
4th	2	3	17	48	21	7	1	0	0	0
5th	1	3	6	18	47	19	3	2	0	1
6th	1	0	4	6	20	47	18	1	2	1
7th	0	0	1	1	2	21	55	15	2	1
8th	0	0	0	0	1	7	26	46	17	3
9th	1	0	0	0	1	2	5	15	57	17
10th	1	0	0	0	0	1	1	2	10	84

[1] Five-year average expanded income represents the average of 1985 through 1989 income, expressed in 1989 dollars.

[145] In Slemrod, "Taxation and Inequality: A Time-Exposure Perspective," Slemrod tests a panel data set (the Continuous Work History Panel) for differences in the distribution of expanded income, for 1983, and the distribution of average expanded income, from 1979 to 1985. His results were very similar to the results derived in the SOCA panel. Again, the distributions between single year measures of income do not differ significantly from average income measures. Similar findings appear Don Fullerton and Diane Lim Rogers "Lifetime vs Annual Perspectives on Tax Incidence," NBER Working Paper 3750, June, 1991.

Consumption/expenditure

Some of the problems of the annual income classifier could be solved by using a consumption classifier. If people behave according to the life-cycle hypothesis, then even if income varied significantly over the life-cycle, consumption would be less variable from year to year than income. In this cases, consumption might reflect well-being more accurately than income. On the other hand, if people do not smooth consumption over time, either because of borrowing constraints or lack of foresight, then annual consumption expenditures might mirror annual income. The college students who consumed little because they could not borrow even though anticipating large future incomes would not be classified as having a high level of economic well-being with a consumption classifier.

One potential problem with using consumption as a classifier is that any wealth (accumulated from labor or capital income) left as a bequest is never consumed within the earner's lifetime. Thus, some individuals might have high annual incomes every year, and hence great command of economic resources, but (under a consumption-based classification scheme) they would not be classified as having high economic well-being if their annual consumption of goods and services were not also high. People who save for the future consumption or for precautionary reasons may die earlier than expected and, thereby, leave an unintended bequest. These people derive as much utility from saving as from consuming income. If people explicitly choose to leave a bequest, it must be because they get at least as much utility from increasing the potential consumption of their heirs as they would from current personal consumption. Thus, using annual consumption as a classifier would make people who leave bequests appear to be less well-off than an income classifier. One way to solve this problem would be to treat bequests as consumption in the last period of the individual's life. To the extent that the consumption value of bequests accrues over more than one year, however, characterizing bequests as last-year consumption would not be appropriate. The value of the bequest should be amortized over the life of the taxpayer, but this calculation would be impractical.

A more serious problem with using consumption as a classifier is that it is more difficult to compare pre-tax and after-tax situations. This comparison is an important element of tax policy. It is very difficult to compare pre-tax and after-tax consumption, because one would need to know what consumption would have been in the absence of the tax under consideration. Since the tax might have reduced both consumption and saving, simply adding the tax to consumption could be misleading.[146]

There exist a number of situations, furthermore, where the relationship between consumption and well-being is not straightforward. Some illustrative examples include persons incurring large medical expenses or who support a large number of children.

[146] Note, however, that both consumption and income classifiers have a similar problem with respect to measuring pre-tax economic positions. The JCT staff currently assumes that pre-tax income is equal to after-tax income plus the amount of tax paid. To the extent that the existence of the tax system changes the amount of work and saving that people do, this measure of pre-tax income does not equal the income people would have received in the absence of the tax system.

In addition, the annual consumption of the services from durable goods is not easily measurable. Finally, the primary data source available to the JCT staff are income tax returns. Tax returns do not reflect consumption; their purpose is to report income. Consequently, the JCT staff has less reliable information about the consumption/expenditure patterns of individuals and households than about their sources and amounts of income. For these reasons, the JCT staff has decided not to use consumption as the classifier in distributional analyses. However, the JCT staff does attempt to highlight and correct the cases in which income clearly misrepresents current well-being (as discussed in the section below).

C. Issues in Defining Income

Adjusted gross income (AGI)

The largest and most reliable data source available to the JCT staff, the Statistics of Income (SOI) file prepared by the Internal Revenue Service, prepares distributional analyses according to AGI. Adjusted gross income includes all sources of taxable money income, reduced by adjustments such as contributions to certain retirement accounts and alimony paid. However, as discussed below, adjusted gross income, a tax return concept, does not lend itself to comprehensive distributional analyses, because it does not fully reflect the taxpayer's command over economic resources, and, therefore, it creates an incomplete picture of economic well-being.

In addition, AGI does not constitute a consistent definition of income from year to year. Changing tax laws often change the definition of AGI. Prior to 1986, for example, moving expenses were a negative adjustment to AGI. In 1986, moving expenses were redesignated as itemized deductions, which are subtracted after the computation of AGI. A taxpayer in the same financial situation in 1987 as in 1986 and with identical moving expenses in both years would report different values for adjusted gross income as a result of the redefinition of AGI. For these reasons, AGI is an unacceptable measure of economic well-being.

Expanded income

When preparing distributional analyses, the JCT staff uses an income concept meant to measure economic income—not just taxable income—since economic income is the appropriate measure of economic well-being. However, the measurement of economic income—implementing the theory—involves some difficult issues, which are discussed below. In general, the approach taken by the staff is to resolve these issues so that people in similar economic situations are treated similarly. Although theoretical ambiguities and data constraints prevent the JCT staff from constructing a perfect measure of economic income, the JCT income classifier represents an attempt to come as close as possible to matching this income concept. In this pamphlet, the concept developed by the JCT staff to fulfill these requirements is referred to as expanded income (EI).

Meaningful analysis necessitates an inclusive income concept that can be extracted from available income and tax databases. Its definition, moreover, should remain constant, despite changes in

the tax code. The JCT measure of income is designed to approximate economic income, subject to data constraints. This measure, called expanded income, is defined as follows.

Expanded Income =
Adjusted Gross Income
+ tax-exempt interest
+ workers' compensation
+ nontaxable Social Security benefits
+ excluded income of U.S. citizens living abroad
+ value of Medicare benefits in excess of premiums paid
+ minimum tax preferences
+ employer contributions for health plans and life insurance
+ employer share of payroll taxes
+ corporate tax payments imputed to individual holders of corporate equity

Expanded income is a cash-flow, current-year, pre-tax and transfer income concept, expressed in nominal dollars. Expanded income captures many of the elements of Haig-Simons income and is a reasonably accurate measure of ability-to-pay.

The formulation of expanded income embodies significant departures from the Haig-Simons concept; for instance, it includes realized, not accrued, income from capital gains and pension benefits, and it ignores the rental value of owner-occupied housing.[147] The most economically significant departure from the Haig-Simons concept is the inclusion of nominal, rather than real, capital income. Both interest income and capital gains are overstated in the presence of inflation. For example, if a taxpayer has a $1,000 savings account that pays a five percent annual interest rate, the taxpayer has $50 of nominal interest income. This nominal interest income is included in AGI and in Expanded Income. However, if the annual inflation rate is four percent, then the annual real interest rate is only one percent and the taxpayer's real interest income is only $10. The real interest income is equal to the $50 nominal interest income minus the $40 decline in real value of the savings account balance due to the four percent inflation.[148] As discussed below, similar mismeasurement occurs with respect to capital gains, because AGI and Expanded Income measures the difference between the nominal sales price of the asset and its nominal purchase price, with no adjustment for the inflation that occurred between the date of purchase and the date of sale. The issues in-

[147] The Office of Tax Analysis of the Department of the Treasury uses a different measure of ability to pay. The Office of Tax Analysis income classifier, family economic income, attempts to more closely follow Haig-Simons precepts. For example, family economic income includes measures of accruing capital gains, accruing pension benefits, and an imputed rental value of owner-occupied housing. For a description of the Office of Tax Analysis family economic income measure, see Susan C. Nelson, "Family Economic Income and Other Income Concepts Used in Analyzing Tax Reform," in Office of Tax Analysis, Department of the Treasury, *Compendium of Tax Research 1987*, (Washington, D.C.: U.S. Government Printing Office), 1987, and James R. Nunns, "Tabulations from the Treasury Tax Reform Data Base," in Office of Tax Analysis, Department of the Treasury, *Compendium of Tax Research 1987*, (Washington, D.C.: U.S. Government Printing Office), 1987.

[148] The computation of real interest may even be more complicated. If a bond sells at premium or discount compared to its face value, the coupon payment will not even measure nominal interest income correctly. Since the taxpayer's tax return does not report whether the bond was purchased at premium or discount (nor the value of the premium or discount), it would not be possible to adjust reported interest for inflation in such a case.

volved in compiling the expanded income classifier are discussed below.

Items added to AGI

Cash receipt not included in AGI

Items (1)-(4), below, in the AGI adjustments represent cash receipts that, while not taxable under current law, clearly represent economic income.

(1) Tax-exempt interest.—Tax-exempt interest is added to AGI in an effort to reflect fully economic resources from capital. Holders of tax-exempt investments accept a lower rate of return in exchange for the exemption from income tax obligations on the interest received. The difference between the taxable and the tax-exempt rates may be viewed as an implicit tax which is "paid" to State and local government issuers. A pre-tax definition of income would include both the tax-exempt earnings and the implicit tax, and the distribution analysis would, subsequently, credit the tax as paid by holders of tax-exempt issues. The implicit tax, however, is paid to State and local governments, and would not be included in the calculation of taxes paid. The resulting picture of the distribution of the tax burden, therefore, would be biased. Consequently, the JCT staff includes only the tax exempt earnings as income.

(2) Workers' compensation.—Workers' compensation is an insurance program that provides income replacement during temporary periods of unemployment. Employers contribute to this program on behalf of their workers, and these contributions represent a portion of total compensation. The insurance value of this program is difficult to assess and the dollar value of the benefit more accurately reflects the value of the program to the worker, so the JCT staff includes program payments in expanded income.

(3) Social security benefits.—Social security exhibits characteristics of both a contribution-based retirement plan and a system of social welfare transfers. Social security benefits are based on payroll tax contributions, although the system provides a widely variable return depending upon income and family status. This presents the JCT staff with a choice, since expanded income should include retirement income but not transfer payments.

In view of the relationship between past earnings (and, therefore, taxes) and benefits, it is reasonable to treat social security as a contribution-based retirement plan and include benefits, net of after-tax contributions, in income. This view is consistent with Congressional actions concerning the taxation of social security benefits.[149] Data limitations, however, prevent the JCT staff from subtracting employees' contributions from expanded income. The imputation of an employee's basis would be imprecise, because payments were made over many years. The total amount of the contributions, moreover, would be relatively small.

(4) Excluded income of U.S. citizens living abroad.—U.S. citizens living abroad are entitled to exclude from gross income $70,000 of earned income from foreign sources as well as a housing allowance.

[149] Congress has always set limits on the percentage of social security benefits subject to taxation. This is because a portion of social security benefits represents the employee's basis. This basis was contributed from after-tax income.

The amount of the housing allowance is based on employer-provided foreign housing costs. This compensation is clearly economic income, and the excluded income is incorporated in the JCT income classifier.

Value of non-means-tested Federal program

(5) Insurance value of Medicare.—Medicare (parts A and B) is a Federal program designed to provide health care benefits to elderly and disabled persons who are insured under the Social Security program. The insurance value of this benefit represents a contribution-based insurance plan. It is equivalent to social security benefits, and should be treated in a consistent manner. In the case of part B Medicare (supplementary Medicare coverage, a voluntary program), sufficient data exist to net the supplemental premiums paid by participants. Contributions to part A (basic medicare coverage), however, are not netted out due to data limitations.

Special or enhanced deductions allowed in computing AGI

(6) Minimum tax preferences.—Tax preference items generate considerable tax savings by reducing adjusted gross income. It is generally believed that the deductions represent economic income; so they are added back into AGI in the computation of the JCT income classifier. Among the minimum tax preference items are the following:

(a) the amount by which depletion deductions for interest in a mineral deposit exceed the basis of the interest;
(b) excess intangible drilling costs;
(c) appreciation of the value of a capital asset for which the taxpayer has claimed a charitable deduction;
(d) excess of accelerated depreciation over straight-line depreciation on some properties;[150]
(e) excess of rapid amortization of pollution control facilities; and
(f) excess of accelerated depreciation over ACRS depreciation on some properties

Non-taxable, non-cash compensation

(7) Employer contributions for health plans, life insurance, and other fringe benefits.—The value of employer contributions to health and life insurance plans and other fringe benefits are included in expanded income. These benefits represent a significant proportion of total compensation.

Employer expenditures for health and life insurance plans and other fringe benefits increase the economic welfare of workers, and should therefore be included in income. However, it is not clear how the value of these expenditures should be computed for purposes of inclusion in income. If the expenditures are on commodities that the workers would otherwise have purchased themselves, they should be valued at cost divided by (1.0 - tax rate), since they are not taxed. For instance, a $1.00 expenditure on health insur-

[150] The excess of accelerated depreciation over economic depreciation should be included in economic income. It is unclear whether straight-line depreciation represents economic depreciation.

ance would have the same value as $1.45 in wages for a worker with a 31 percent marginal tax who would have purchased the insurance anyhow. However, because fringe benefits are non-taxable, compensation packages will oversupply fringes relative to what workers would choose in the absence of a tax advantage. At the margin, the value of $1 of fringe benefits is $1 in wages, since workers will choose to be compensated in fringe benefits until the value of the last dollar spent on fringes is just equal to one dollar of wage income. Thus, on average, the value of fringe benefits exceeds its cost to the worker. However, because it is not possible to know the magnitude of the excess of value over cost, and because the implicit tax paid on these fringes is not actually paid (see discussion in (1) above), these fringes are valued at cost in the income classifier.

(8) Employer share of payroll taxes.—Employer share of payroll taxes—contributions to FICA—are included in expanded income. The employers' share of the FICA tax includes Old Age, Survivors, and Disability Insurance (commonly thought of as social security) and Hospital Insurance (Medicare, part A). This represents a significant portion of total compensation.

Taxes collected from corporations attributable to income earned by owners of capital

(9) Corporate tax payments.—The JCT income classifier includes corporate income in the form of dividends and capital gains. These income components reflect the burden of corporate taxes on owners of capital. Dividends and capital gains are post-corporate tax income flows. Expanded income, however, is a pre-tax income concept. In order to preserve the pre-tax nature of the JCT income classifier, the value of corporate income taxes that have been paid on each dollar of corporate income components is added back to the expanded income. The JCT staff distributes annual corporate tax liabilities among shareholders according to the proportion of total corporate equity each holds.

Items not included in expanded income

Annual accruals of capital gain

Conceptually, the income classifier would include accruing increments to net worth. Appreciation of an individual's assets clearly represents economic income to the taxpayer, and a true Haig-Simons approach would incorporate all accruing capital gains and losses in income.

The most significant of untaxed increments to net worth includes accrued capital gains and tax-deferred contributions to savings/retirement plans. Although annual changes in wealth constitute a significant part of Haig-Simons income, it is not clear that estimated valuations of accrued wealth should be incorporated in an income classifier. Estimations of the nominal value of assets are often inexact, and the conversion of these assets is not without transactions costs. The convertibility of assets at the current market value, moreover, is never guaranteed. An estimated valuation that ignores liquidity and transactions costs is not necessarily more precise than an income concept that includes only realized income.

Another possibility is to replace capital gains and losses on corporate equity with corporate income information in an effort to create an accrued wealth concept. Allocating corporate profits and retained earnings to stockholders can only be done by making many assumptions about the distribution of stock ownership and then imputing corporate income based on these assumptions. Among the assumptions would be those that reflect "who" holds "what." These rules would then be applied to allocate corporate finances among taxpayers in the tax model.

The tax system taxes income only upon realization, so unrealized capital gains on financial assets and on tangible assets (housing, real estate, etc.) are not reported on the tax return. Consequently, data on gain and loss accruals are not available for the individual taxpayer, and estimations of accrued wealth are imprecise. As a result, JCT expanded income does not fully reflect accrued wealth in each year. Realizations of capital income reported on the tax return, however, are included in the income classifier. Although there is no reason to believe that annual accruals match annual realizations, realizations and accrued wealth should be the same in the long run (except for gifts and bequests made).

It is important to note that capital gains realizations included in expanded income—a nominal income concept—mismeasure real income from capital. Gains are calculated by subtracting the nominal sales price of the asset form the nominal basis. Data constraints prevent the JCT staff from expressing the basis and the sales price in constant dollars, so the resulting gain does not reflect only the increase in the value of the asset. Increases in the price level are also reflected in the "capital gain."

Pensions

An inclusive specification of Haig-Simons income would incorporate contributions to pensions when they occur, as well as the earnings that accrue on these funds.

Funds contributed to an employer-sponsored pension plan, whether by an employer or employee, are not included in the income classifier for a number of reasons. First, it is difficult to determine the value of defined-benefit pension plans, since it depends on wage growth, employee turnover, and current and future rates of interest and inflation. Second, not all employees covered by pension plans are vested; this also makes it difficult to value the economic income associated with employer-sponsored pension plans. The decision of the JCT staff is not to include pension contributions as income when contributed, but rather include distributions of principal and earnings when withdrawn.[151]

Although it is generally agreed that pension contributions represent a decision to save income, such contributions are tax-deductible at the employer level and excludible at the employee level, and this tax-sheltered income is not included in reported income from wages and salaries. Information on these contributions, therefore, would have to be estimated. Employer contributions to pensions

[151] Lump-sum pension distributions are not included in the JCT income classifier, however, because they represent one-time realizations that distort the distribution of income. For the same reason, income from lump-sum pensions is included in AGI according to income averaging procedures and, therefore, in expanded income.

and savings plans are another element of income that must be estimated, because this information is not reported on tax returns. Further, accrued earnings on these funds represents additions to wealth that would be considered a component of Haig-Simons income. Again, this income would have to be approximated, because earnings on such funds are not reported. Further, because plans and associated earnings vary greatly, estimations of these income components are too inexact to warrant imputation.

Pension income that escaped taxation when it was earned is reported on the tax return of the recipient when it is distributed. Including these funds in expanded income allows the JCT staff to rely on tax data. This method also ensures that company-matched funds are included in income when they are withdrawn. This information is accurate and includes accrued interest as well as employer contributions. Expanded income, therefore, captures income from pensions by ignoring contributions and including distributions.

Savings plans

Although contributing to an IRA does not reduce a taxpayer's economic income, considerations of comparability across taxpayers make it difficult to decide whether to add these contributions to AGI. Because contributions to pension plans by employers on workers' behalf are not included in employees' income, and because current law restricts deductible IRAs to people below a certain income level and people without pension plans, comparability between people with and without pension plans suggests that deductible contributions not be added to AGI.

Non-taxable government payments

The JCT staff does not include some government payments in the income classifier, because the classifier is supposed to reflect pre-tax income. Transfers can be interpreted as negative taxes; they do not, therefore, belong in a pre-tax income concept. The government payments that are included—Social Security, worker's compensation, and Medicare—represent programs to which the recipient contributed in order to qualify for benefits. They can be viewed as types of savings plans. Payment programs that do not require the taxpayer to contribute are negative tax programs—strict transfers—and do not belong in a pre-tax income concept.

The transfer programs that the JCT staff does not incorporate in its income classifier include both cash and non-cash benefits: the insurance value of Medicaid benefits, welfare, AFDC payments, or food stamps, housing benefits, educational assistance. With the exception of educational assistance (in the form of Pell grants, Head Start, the College Work Study Program, and Supplemental Educational Opportunity Grants), low-interest loans and farm-support programs, most of the Federal Government assistance that the JCT staff does not include in expanded income accrues to legitimate non-filers of tax returns. Educational assistance programs are more evenly distributed across the range of expanded income (except the Head Start program which is more concentrated in lower income families). To the extent that taxpayers who have a filing requirement receive Federal Government assistance other than edu-

cational grants, the JCT staff's income classifier will tend to understate the post-tax and transfer income of taxpayers with low income.[152]

Rental value of housing (and other durable goods)

The rental value of a homeowner's home represents economic income, similar to income received on any other investment. Consider a taxpayer who buys and occupies a $100,000 house that could be rented for $5,000 a year. This taxpayer would be equally well off (ignoring tax considerations) if he or she spent $100,000 on a financial asset that pays $5,000 per year in cash returns, and used the cash to rent a similar house. It would be incorrect conceptually to say that the first taxpayer had $0 in income while the second had $5,000. Hence, the rental value of the house should be included in expanded income.

The rental income implicit in home ownership represents considerable economic resources. Since imputed rent is not taxed, its value may exceed the dollar amount of rent on an equivalent house. In the past several years, falling real estate prices have resulted in negative estimates of the aggregate of this component. Since tax returns do not include any information about house values, and since it is only possible to know if a taxpayer owns a home if the taxpayer deducts mortgage interest, the JCT staff has decided that too little information exists to accurately impute rental values to owner-occupants.

Fringe benefits other than health and life insurance

Certain fringe benefits provided by employers, in addition to health and life insurance, are not taxable. These include employer-provided parking, contributions to club dues, and child-care costs up to $5,000. Because little data exist on these expenditures, and because the aggregate value of the non-taxable benefits is believed to be small, they are omitted from the income classifier.

Unreported income

Unreported income refers to all sources of income that are not reported, or are under-reported, on the tax return. Some transactions for which there is no information reporting requirement fall into this category. This includes some cash transactions, such as tips or moonlighting jobs (e.g. carpentry or plumbing, etc). In addition, income from foreign sources is often thought to be under-reported. Unreported income also includes the income of persons below the filing line (i.e., persons whose income is so low that they do not owe income taxes).

Adding under-reported income to the income classifier would enable the JCT staff to more accurately estimate the distribution of the burden of taxes. Data limitations, however, make the imputation of this income very imprecise. Therefore, unreported income is not currently included in expanded income.

[152] The JCT staff's classifier also does not include State or local government assistance.

Special problem areas

Lower income categories

The IRS data that the JCT staff uses are representative of taxpayers who file returns. To analyze proposals that would affect persons not currently required to file tax returns the JCT staff uses information from the Current Population Survey to augment the IRS tax return data. These data are statistically matched with the IRS tax return to provide information about persons who do not currently file tax returns. An example of a proposal that would utilize this data would be a proposal to lower the income threshold on tax return filing requirements. The distributional effect of including non-filers is to increase the number of low-income persons relative to those represented by the tax return information. Excluding these persons from the income classifier would understate the distributional effects of proposals that would increase the number of taxpayers filing returns.

Taxpayers with losses

Expanded income, the income classifier that the JCT staff uses, includes losses that are subtracted from income when computing adjusted gross income. These include capital, partnership, small corporation, sole proprietor, rental, and farm losses as reported on the respective tax schedules. Unlike the reporting of wage and salary income, the reporting of income and losses from these sources can involve a substantial amount of discretionary tax planning. Some analyses, such as those published by the Statistics of Income Division of the IRS, separate income from these sources into negative and positive income components to reflect these tax planning choices. To the extent that losses reflect tax planning strategies, an income classifier that includes negative incomes will tend to misrepresent some middle- and high-income taxpayers as low-income taxpayers. For this reason, the JCT staff has decided to eliminate observations with negative net expanded income from distributional analyses.

V. ISSUES IN PRESENTING DISTRIBUTIONAL ANALYSES

A. The Reporting Unit

The unit chosen for distributional analysis can have significant effects on the resulting analysis. There are many possible choices for the unit of analysis, including tax returns, households, families, "standardized" families, and individuals. Because distributional analysis attempts to measure the differential impact of policy changes on people with different levels of economic well-being, the unit chosen should be one that reflects ability-to-pay.

For instance, consider two tax returns, one for a single person with no dependents, and the other a joint return for a married couple with two children. If both returns show income of $25,000, it is likely that these economic units have different levels of economic well-being. One possibility to address this issue is to base distributional analysis on a per-capita basis; using this approach, there would be five units represented by the two tax returns—one with income of $25,000 and four with income of $6,250 each ($25,000/4). However, because children may have different needs and because of economies of scale, this approach may not reflect differences in economic well-being.

A number of researchers use "equivalence scales" to construct equivalent family units as the basis for distributional analysis. These scales typically say that a first child "costs" some fraction of the annual costs of an adult, and subsequent children cost less. The JCT staff has decided not to use this approach because there are a wide variety of such scales, because the JCT staff does not always have the data required to construct such scales, and because the resulting analysis may be difficult to interpret for those unfamiliar with the exact equivalence scales used. Instead, the JCT staff uses the tax return as the unit for distributional analysis. A tax return can generally be viewed as representing a "household". A small percentage (approximately 0.5 percent) of married couples file single returns, and there are also a significant number (approximately 14.6 percent) of dependent returns. In order to maintain this idea of a household, dependent returns are discarded.[153]

Sometimes the impact of a proposal depends on whether the taxpayers are single, married, or household heads. Because the JCT staff does have good information on filing status, it is possible to do distributional analysis separately for each filing type. Table 7 examines the distributional impact of a five-percent increase in the earned income tax credit rate. As the table demonstrates, for tax-

[153] In the future, the JCT staff hopes to match dependent returns to parents rather than just discard them. Beginning with 1987, the Statistics of Income Division of the IRS identified all dependents reported on tax returns in their sample of individual returns, and matched any returns filed such dependents to their parent's return. Within the next few years the JCT staff hopes to base its income measure on this tax family unit. Such a change is consistent with the JCT staff's use of expanded income.

Table 7.--Distributional Effects of a 5% Increase in the EITC Rate, 1994-1998

(1993 Level)

Expanded Income Class (1)	All Returns		Joint Returns		Nonjoint Returns	
	Proposed Change in Tax Burden	Burden Change as a Share of Income	Proposed Change in Tax Burden	Burden Change as a Share of Income	Proposed Change in Tax Burden	Burden Change as a Share of Income
	Millions	Percent	Millions	Percent	Millions	Percent
Less than $10,000	-$634	-0.70%	-$194	-1.78%	-$440	-0.55%
10,000 to 20,000	-1,534	-0.47%	-569	-0.76%	-966	-0.38%
20,000 to 30,000	-476	-0.11%	-178	-0.12%	-298	-0.11%
30,000 to 40,000	-72	-0.02%	-27	-0.01%	-45	-0.02%
40,000 to 50,000	-16	0.00%	-8	0.00%	-8	0.00%
50,000 to 75,000	-7	0.00%	-7	0.00%	0	0.00%
75,000 to 100,000	-1	0.00%	0	0.00%	-1	0.00%
100,000 to 200,000	0	0.00%	0	0.00%	0	0.00%
200,000 and over	0	0.00%	0	0.00%	0	0.00%
Total, All Taxpayers	**-$2,741**	**-0.07%**	**-$982**	**-0.03%**	**-$1,758**	**-0.13%**

Source: Joint Committee on Taxation

(1) The income concept used to place tax returns into income categories is adjusted gross income (AGI) plus: [1] tax-exempt interest, [2] employer contributions for health plans and life insurance, [3] employer share of FICA tax, [4] workers' compensation, [5] nontaxable social security benefits, [6] insurance value of Medicare benefits,and [7] corporate income tax liability imputed to stockholders, [8] alternative minimum tax preference items,and [9] excluded income of U.S. citizens living abroad.

payers in the lowest two income brackets, those that file joint returns receive a larger benefit than those who file nonjoint returns (singles and heads of household). Overall, however, because household heads are more likely to be in the lowest tax brackets, nonjoint returns receive a larger tax reduction (.08 percent) than joint returns (.01 percent). Although presenting separate distribution tables does not control for family size and needs, it generally controls for the number of adults, and presents the analysis separately for single adults with children and single adults without children.[154]

[154] Appendix D presents a table with the JCT staff's 1993 projection of tax filing units distributed by filing status and by income.

B. Subsamples of the Population

When considering proposed changes in the tax code, policymakers may be interested in the effects of the proposed changes on particular subgroups of the population. For example, policymakers may be concerned with how a particular proposal affects the elderly, families with children, or taxpayers in different parts of the country. The distribution of income across different subsamples of the population does not mirror the distribution of income across the whole population. The preceding table provides an example of a frequent problem: an aggregate categorization of taxpayers or households by income conceals interesting information on subsamples of the population. One sees that a distribution of the burden or benefit of a proposed tax change can vary by filing status.

Tax data permit analysis of some subsamples of the population, but not all. For example, Tables 8a and 8b below distribute taxpayers according to the age of the primary taxpayer[155] as well as according to the JCT expanded income measure.

Table 8a.--Distribution of Expanded Income by Age of Primary Taxpayer, 1993

Expanded Income Class (1)	Income All Ages	Income Age 20-35	Income Age 35-50	Income Age 50-65	Income Age 65 and above
	Percent	Percent	Percent	Percent	Percent
Less than $10,000	2.0%	3.1%	0.8%	0.8%	1.3%
10,000 to 20,000	7.7%	11.6%	3.6%	4.2%	11.5%
20,000 to 30,000	10.1%	16.0%	7.0%	7.0%	11.4%
30,000 to 40,000	10.7%	14.1%	9.5%	8.8%	12.4%
40,000 to 50,000	10.7%	13.4%	10.2%	9.4%	11.1%
50,000 to 75,000	21.6%	22.2%	19.2%	20.2%	18.5%
75,000 to 100,000	11.7%	9.5%	15.8%	13.0%	8.3%
100,000 to 200,000	12.6%	7.2%	18.4%	15.3%	9.5%
200,000 and over	12.9%	2.8%	15.4%	21.2%	16.0%
Total, All Taxpayers	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Source: Joint Committee on Taxation

(1) The income concept used to place tax returns into income categories is adjusted gross income (AGI) plus: [1] tax-exempt interest, [2] employer contributions for health plans and life insurance, [3] employer share of FICA tax, [4] workers' compensation, [5] nontaxable social security benefits, [6] insurance value of Medicare benefits,and [7] corporate income tax liability attributed to stockholders, [8] alternative minimum tax preference items,and [9] excluded income of U.S. citizens living abroad.

[155] The primary taxpayer is the taxpayer whose name is listed first on the return.

Table 8b.--Distribution of Returns by Age of Primary Taxpayer, 1993

Expanded Income Class (1)	Returns All Ages	Returns Age 20-35	Returns Age 35-50	Returns Age 50-65	Returns Age 65 and above
	Percent	Percent	Percent	Percent	Percent
Less than $10,000	14.8%	17.4%	8.0%	8.3%	6.6%
10,000 to 20,000	21.2%	23.9%	12.3%	15.3%	30.9%
20,000 to 30,000	16.6%	20.0%	14.3%	15.7%	18.5%
30,000 to 40,000	12.6%	12.6%	13.9%	13.8%	14.1%
40,000 to 50,000	9.7%	9.3%	11.6%	11.6%	9.8%
50,000 to 75,000	14.4%	11.3%	21.6%	18.2%	12.2%
75,000 to 100,000	5.6%	3.5%	9.4%	8.3%	3.8%
100,000 to 200,000	4.0%	1.8%	7.3%	6.5%	2.9%
200,000 and over	1.1%	0.2%	1.7%	2.2%	1.2%
Total, All Taxpayers	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Source: Joint Committee on Taxation

(1) The income concept used to place tax returns into income categories is adjusted gross income (AGI) plus: [1] tax-exempt interest, [2] employer contributions for health plans and life insurance, [3] employer share of FICA tax, [4] workers' compensation, [5] nontaxable social security benefits, [6] insurance value of Medicare benefits, and [7] corporate income tax liability attributed to stockholders, [8] alternative minimum tax preference items, and [9] excluded income of U.S. citizens living abroad.

The tables show patterns that an aggregate table would not reveal. Table 8a presents a distribution of the total value of income in dollars distributed both according to taxpayers' age as well as by income category. The second column reports the distribution of income earned by all taxpayers. For example, 2.0 percent of all income accrues to taxpayers with less than $10,000 of income. Column four reports the same information, but restricted to taxpayers aged 35 to 50. For example, 0.8 percent of the income earned by taxpayers age 35 to 50 is earned by those with incomes less than $10,000.

Table 8b presents the same subsample, but the entries are percentages of returns rather than percentages of income. Again, the second column reports the distribution of returns filed by all taxpayers. For example, 14.8 percent of returns are filed by taxpayers with incomes less than $10,000. Column four reports the same information, but restricted to taxpayers aged 35 to 50. Among taxpayers age 35 to 50, 8.0 percent of returns are filed by taxpayers with incomes less than $10,000. These two tables, as would be expected, show that tax filing units for which the primary taxpayer is age 35 to 50 are more heavily represented in the income categories above $50,000 than are taxpayers younger than 30 or older than 65.

Analysis of such subsamples can provide information important in policy analysis. For example, these tables document the life cycle pattern of income, discussed in Part IV.B, above. An individual's income rises from his or her 20s generally to a peak in middle age and declines with retirement. Analysis such as these could illuminate the pattern of the tax burden over a taxpayer's lifetime.

Even tables such as Table 8a and 8b above, obscure information that may be relevant to policymakers, because different taxpayers earn their income from different sources. Tables 9 and 10, below, further disaggregate the income data to a distribution of wage income and a distribution of the income from interest and dividends. For example, column four of Table 9 reports that 39.7 percent of all wage income earned in the United States is earned by taxpayers aged 35 to 50, while column six reports that only 2.4 percent of wage income is earned by those aged 65 or over. Column four of Table 10, on the other hand, reports that taxpayers age 35 to 50 account for 15.7 percent of all interest and dividend income earned, while column six reports that taxpayers age 65 and over account for 51.7 of total interest and dividend income earned. Reading across the rows of these tables reveals that among taxpayers with incomes between $40,000 and $50,000 those age 20 to 35 accounted for 5.5 percent of interest and dividend income earned by such taxpayers, while those age 50 to 65 accounted for 19.8 percent of the interest and dividend income earned by such taxpayers.[156]

[156] Reading across a row in Table 9 or Table 10, the sum of columns three through six does not equal 100 percent because the table does not report the earnings of taxpayers under age 20.

Table 9.--Distribution of Wage Income Across Expanded Income Classes by Age of Primary Taxpayer, 1993

Expanded Income Class (1)	Wages All Ages	Wages Age 20-35	Wages Age 35-50	Wages Age 50-65	Wages Age 65 and above
	Percent	Percent	Percent	Percent	Percent
Less than $10,000	100.0%	48.6%	12.9%	5.1%	0.1%
10,000 to 20,000	100.0%	58.1%	17.5%	10.0%	1.1%
20,000 to 30,000	100.0%	56.6%	25.6%	13.4%	1.8%
30,000 to 40,000	100.0%	46.7%	32.7%	17.7%	2.4%
40,000 to 50,000	100.0%	42.9%	36.1%	19.0%	2.0%
50,000 to 75,000	100.0%	33.2%	44.2%	20.7%	1.9%
75,000 to 100,000	100.0%	25.6%	48.6%	24.1%	1.8%
100,000 to 200,000	100.0%	17.8%	53.0%	26.7%	2.5%
200,000 and over	100.0%	7.0%	48.6%	36.7%	7.7%
Total, All Taxpayers	**100.0%**	**35.0%**	**39.7%**	**20.9%**	**2.4%**

Source: Joint Committee on Taxation

(1) The income concept used to place tax returns into income categories is adjusted gross income (AGI) plus: [1] tax-exempt interest, [2] employer contributions for health plans and life insurance, [3] employer share of FICA tax, [4] workers' compensation, [5] nontaxable social security benefits, [6] insurance value of Medicare benefits,and [7] corporate income tax liability attributed to stockholders, [8] alternative minimum tax preference items,and [9] excluded income of U.S. citizens living abroad.

Table 10.--Distribution of Interest and Dividend Income Across Expanded Income Classes by Age of Primary Taxpayer, 1993

Expanded Income Class (1)	Int&Div All Ages	Int&Div Age 20-35	Int&Div Age 35-50	Int&Div Age 50-65	Int&Div Age 65 and above
	Percent	Percent	Percent	Percent	Percent
Less than $10,000	100.0%	17.4%	22.3%	32.1%	10.3%
10,000 to 20,000	100.0%	6.3%	10.8%	26.5%	54.4%
20,000 to 30,000	100.0%	5.9%	9.5%	19.7%	64.7%
30,000 to 40,000	100.0%	4.6%	11.2%	23.3%	60.9%
40,000 to 50,000	100.0%	5.5%	10.1%	19.8%	64.6%
50,000 to 75,000	100.0%	5.8%	13.6%	22.2%	58.5%
75,000 to 100,000	100.0%	5.1%	17.1%	27.8%	50.0%
100,000 to 200,000	100.0%	4.3%	18.8%	29.8%	47.1%
200,000 and over	100.0%	3.6%	21.8%	37.0%	37.6%
Total, All Taxpayers	**100.0%**	**5.0%**	**15.7%**	**27.3%**	**51.7%**

Source: Joint Committee on Taxation

(1) The income concept used to place tax returns into income categories is adjusted gross income (AGI) plus: [1] tax-exempt interest, [2] employer contributions for health plans and life insurance, [3] employer share of FICA tax, [4] workers' compensation, [5] nontaxable social security benefits, [6] insurance value of Medicare benefits, and [7] corporate income tax liability attributed to stockholders, [8] alternative minimum tax preference items, and [9] excluded income of U.S. citizens living abroad.

Unfortunately, similar information cannot be compiled for all conceivable subsamples of the population. For example, the JCT staff's individual tax model is based upon a random sample of individual taxpayers' actual returns.[157] However, due to the way in which this sample is collected, it does not provide an accurate representation of taxpayers by State of residence. Therefore, it is not possible to present information on changes in tax burden by State based upon tax return data. Similarly, individual tax returns are limited in the amount of demographic data they provide. This makes examination of many potentially interesting demographic groups impractical. In general, data limitations may preclude the examination of other subgroups that may be of interest.

While no single table addresses all the questions that one might ask concerning the burden of a change in taxes, the JCT staff generally will provide only one table detailing the estimated change in burden by income of taxpayers. Such a table addresses many of the questions that one asks of distributional analysis. A standard table also permits policymakers to compare alternative proposals.

[157] For a discussion of the JCT staff's individual tax model, see, Joint Committee on Taxation, *Discussion of Revenue Estimation Methodology and Process*.

C. Distribution Breakpoints

JCT distribution analyses present the revenue and tax burden effects of proposed tax policies on taxpaying units organized according to nominal classes of the expanded income. The upper bounds of these classes are referred to as breakpoints. The breakpoints define nominal income classifications that do not represent constant values of real income; they are not indexed for inflation. An individual whose income has risen only enough to keep up with the cost of living, then, may find that his income has moved up from one income class to another even though the purchasing power of his income did not increase.

An examination of changes in tax liabilities according to income deciles[158] may tell a different story than a review of income classes bounded by absolute dollar amounts. The top decile covers a wider range of income than the top income class in a JCT distribution table, because, as shown in Tables 11 and 12 on the next page, the top decile begins at $76,842. The top income class begins at $200,000 and contains only 1.1 percent of the taxpaying population. Similarly, the bottom decile covers a much narrower range than the bottom income class; 20 percent of the population will earn less than $12,241 in 1993.

Decile distributions may convey more information than nominal income distributions, because the same number of entities are represented in each class. Comparisons of standardized groups may be more meaningful than comparisons of groups whose size relative to the population is unknown. As indicated in the table, one can see that the bottom 10 percent of the population earns only one percent of total expanded income. Similarly, the wealthiest 10 percent of the population has 36 percent of expanded income. It is also important to have some idea about the relative number of persons who benefit from tax reductions and the relative number who experience increases in their tax burdens. A decile distribution provides this information at a glance.

[158] A decile includes 10 percent of the taxpaying units in the population. The first decile encompasses the poorest 10 percent of the taxpaying population, while the tenth decile includes the wealthiest 10 percent of the taxpaying population.

Table 11.-Decile Distributions, 1993

Expanded Income Decile	Breakpoint	Total dollars	Distribution of dollars (percent)	Population distribution (percent)
1st	$7,482	$46,890	1.0	10
2nd	$12,241	$115,061	2.4	10
3rd	$16,888	$166,846	3.5	10
4th	$22,184	$224,615	4.8	10
5th	$28,183	$288,461	6.1	10
6th	$35,578	$366,507	7.8	10
7th	$44,637	$460,435	9.8	10
8th	$56,900	$580,770	12.4	10
9th	$76,842	$758,261	16.1	10
10th	****	$1,693,812	36.0	10
Total		$4,701,659	100	100

Table 12.-Nominal Income Distributions, 1993

Expanded Income Class	Breakpoint	Total dollars	Distribution of dollars (percent)	Population distribution (percent)
1st	$10,000	$95,352	2	14.8
2nd	$20,000	$360,566	7.7	21.2
3rd	$30,000	$472,585	10.1	16.6
4th	$40,000	$504,888	10.7	12.6
5th	$50,000	$502,030	10.7	9.7
6th	$75,000	$1,014,230	21.6	14.4
7th	$100,000	$551,777	11.7	5.6
8th	$200,000	$594,178	12.6	4.0
9th	****	$606,053	12.9	1.1
Total		$4,701,659	100	100

Decile distributions provide useful information about the general distribution of income and the tax burden, but the JCT staff does not usually use them because they do not provide specific information for individual taxpayers. Taxpayers are familiar with their incomes, but not the decile in which their incomes place them. When faced with a distribution table based on income deciles, most persons would not know where they are located in the table. People do know exactly where they are in a distribution table in which breakpoints are expressed in dollars.

D. Misreported Tax Liability

Data sets that rely upon individual voluntary responses are subject to reporting inaccuracies. For the tax return data that the JCT staff relies upon, this takes the form of incorrectly reported income, deduction, and adjustment amounts. The most extreme form of misreported tax information occurs when a taxpayer who is required to file fails to file a return. The IRS estimates that as many as 10 million taxpayers, with a total tax liability of nearly $120 billion, may not be filing tax returns.[159] While some nonfiling may occur unintentionally because of a misunderstanding of the tax treatment of a particular source of income, there are taxpayers with substantial amounts of taxable income that are deliberately not filing tax returns. Moreover, some of these persons have not filed tax returns for many years and fear reentry into the tax return filing system because of liability for back interest, penalties, and possible criminal prosecution. At the present time, the JCT staff does not know the distribution of illegitimate non-filers, although efforts are underway by the IRS to assess the number and magnitude of the underreported tax liability attributable to these individuals.

Among taxpayers who file tax returns, misreporting tax liability is due to either unintentional error, tax evasion, or some combination of both. Unintentional errors are much more common on individual tax returns that are self-prepared than on returns prepared by third-party tax professionals.[160] By their very nature, unintentional errors result in both overreporting of liability, as in the case of a taxpayer who reports tax-exempt income as taxable, and underreporting of amounts, as in the case of taxpayers who fail to report unemployment compensation because in the recent past it was not taxable.[161] Moreover, for some taxpayers, unintentional errors could result in overreporting of tax liability.[162] While the JCT staff does not know the distribution of unintentional errors, they

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[159] Comments by Carol Stender, Chief of the Examination Division in the Boston District, on November 20,1992, at the IRS District Director's Third Annual Open forum sponsored by Bentley College Center for Tax Studies.

[160] See Michael Udell, "The Effect of Tax Preparers on Individual Income Tax Evasion" unpublished manuscript.

[161] The distinction between unintentional underreporting of liability and tax evasion might appear to be tenuous. However, the policy prescriptions that address these situations are very different. Taxpayer services are largely ineffective against intentional tax evasion while enforcement actions that are effective towards deterring would-be tax evaders are ineffective towards alleviating taxpayer confusion.

[162] Some observers have noted that taxpayers who are uncertain of their true tax liability would tend to overstate their liability to avoid penalties from understatements. See Suzanne Scotchmer, "Who Profits from Taxpayer Confusion?," *Economics Letters*, 29, 1989.

are likely to be concentrated among the middle-income and lower-income returns for which self preparation is the norm.

Unlike unintentional errors, which predominantly occur on individual tax returns, tax evasion occurs in substantial amounts on both individual and corporate tax returns. The IRS has estimated that as much as $91 billion of individual income tax liability and $19 billion of corporate income tax liability will not be paid for tax year 1992.[163]

If the JCT staff were to include tax evasion in the income classifier, it would enter chiefly through underreported income.[164] For individual taxpayers, underreported income arises mostly from cash transactions associated with skilled and professional workers whom "moonlight," and proprietors who maintain inadequate record keeping. It is very difficult to detect income derived in this fashion.[165] The JCT staff does not distribute underreported income to individuals mainly because existing estimates of underrreproted income from cash transactions and from "moonlighting" activities are quite poor.

Determining the extent of tax evasion on corporate returns is more difficult than on individual returns because the data on corporate tax evasion are poor. The JCT staff's only source of information on tax evasion for the more than 52,000 corporations with assets greater than $10 million is IRS operational audits. These audits cover limited sections of a tax return. Any evasion on unaudited sections of the return will not be detected.[166] Furthermore, discrepancies uncovered by an audit may not represent evasion by a corporate taxpayer. There is less agreement among taxpayers, the IRS, and the courts on the interpretation of sections of the tax code relating to corporations than for those related to individuals. Such disagreements may reflect the vagueness of the tax code as much as they do deliberate attempts at tax evasion. Because of the uncertainty as to the sources of corporate tax evasion, the JCT staff does not take account of corporate tax evasion in its distributional analyses. However, because the majority of shareholders of corporate stock are upper income taxpayers, the failure to account for undetected corporate tax evasion tends to understate their income.[167]

E. Foreign and Sub-Federal Taxes

The distributional analyses produced by the JCT staff do not include tax burdens imposed on taxpayers by State, local, and foreign governments. The consequences of these omissions are discussed below.

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[163] See "Income Tax Compliance Research: Net Tax Gap and Remittance Gap Estimates," Reasearch Division, Internal Revenue Service; Publication 1415; 1990.

[164] To the extent that income is underreported, expanded income understates economic income.

[165] These sources of income are typical for legal sector activities. Income from the illegal sector including drugs, gambling, and prostitution activities are even more difficult to ascertain, both in magnitude and distribution.

[166] For corporations with assets less than $10 million, and for individual taxpayers, the Taxpayer Compliance Measurement Program of the IRS provides detailed estimates of tax evasion for each line item of the tax return.

[167] Corporate tax evasion that is not detected may still be accounted for in the firm's retained earnings. The undetected evasion may lower a firm's cost of capital. The shareholders are the beneficiaries of this evasion, even though they will not realize the gains from evasion as income until they sell their shares of corporate stock.

The significant variation across the United States in taxes imposed by State and local governments suggests that inclusion of these taxes paid in distributional analyses might influence results. In particular, many States and localities fully or partially "piggyback" on the Federal definition of taxable income for corporations and individuals, so that taxpayers residing in those jurisdictions may feel direct effects from changes in the income tax bases made at the Federal level.

Proposals affecting the availability of State and local bonds provide additional examples of cases where important effects would not be captured by looking solely at Federal tax burdens. Restriction or enhancement of tax-exempt bond availability would have complex effects depending on taxpayer residency, and such effects would not be captured by statistics on Federal tax burdens.

As noted above in Part IV, for income classification purposes, the JCT staff attributes certain items of foreign-source income to United States persons. This income stems from investment, the renting of assets, or the provision of labor services abroad. In addition, the United States Federal income taxes levied on such income, to the extent not offset by the foreign tax credits granted by the United States, are included in the distributional tables. However, the foreign taxes levied on such income generally are not included in the distributional tables, thus potentially misstating the overall tax burden on foreign-source income. For example, if United States tax on an item of foreign source income is offset by the foreign tax credit, then the beneficiary of this credit may appear to be relatively lightly taxed in the JCT distributional table, even though the overall tax (United States plus foreign) applied to this item may equal or surpass the tax applied to similar domestic-source items.

Several factors motivate the omission of foreign and sub-Federal tax burdens from the distributional tables. First, there are problems in obtaining data needed to distribute such burdens, particularly with respect to State and local tax payments. Federal taxpayers are not required to provide detailed information about State and local tax payments with their Federal returns. Data availability is not as much a problem with foreign source income, because taxpayers seeking foreign tax credits must provide information on foreign tax payments. However, there are still some data problems with respect to foreign source income: for example, taxpayers who qualify for the foreign earned income exclusion under section 911 of the Internal Revenue Code do not have to provide detail on foreign taxes they paid on the excluded income, making this burden difficult to ascertain.

A second reason for omitting non-Federal tax burdens is that the purposes for, and the analytical interest in, these taxes distinguish them from Federal taxes. For example, State and local taxes may be levied to fund programs providing more localized benefits than Federal taxes, so one may want to separate these tax burdens because they fund different benefit packages.[168] It is also possible that certain taxes levied on United States investors by foreign gov-

[168] A normative discussion of this issue is provided in Richard A. and Peggy B. Musgrave, *Public Finance in Theory and Practice* (New York: McGraw-Hill), Fifth Edition, 1989, Part Six.

ernments are offset by specific economic benefits granted by the foreign governments.[169]

More generally, the distributional tables produced by the JCT staff have been evaluated usually from a distinctly Federal perspective. The inclusion of non-Federal tax burdens would distort this perspective. Therefore, while non-Federal tax burdens may be of interest for particular proposals and questions, these burdens will not be presented in the standard format.

[169] Background on this issue can be found in Treasury Regulation section 1.901-2A.

APPENDICES

Appendix A: Annuitization of Burden/Benefit Streams Over Time

Assume that starting in the present year (year 0), an individual receives a benefit of x_0. In the four years after this the benefit is x_i, for i = 1,2,3,4. Then with an interest rate of r, the present value of this five-year stream is

$$V = \sum_{i=0}^{4} \frac{x_i}{(1+r)^i} \ . \qquad (1)$$

With no growth in the economy, the equivalent annuity to this stream of benefits is that single value y, payable in each year, which solves the equation

$$\sum_{i=0}^{4} \frac{y}{(1+r)^i} = y \sum_{i=0}^{4} \frac{1}{(1+r)^i} = V \ . \qquad (2)$$

Now consider the case when the economy is growing at a rate g per annum. A growth adjusted annuity stream is now used to characterize benefits which occur over time. This is a stream of benefits that can be written as y, $y(1+g)$, $y(1+g)^2$, $y(1+g)^3$, $y(1+g)^4$. That is, it is just like a normal annuity, except that it grows at the rate g over time. The growth adjusted annuity stream corresponding to the original benefit stream x_i, i = 0,1,2,3,4, is therefore calculated by finding the value y which solves the equation

$$\sum_{i=0}^{4} \frac{y(1+g)^i}{(1+r)^i} = y \sum_{i=0}^{4} \frac{(1+g)^i}{(1+r)^i} = V \ . \qquad (3)$$

This methodology can be applied to the examples discussed in the pamphlet. The first example in the text (page 34) is of a permanent cut in marginal tax rates that reduces an individual's burden by $100 in the current year. Due to the growth of the economy, this benefit increases over the next five years at a rate of g = 0.05 (i.e., five percent) , to give the stream $100, $105, $110, $116, $122 . In

terms of the notation introduced above, $x_0 = 100$, and $x_i = x_0(1+g)^i$ for i = 1,2,3,4. From equation (3), it can then be seen that y satisfies

$$y\sum_{i=0}^{4}\frac{(1+g)^i}{(1+r)^i} = x_0\sum_{i=0}^{4}\frac{(1+g)^i}{(1+r)^i} \quad . \tag{4}$$

This clearly implies that y = 100 , and the growth of this value over the five years at a rate of five percent gives the growth adjusted annuity stream \$100, \$105, \$110, \$116, \$122 (which is identical to the original stream of benefits).

The second example in the text (page 35) is of a temporary reduction in taxes. The stream of benefits resulting from this provision is \$100, \$0, \$0, \$0, \$0, the present value of which is just V = 100. The annuity value is y = \$22, which is again found by solving equation (3), and the growth adjusted annuity stream is \$22, \$23, \$24, \$25, \$26.

Finally, the third example in the text (page 35) considers the benefit of the same tax cut which is postponed until year 4 (i.e. 1997 if the current year is 1993). The benefit in year 4 of this tax cut is \$122. Thus the stream of benefits in the five-year window is \$0, \$0, \$0, \$0, \$122. The present value of this stream is \$83, and the annuity value y = \$18 is calculated once more by solving equation (3). The growth adjusted annuity stream is then \$18, \$19, \$20, \$21, \$22.

Appendix B: Equivalence of a Broad-Based Consumption Tax and a Tax on Wages and Old Capital

The equivalence of a broad-based consumption tax and a tax on wages and old capital is outlined. In any single year gross income Y, can be channelled into either consumption, C, or gross savings, S.[170] This means that consumption in any year is equal to the difference between gross income and gross savings. Since gross income is made up of wages plus gross capital income, consumption is identical to wages plus gross capital income less gross savings. That is,

$$\begin{aligned} C &= Y - S \\ &= w + rK - S \end{aligned} \tag{1}$$

Equation (1) shows that a tax on consumption is equal to a tax on income with a one-time deduction for savings. Now a tax on savings, tS , has the same effect, in terms of present values, as a tax on the returns to those savings. This can be seen by noting that the discounted sum of a tax on future returns is

$$\begin{aligned} A &= trS + \frac{trS}{(1+r)} + \frac{trS}{(1+r)^2} + \frac{trS}{(1+r)^3} + \ldots \\ &= trS\frac{1}{r} \\ &= tS \end{aligned} \tag{2}$$

which is just equal to a the same tax on the initial savings. Therefore, a one-time deduction for savings, which saves an individual tS in taxes at the time the savings are made, is equivalent to no deduction and exemption from tax of future earnings on these savings, which saves the individual trS in each subsequent year. Thus, a consumption tax is also equal to a tax on all income except for income from savings, with no deduction given for savings when they are made. That is, a tax base equal to

[170] Gross saving is the net addition to the capital stock plus depreciation, while net saving is the net addition to the capital stock from the previous year.

$$w + r(K - S) = w + rK_0 \qquad (3)$$

yields identical economic effects to one based on consumption, where K is the capital stock, S is the amount of new saving since the introduction of the tax, and K_0 is the capital stock existing at the time the tax is introduced.

As mentioned in the text, the consumption tax is equivalent to a business transfer tax. The BTT allows full expensing for new investment, but taxes all future returns. It also does not allow a deduction for wages, which are thus taxed.[171] The equivalence is clear from the discussion above, but that simple exposition disguises some more subtle arguments. In particular, taxes paid under a personal consumption tax and a BTT may differ for an individual in a given year, but the economic burden faced will be equivalent.

First it is shown that while the total annual tax payments under a consumption tax and a BTT are identical, the tax payments will differ for individual taxpayers. The aggregate cash flow (gross receipts less gross investment and costs) of firms depends on the level of net investment which, in a closed economy, is equal to the aggregate level of savings. But these savings can be distributed across individuals in different ways. For instance, an individual in mid-career may be saving for retirement, while an elderly person may be dissaving. The BTT is paid by individuals in proportion to their wages received and asset holdings.[172] However, under a tax based on personal consumption, individuals pay tax based on their wages and the change in their asset holdings, i.e., on their personal cash flow. For example, for individuals with the same wages and levels of asset holdings, those with high current savings pay less tax than those with high current consumption under the consumption tax, whereas both types of individuals pay the same tax under a BTT.

This discrepancy between taxes paid by individuals in a given year under the alternative tax structures is illustrated by the following example. Suppose there are two individuals with incomes Y_1 and Y_2, consumption c_1 and c_2, capital holdings k_1 and k_2, and savings s_1 and s_2 in a particular period. All capital, k, is held in firms, so the only way to save is to purchase shares in businesses (so k_1 and k_2 represent shares in firms). The individuals face the following budget constraints: $c_1 = w_1 + rk_1 - S_1$ and $c_2 = w_2 + rk_2 - S_2$, where rk is the dividend received on capital shares (and r is the same for all firms).

To see that a BTT and a consumption tax impose different tax payment obligations on different individuals in a given period, suppose that net cash-flow is zero, so that aggregate saving (which equals aggregate investment in a closed economy), is rk.[173] Also as-

[171] The BTT is therefore equivalent to a tax on wages and business cash-flow.

[172] If all businesses are subject to the tax, then all wages are taxed at the business level. The real incidence of the tax on wages is the independent of its statutory incidence.

[173] The net cash-flow of a firm is equal to its gross receipts less wages, investment expenses, and other costs. Gross receipts less wages and other costs is just the return to capital, which,

Continued

sume that the consumption of individual 1 is greater than her income—she dissaves by selling σ shares to individual 2. That is,

$$S = s_1 + s_2 = rk \quad , \text{ with } \quad s_1 = rk_1 - \sigma \quad \text{and} \quad s_2 = rk_2 + \sigma. \qquad (4)$$

Then the business cash-flow tax is zero, and each individual just pays a wage tax of tw. However, under the consumption tax, individual 1 pays tax equal to $t(w_1 + \sigma)$ and individual 2 pays tax equal to $t(w_2 - \sigma)$. If wages are equal, individual 1 (who dissaves) is liable for more tax in the period.

However, tax liability and tax burden are not equivalent. In this case, tax liability differs from tax burden because future tax liabilities can be shifted onto current asset holders. This is an example of the capitalization of a tax, also discussed in Part II.D. The description of asset trades in the example did not make explicit reference to prices. When a firm finally distributes its assets to shareholders (negative investment), its recorded cash-flow will be positive (assuming that the final act is not one of paying off debts). Under the wage plus business cash-flow tax, this stream will be taxed. Each shareholder at this time will receive $(1-t) of consumption for every dollar of shares owned.

When individuals trade shares, they will anticipate this future tax liability. In particular, the price of a $1 share will decrease to $(1-t) , so if individual 1 sells σ shares to individual 2, this will generate $\sigma(1-t) of consumption. That is, under the wage plus business cash-flow tax, the consumption of individual 1 will be

$$c_1 = (1-t)w_1 + (1-t)\sigma. \qquad (5)$$

However, under a consumption tax, the price individual 1 gets for a $1-share is $1, so under a consumption tax, her after-tax consumption is

$$c_1 = (1-t)(w_1 + \sigma). \qquad (6)$$

which is identical to that under the wage plus business cash-flow tax. Thus, while tax payments may be different for an individual in a particular time period under the different tax regimes, in each period the different tax structures have identical economic effects and impose identical real economic burdens.

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if net cash-flow is zero, is fully reinvested in the firm. Note, it is assumed here that there are no other existing taxes.

Appendix C: Diagrammatic Exposition of Burden in the Presence of an Externality

Environmental taxes are designed to reduce or eliminate the social welfare loss that arises from externalities.[174] These points can be illustrated using Figure 7 on the next page. Figure 7 is identical to Figures 1 and 3 in Part II.B.; above. Assume the production of gadgets produces a negative externality (e.g., air pollution). In Figure 7 SUPPLY′ represents the full social costs of production, including the value of the externality. SUPPLY represents the producers' private cost of production. That is, the cost of the externality equals the vertical distance between the curves SUPPLY and SUPPLY′. Economists argue that society's resources are used most efficiently if the level of production and consumption occurs at the level where demand equals supply, accounting for full social costs, at quantity Q-X in Figure 7. The private market outcome of Q, which incorporates only the private costs, not social costs, represents too many gadgets sold at prices less than their full social cost. The loss to society from this extra production can be measured as the difference between SUPPLY′ (full social cost) and the demand curve, the triangle BHE in Figure 7. Triangle BHE represents the same area as triangle BEC. If a tax were imposed to reduce production and consumption to Q-X and the existence of the externality were ignored, the analysis presented in Part II.B (in Figures 3 and 4) would overstate the burden of the tax as elimination of the existing social loss would be ignored. In addition, the social benefits from reduced production and consumption may accrue to individuals other than producers or consumers of the good subject to tax.

[174] For a discussion of externalities and environmental taxes as a policy prescription see Harvey S. Rosen, *Public Finance*, or Anthony B. Atkinson and Joseph E. Stiglitz, *Lectures on Public Economics*, (New York: McGraw-Hill) 1980. For an analysis of specific proposals to enact environmental excise taxes, see Joint Committee on Taxation, *Description of H.R. 2922 ("Lead-Based Paint Hazard Abatement Act"* (JCX-26-92), June 30, 1992, and Joint Committee on Taxation, *Description of H.R. 2497 (Sulfur and Nitrogen Emissions Tax Act of 1987)* (JCS-20-87), August 31, 1987.

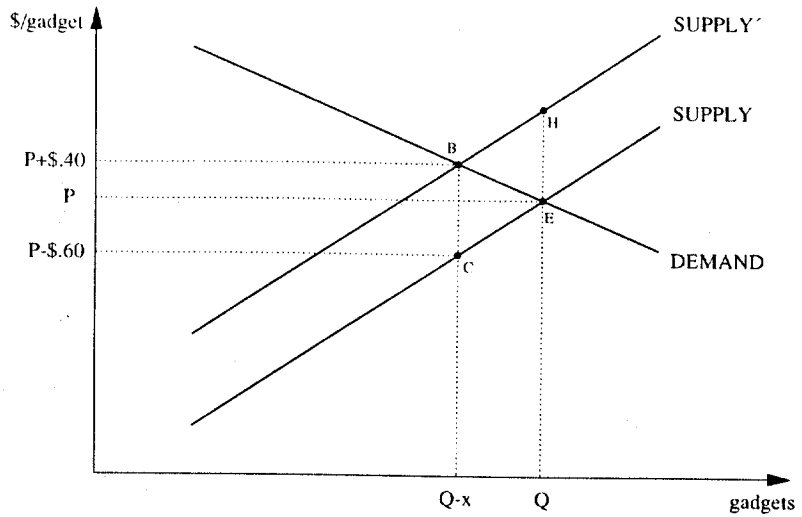

FIGURE 7

Appendix D: Distribution of Taxpayers by Filing Status and by Income

Table D.1 shows the JCT staff's projection for 1993 of the number of tax filing units distributed by filing status and by income.

Table D.1.- - Distribution of Returns by Filing Status, 1993

Expanded Income Class (1)	All Returns		Joint Returns		Nonjoint Returns	
	Number of Returns	Percent Distribution	Number of Returns	Percent Distribution	Number of Returns	Percent Distribution
	Thousand	Percent	Thousand	Percent	Thousand	Percent
Less than $10,000	17,070	14.81%	1,973	3.69%	15,097	24.43%
10,000 to 20,000	24,400	21.17%	5,358	10.03%	19,042	30.81%
20,000 to 30,000	19,128	16.60%	6,691	12.52%	12,437	20.13%
30,000 to 40,000	14,504	12.59%	7,532	14.09%	6,973	11.28%
40,000 to 50,000	11,205	9.72%	7,197	13.47%	4,008	6.49%
50,000 to 75,000	16,643	14.44%	13,556	25.36%	3,087	5.00%
75,000 to 100,000	6,450	5.60%	5,832	10.91%	618	1.00%
100,000 to 200,000	4,608	4.00%	4,218	7.89%	390	0.63%
200,000 and over	1,234	1.07%	1,089	2.04%	145	0.23%
Total, All Taxpayers	**115,242**	**100.00%**	**53,446**	**100.00%**	**61,797**	**100.00%**

Source: Joint Committee on Taxation

(1) The income concept used to place tax returns into income categories is adjusted gross income (AGI) plus: [1] tax-exempt interest, [2] employer contributions for health plans and life insurance, [3] employer share of FICA tax, [4] workers' compensation, [5] nontaxable social security benefits, [6] insurance value of Medicare benefits, and [7] corporate income tax liability attributed to stockholders, [8] alternative minimum tax preference items, and [9] excluded income of U.S. citizens living abroad.

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