DISTRIBUTIONAL IMPLICATIONS OF INTRODUCING A BROAD-BASED CONSUMPTION TAX

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EXECUTIVE SUMMARY

As a tax base, "consumption" is sometimes argued to be less fair than "income" because the benefits of not taxing capital income accrue to high-income households. We argue that, despite the common perception that consumption taxation eliminates all taxes on capital income, consumption and income taxes actually treat similarly much of what is commonly called capital income. Indeed, relative to an income tax, a consumption tax exempts only the tax on the opportunity cost of capital. In contrast to a pure income tax, a consumption tax replaces capital depreciation with capital expensing. This change eliminates the tax on the opportunity cost of capital, but does not change, relative to the income tax, the tax treatment of capital income arising from a risk premium, inframarginal profit, or luck. Because these components of capital income are more heavily skewed toward the top of the distribution of economic well-being, a consumption tax is more progressive than would be estimated under conventional distributional assumptions. We prepare distribution tables and demonstrate that this modification is quantitatively important.

1. INTRODUCTION

Critics often claim that, as a tax base, "consumption" is less fair than "income" because the benefits of not taxing capital income accrue to high-income households. As is often noted, this claim depends critically on the time frame for analyzing fairness; consumption

taxes may be less regressive from a lifetime perspective than an annual perspective (see, e.g., Davies, St. Hilaire, and Whalley, 1984; Poterba, 1989; and Fullerton and Rogers, 1993).

In this paper, we argue that, despite the common perception that consumption taxation eliminates all taxes on capital income, consumption and income taxes actually treat similarly much of what is commonly called "capital income." In fact, not all of what is commonly called capital income escapes the consumption tax. In principle, one can decompose capital income into four components (see also Bradford, 1995): (1) the opportunity cost of capital (the return to waiting); (2) the expected risk premium for investing (the return to risk-taking); (3) inframarginal returns to investing (what economists call "economic profit"), and (4) a remainder that reflects realizations differing from expectation. For most investments, the income tax base--but not the consumption tax base--includes the first component of capital income; both tax bases treat similarly the last three components of capital income. Relative to an income tax, a consumption tax exempts only the tax on the opportunity cost of capital.

Moving from the current U.S. tax base to a broad-based consumption tax base encompasses two reforms: (1) a move from the current income tax to a broad-based income tax with uniform capital taxation, and (2) a switch from this pure income tax base to a consumption tax base. Short-run and long-run distributional consequences of moving from the current tax system to a consumption tax may differ in significant ways. In the short-run, eliminating differential capital taxation would affect asset prices favoring currently heavily-taxed assets (e.g., corporate capital) over lightly-taxed assets (e.g., housing). The short-run effects of switching from an income base to a consumption base may depend heavily on transition rules. The short-run distributional consequences of changes in asset prices depend critically on the current pattern of wealth holding in the economy and the horizon over which different people plan to hold their wealth.

In the long run, moving from the current income tax to an income tax with uniform capital taxation does not necessarily change the average level of capital taxation. However, depending on general equilibrium effects, it may favor households that prefer goods produced with currently heavily-taxed assets. The second reform--switching from an income tax with uniform capital taxation to a consumption tax--reduces the taxation of capital income. The long-run distributional effects of this change depend on how after-tax rates of return change and, because not all components of capital income benefit from tax reform, the distribution of the different components of capital income. A key question for long-run distributional analysis is which savers get the opportunity cost of capital as their rate of return and which savers receive higher returns. For example, for a given level of wealth, investors whose returns mainly consist of the opportunity cost of capital would benefit more than investors whose returns include returns to risk-taking or economic rents. In addition, as a prototype for reform, the flatness of the Flat Tax of Hall and Rabushka (1983,1995)[1] affects the distribution of after-tax earnings; however, these effects are not specific to consumption taxes.

We identify basic sources of distributional change from fundamental tax reform and offer descriptive statistics on the relative magnitudes of these different sources. Our principal findings are three. First, the substantial observed heterogeneity in household portfolios implies that eliminating differential capital taxation will differentially affect households; data from the Federal Reserve's Survey of Consumer Finances suggest that even though middle-income and middle-net-worth households would bear some losses to the extent that house values decline, overall losses in asset values are concentrated among high-income and high-net-worth households. Second, we show that holdings of assets most easily identified with inframarginal returns (active businesses) are highly concentrated among high-income and high-net-worth households. This result suggests a more progressive distribution of the tax change than that generated under the assumption that all capital income represents opportunity cost. Our distributional analysis suggests that this qualification is quantitatively important. Third, regarding the short-run impact of switching tax bases, transition losses associated with holding basis in existing assets are concentrated among high-income and high-net-worth households.

The paper is organized as follows. In the next section, we compare the taxation of capital under a pure income tax base and a pure consumption tax. The following section identifies the basic factors that determine the short-run and long-run distributional consequences. We then examine the key incidence questions for eliminating differential capital taxation followed by a discussion of the winners and losers in the long run and in the short run from this reform. We then use recent data on household asset holdings to suggest patterns of incidence of the consumption tax relative to the income tax. Finally, we use this information to guide the preparation of conventional "distribution tables." The last section concludes.

2. COMPARISON OF UNIFORM PURE INCOME AND CONSUMPTION TAXES

2.1 What Are Income and Consumption Taxes?

It is useful to begin by comparing two hypothetical taxes: a pure uniform-rate income tax and a subtraction-method value-added tax (or combination of a wage tax and a business cash flow tax at the same rate). A pure uniform-rate income tax has a base that includes all forms of labor and capital income and a flat rate. This system would tax corporate and non-corporate capital at the same total tax rate. One way to implement such an income tax would be to combine a business-level tax (for both corporate and non-corporate firms) on receipts less wages, materials costs, and capital depreciation with a household-level tax on wages. For simplicity, suppose that business and household taxes are imposed at a flat rate; the two tax rates are the same; no tax-favored ways of holding wealth are available; and the economy is closed to capital flows. Abstracting from risk considerations (see the discussion in section 2.4), the revised income tax system, then, has three components: (1) a wage tax, (2) a tax on returns from marginal investment projects, and (3) a cash flow tax on returns from existing capital and inframarginal investment projects. Within the context of broad-based income tax reform, the U.S.

Treasury Department's (1992) Comprehensive Business Income Tax (CBIT) proposal generally followed this model.

In a subtraction-method value-added tax (VAT), each business has a tax base equal to the difference between receipts from sales of goods and services and purchases of goods and services from other businesses. This measure of value added is then taxed at a fixed tax rate. Transactions among businesses generate offsetting increases in the tax base of sellers and decreases in the tax base of buyers, so that no net revenue accrues to the government. Net revenue arises when goods are sold by a business to a non-business entity, generally households. Because the aggregate business tax base equals the aggregate sales by businesses to non-businesses, the tax base is equivalent to aggregate consumption. As long as tax rates are uniform, this subtraction-method value-added tax is equivalent to the familiar European-style credit invoice value-added tax.

For a uniform tax, we could equivalently allow a deduction for wages at the business level with wage taxation at the same rate for individuals (as in the Hall-Rabushka Flat Tax). Thus the subtraction-method VAT can be thought of as a combination of a wage tax and a tax on business cash flow. With this alternative means of administration, the consumption tax looks strikingly similar to the hypothetical income tax. The difference between the two taxes is that the income tax base depreciates capital expenditures but the consumption tax base deducts capital outlays.

2.2 Single Riskless Returns to Capital: What Is Taxed?

Traditional descriptions of the taxation of capital income under a cash flow tax or consumption tax assume that all income from capital is exempt.[2] To explain this view, assume that investment projects offer a single riskless rate of return. We can then decompose the base of the Flat Tax into two parts: the first is a business cash flow tax whose base is R I, where R is receipts from sales of goods and services less purchases for labor, raw materials, and services, and I is expenditure on capital goods.[3] The second is a wage tax, whose base is wages, W. (The subtraction-method VAT combines the two pieces, with a base equal to $R + W - I$.) While the wage tax burden is borne by labor, how should we think about the burden of the cash flow tax?

Under the cash flow tax, the user cost of capital is independent of tax parameters. In this case, the present value of one dollar's worth of depreciation deductions is one dollar, while the present value is less than one dollar under the income tax. The present value of depreciation allowances depends on the depreciation schedule prescribed by the tax code for the firm's assets and the discount rate which the firm uses to discount the future tax savings from the depreciation allowances. Hypothetically, depreciation schedules reflect the useful life of different assets. For the case of a riskless investment project, the tax savings from depreciation allowances represent riskless cash flows which the firm would discount at the safe (nominal) rate of interest.

For a marginal investment--one in which the expected rate of return just equals the interest rate--the upfront subsidy to investment provided by expensing just equals the

expected future tax payments. In this sense, the return to capital is not taxed under the cash flow tax (or, equivalently, under the consumption tax).

2.3 Inframarginal Returns: What Is Taxed?

The foregoing example assumed a single riskless return available on investment projects. Now suppose that, in addition to having access to riskless investments, certain entrepreneurs have access to investments with inframarginal returns. Such returns are associated with rents to ideas, managerial skill, or market power. By construction, the scale of these projects or opportunities is limited.

Extending the first example, what is taxed are rates of cash flow in excess of the firm's discount rate for depreciation allowances (the riskless rate of return under our hypothetical tax systems). Cash flows representing inframarginal returns are taxed equivalently under the broad-based income tax and the cash flow tax (or consumption tax). As long as the scale of inframarginal projects is limited and entrepreneurs' project selection is optimal,[4] the tax savings from expensing should be invested in another riskless asset. For the case of inframarginal projects, then, only the component of the return representing the riskless rate is untaxed under the cash flow tax (or consumption tax).

2.4 Risky Investments: What Is Taxed?

Thus far, we have abstracted from risk in project returns. Introducing risk adds two complications. First, risky investments have a higher ex ante required rate of return than riskless investments, reflecting a risk premium to compensate savers for bearing risk. Second, risky investments generate ex post high or low returns to investing. When we look at the distribution of capital income across households, some variation reflects this ex post good or bad fortune. The component of capital income that represents luck after a risky investment decision has been made can be treated like the inframarginal return in our hypothetical income tax and cash flow tax. Ex post returns in excess of the ex ante expected return are taxed under both the income tax and the cash flow tax; assuming similar loss offset provisions, low ex post returns also generate the same tax consequences under the two systems.

Whether either tax system levies a tax on the ex ante risk premium depends upon how one defines a "tax." If a tax is defined as an increase in expected government revenues, then both the income tax and the cash flow tax include the ex ante risk premium; if, in contrast, a tax is an increase in the discounted present value of government revenues, then neither tax system includes the ex ante risk premium. This distinction is most easily seen for a cash flow tax with full loss offsets. By levying such a tax, the government shares equally in the costs and revenues of investment projects; this feature of the tax system leads to the anology of the government as a "silent partner" in the investment. Suppose that the government taxes two projects with the same costs but with different expected returns (because one project is riskier than the other). Neither project has expected inframarginal returns. As do private investors, the government would expect a higher

return on its investment (cost-sharing) in the riskier project. However, assuming that expected returns compensate for risk, the "market value" of this extra expected revenue would be zero because it compensates the government for the added riskiness of the revenue stream; that is, the government does not increase the discounted present value of its revenue by taxing pure risk.[5]

In contrast to the cash flow tax, an income tax provides depreciation allowances rather than expensing for capital purchases. This difference does not affect the treatment of the uncertainty about costs and revenues as long as the two tax systems have similar loss offset provisions. By providing depreciation allowances rather than expensing, the government pays a smaller share of the cost of investment projects because the investor recoups the government's "share" of the cost in the future rather than at the time of the outlay. The present value of the loss to the investor (and, conversely, the gain to the government) depends on how the tax savings from depreciation allowances should be discounted. Under the assumption of full loss offsets and constant tax rates under both tax systems, the government's promise of depreciation allowances gives the investor a safe, predictable cash flow which warrants discounting at the default-risk-free rate of return.

Our analysis is not really at odds with Kaplow's (1994) arguments that an income tax is equivalent to a wage tax plus an ex ante wealth tax and that a consumption tax is equivalent to a wage tax; the apparent difference arises from Kaplow's assumptions about the government's portfolio behavior.[6] Kaplow concludes that neither an income tax nor consumption tax taxes risk because the government offsets the effects of both taxes on the uncertainty of government revenue by decreasing its position in risky assets and increasing its position in safe assets. In Kaplow's model, the government can achieve the same effect as a tax on risk by in effect swapping safe assets for risky assets (which Kaplow argues is not a tax). Such a swap would increase the government's expected revenue (provided the expected return on risky assets exceeds the safe rate of return) but does not increase the current value of the government's portfolio (that is, the transaction generates a zero market value in an efficient financial market). In comparing a switch between the two tax systems--holding the tax rate constant--the government portfolio rebalancing of Kaplow's framework is unnecessary since both tax bases include the return to risk-taking.[7]

In either case, the key point for our analysis is that the stylized income and consumption tax bases treat both the ex ante and ex post components of the return to risk-taking similarly. Because traditional ex post distributional analysis includes the returns to risk-taking in household income and the consumption purchased from such returns (which is relevant, for example, for analyses that distribute consumption tax burdens in accordance with consumption), our distributional analysis assumes that the income and consumption tax bases include the returns to risk taking. That is, we allocate taxes based on the distribution of either expected or realized income.

This analysis suggests the income and consumption tax bases are similar with respect to the returns to risk-taking, while conventional treatments (e.g., Auerbach and Kotlikoff, 1987) claim that a consumption tax is equivalent to a wage tax plus a tax on the value of

old capital.[8] Relative to an analysis assuming a consumption tax is borne in proportion to wage income and ownership of "old" capital, the inclusion of the returns to risk-taking imply that households with relatively more risky assets will bear more of the consumption tax. If attitudes toward risk vary across income or wealth groups, then including the return to risk-taking in the consumption tax base can affect the distribution of taxes across income or net worth classes.

Putting our arguments together, what is often called the return to capital can be thought of as the sum of the riskless return (opportunity cost, or return to waiting), inframarginal returns (economic profits), or ex ante risk premium on risky investments (payment for beating risk) and ex post realizations on risky investments (luck). Unlike the consumption tax base, the income tax base includes the opportunity cost of capital, which equals the rate of return on a marginal riskless project. Assuming the consumption tax does not change the rate of return on investment, for investments with the same opportunity cost, the owner of the investment with a high rate of return will pay more in taxes than the owner of the investment with a lower rate of return. Because households that save benefit from eliminating the tax on the opportunity cost of capital, they benefit from this tax reform. However, because inframarginal returns to saving are still taxed, the distributional effects also depend on separating "opportunity cost" returns to saving from inframarginal returns and returns to risk-taking.

3. DISTRIBUTIONAL CONSEQUENCES OF SHIFTING THE TAX BASE FROM INCOME TO CONSUMPTION

3.1 Who Benefits in the Long Run?: Implications from a Life-Cycle Model

In replacing a pure income tax with a pure consumption tax, the long-run distributional effects depend on what happens to the amount that individuals save (and the timing of their saving) throughout their lifetime and to the after-tax return to saving. To fix ideas for the first issue, we use the familiar life-cycle model. In the simplest version with representative agents for each cohort and perfect lending and insurance markets, capital income is earned from the accumulated stock of savings, and saving occurs to finance future consumption for the individual. If the inter-temporal elasticity of substitution in consumption is high, a switch from an income tax to a consumption tax generates a large saving response, and the higher capital stock makes future generations better off (see, e.g., Auerbach and Kotlikoff, 1987). In a closed economy with uniform taxation of all capital income, this saving response is the only source of funds for increasing the capital stock.

The simplest life-cycle story is not easily transferred to the distributional analysis considered by tax policymakers, who are concerned as much with intragenerational as intergenerational comparisons of economic well-being. This concerns does not imply that the life-cycle model's guidance is not useful, however. An expanded life-cycle framework can consider several major sources of heterogeneity in household saving propensities. These sources include differences in the level of lifetime income, the timing of the receipt

of income, and differences in households' terms of trade in lending and insurance markets (see, e.g., Fullerton and Rogers, 1993, and Hubbard, Skinner, and Zeldes, 1994, 1995).

3.2 Who Benefits or Loses in the Short Run?: Transition Issues

A major focus of political discussion of the incidence of a consumption tax relates to transitional redistributions accompanying a switch from an income tax to a consumption tax. In the life-cycle framework, part of the steady-state gain in welfare accompanying the tax reform is accounted for by a transition tax, borne disproportionately by the elderly in the conventional life-cycle setting. The elderly accumulate assets to finance retirement consumption under the income tax regime; now they must pay tax again on those funds as they are used to purchase goods and services. The extent to which the elderly bear this tax depends on the change in the after-tax price of consumption from switching tax bases. In part, the after-tax price of consumption depends on the general price level effects of tax reform which, in turn, may depend on the administration of tax reform. If the transition tax comes only from disallowing depreciation allowances and not from a one-time increase in the price level, then the elderly bear the tax only to the extent they own a disproportionately large share of that lose their depreciation allowances. There is another significant consideration, however: Consumption taxes offer higher expected future after-tax returns to saving. Hence, to the extent that the transition tax is borne by individuals with relatively long future consumption horizons, the consumption tax may make better off even households bearing the transition tax. However, decomposing capital income into its components suggests that the higher expected future (after-tax) returns to saving applies only to opportunity cost returns.

4. ELIMINATION OF THE DIFFERENTIAL TAXATION OF CAPITAL INCOME

The broad-based income tax assumed by the preceding section bears only a faint resemblance to the current U.S. tax system. An important difference between the two is the current system's differential taxation of capital income. Most prominent is the double taxation of equity financed corporate investment created by having a separate corporate income tax. Moreover, variation in the generosity of depreciation allowances across assets generates differences in the effective tax rates across investments. In addition to the corporate tax, many provisions of the individual tax code also produce differential taxation, such as differential tax rates on capital gains and dividends, the non-taxation of the implicit returns from consumer durables, exemption from tax of interest on state and local government bonds, and various provisions to encourage retirement saving.

While this differential taxation can affect the relative pretax returns to various investments, general equilibrium analysis suggests that it can also affect the overall return to saving. For example, the current U.S. income tax can be thought of as the combination of a wage tax, a tax on the capital income of bondholders and shareholders, and a surtax on capital income generated by equity capital invested in the corporate sector. It is reasonable to assign the burden of the wage tax to labor income and the burden of general capital income taxes to capital income. Since Harberger's (1962) seminal analysis, most

economists have argued that, under reasonable specifications of production technology and preferences, the corporation tax is borne by owners of capital in general, and not only by the shareholders of corporations.[9,10]

Again, a consumption tax is only one method of uniform capital income taxation. Such taxation can also be achieved by reforming the income tax system; for example, the Treasury Department's Comprehensive Business Income Tax (CBIT) proposal eliminated most of the main forms of differential capital taxation. Thus the distributional issues associated with eliminating differential taxation are not unique to a consumption tax but can apply to income tax reform.

5. DISTRIBUTIONAL CONSEQUENCES OF ELIMINATING DIFFERENTIAL CAPITAL TAXATION

5.1 Relative Winners and Losers in the Short Run

Starting with differential capital taxation instead of uniform capital taxation changes the distributional consequences of moving to a consumption tax if individuals do not hold the same portfolio of assets. If all individuals own the same assets, but the scale of portfolios depends on the level of saving, then the distributional implications of starting from differential capital taxation would be small. However, the composition of household portfolios varies considerably, so that eliminating differential capital taxation will not have uniform effects across households.

Moving from differential capital taxation to uniform capital taxation (including a consumption tax) would lower the price of currently tax favored assets relative to more heavily-taxed assets. Thus capitalizing effects of the reform, the prices of houses and tax-exempt bonds will fall relative to corporate equity, and investors with portfolios concentrated in these assets will suffer transitional losses. For equities, the consequences of eliminating the income tax depend on a number of considerations, as we describe in the Appendix (in which we review potential asset price effects of tax reform). For debt, the removal of the income tax will lead interest rates to be equated with the after-tax return on investment (adjusted for risk). Under the income tax, interest is deductible by business borrowers and taxed for recipients, leading the interest rate to be equated with the before-tax return on investment.

5.2 Relative Winners and Losers in the Long Run

To a large extent, the short-run incidence of eliminating differential capital taxation depends on the pattern of existing asset holdings. In the long run, however, asset prices and portfolio holdings will adjust to the new tax rules; thus the initial pattern of asset holdings (the sources of income) is irrelevant for long-run incidence. In contrast, the sources of income are relevant for the long-run incidence of moving from a pure income to a pure consumption tax. However, instead of being determined by the sources of income, the long-run distributional consequences of eliminating differential taxation depend on the uses of income. Does differential capital taxation change the relative prices

of consumption goods? If the answer is yes, then the distribution of the tax varies according to variation in consumers' preferences. If consumption bundles are relatively similar across households, then the long-run equity consequences of eliminating differential capital taxation would be small. As an example, consider how eliminating differential capital taxation affects housing. Because the reform is likely to raise the relative cost of housing (both owner-occupied and rental), households with a relative preference for housing would bear more of the long-run burden of tax reform than households that consume less housing.

In addition to these general equilibrium distributional effects, eliminating differential capital taxation can affect long-run progressivity by eliminating the incentives that investors have to engage in tax avoidance through adjusting the composition of assets in their portfolios. For example, under current tax rules, investors facing high tax rates have an incentive to invest in tax-favored assets, such as tax-exempt bonds. To the degree that investors respond to these incentives, such portfolio behavior can undermine the statutory progressivity embedded in graduated income tax rates.[11]

Differential taxation in the current tax system also provides some investors with opportunities to engage in "tax arbitrage." Tax arbitrage is accomplished by borrowing with tax-deductible interest payments to buy tax-favored assets. Examples include borrowing to finance deductible contributions to retirement savings and holding a larger-than-necessary mortgage on one's home (see, e.g., Scholz, 1994, and Engen and Gale, 1995). The extent to which households engage in tax arbitrage obviously varies considerably across households, with high-income households having the largest incentives to undertake this behavior by virtue of their higher marginal tax rates. To the extent that increased uniformity of the taxation of various capital-market transactions reduces the amount of tax motivated portfolio reshuffling and tax arbitrage, the move to a consumption tax will mitigate any inequities associated with differential use of these strategies. The simple story is that, by reducing the number of tax "loopholes," a consumption tax places a relatively high burden on households that would have used the loopholes. For example, to the extent that very high-income or high-net-worth households currently use available tax-minimizing strategies, the combination of the exemption of the opportunity cost of capital from taxation and the elimination of tax arbitrage under the consumption tax may even increase progressivity.

6. ROLE OF HOUSEHOLD PORTFOLIO COMPOSITION: EMPIRICAL ANALYSIS

The short-run gains and losses from tax reform depend on who bears any transition tax--the tax on pre-reform basis--and asset price effects from the reform. Hence the distribution of short-run gains and losses depends on the distribution of asset holdings and liabilities across the population. The pattern of asset holdings and liabilities is also important for the long-term distributional consequences of tax reform either if some assets are more likely than others to generate positive net present value or if differences in portfolio composition reflect heterogeneity in consumer preferences (e.g., a preference for housing). Also, current portfolio decisions affect the long-run distributional effects of

tax reform if household portfolios reflect different amounts of tax avoidance behavior that will be eliminated by tax reform.

As we noted earlier, households are likely to differ in their portfolio choices. We explore this heterogeneity in portfolio composition with data from the Federal Reserve's 1989 Survey of Consumer Finances (SCF), a sample of 3,143 households with an over representation of wealthy households.[12] We use sampling weights so our tables have estimates for the overall U.S. population. As an overview of household portfolio choices, Table 1 presents these summary statistics on household holdings of various assets (or liabilities): (1) the percentage of households with each asset; (2) the median and mean asset holding among households with each asset; and (3) the aggregate portfolio share (ratio of aggregate asset value for each asset to the value of total household assets). Our asset categories are: liquid assets, certificates of deposit (CDs), taxable bonds, tax-exempt bonds, direct holdings of corporate equity, mutual fund holdings of corporate equity, retirement accounts,[13] miscellaneous financial assets, primary residences, other real estate, active businesses (in which the household has an active management role), passive businesses (e.g., limited partnership interests), other real assets, mortgage debt, and other debt. These categories reflect differences among assets relevant for assessing the effects of tax reform.

The first column of Table 1 confirms the suspected heterogeneity of household portfolios. Only liquid assets, houses, and other real assets (primarily vehicles) appear in the portfolios of more than half of the households. Many of the other assets appear in the portfolios of a minority of households. For example, only ten percent of households have any active business assets and fewer than a fifth of households directly own corporate equity. The aggregate portfolio shares in the last column of Table 1 indicate that, even without accounting for defined benefit pension plans, a substantial portion of household wealth is held in currently tax-favored forms, such as housing (30.8 percent of the aggregate portfolio), retirement accounts (5.2 percent), and tax-exempt bonds (2.6 percent).

In Tables 2-4, we present the distribution of assets and liabilities across household groups by age, net worth, and current income. These tables provide information on how the short-run and long-run gains and losses from tax reform will be distributed across broad classes within the economy. While these tables provide information on intergenerational distribution or vertical equity, they are silent on possible horizontal equity differences within groups.

6.1 Distribution by Age Cohort

In Table 2, we classify households by the age of the head of household. The "young" group is the 30 percent of the population in which the head of household is 35 years old or younger. The "middle-aged" group has the 35 percent of the population in which the head of household is between the ages of 36 and 54. The "old" group of households has a head at least 55 years old. Knowledge of the distribution of current wealth holdings across age groups guides understanding the distribution of transition gains or losses from

tax reform because the transition effects depend on who owns which assets. By contrast, the distribution of assets by age is not very informative for understanding the long-run distributional implications of tax reform because, over a lifetime, everyone progresses through the age distribution.

The traditional life-cycle model suggests that older households bear most of the transition tax on existing wealth, because the model predicts that they own most of the current capital stock. In fact, households over age 55 own just over half (51.7 percent) of the total household net worth. Because much of the current wealth is held by households with heads under age 55, a large fraction of any transition tax on existing wealth may be offset by higher after-tax rates of return compounded until younger or middle-aged households dissave. Furthermore, for unrealized capital gains, moving to a consumption tax in the traditional life-cycle model would not create an extra tax burden since these gains would already be subject to the income tax; that is, the transition tax only applies to the tax basis of the assets. For active businesses and direct holdings of corporate equity, the elderly's share of tax basis is less than their share of asset value. Thus, not surprisingly, older households hold a larger fraction of untaxed accrued capital gains than other generations. If the price level does not change in response to tax reform, older households receive a disproportionately large share of this windfall depending on how much future tax would have been paid on these accrued gains.

In terms of the relative asset price effects across cohorts, older households own a disproportionately large share of financial assets. Hence the value of portfolios held by the elderly bear relatively more of the changes in financial asset prices than other age groups. Corporate equity values can change for two reasons: (1) the disallowance of expected depreciation allowances has a negative effect on the value of existing capital; and (2) the repeal of the double tax on corporate dividends could cause equity prices to increase. Depending on the relative magnitudes of these effects, the elderly could either gain or lose. For tax-exempt bonds, the elderly would bear the brunt of any negative asset price effects for tax exempt bonds. However, to translate these asset price effects into changes in consumption (as opposed to changes in either intended or unintended bequests), one must know whether investors plan to consume from the income produced by their portfolios or sell the assets for consumption. For example, if tax reform does not change the after-tax coupons from tax-exempt bonds, older households suffer a loss in after tax consumption only if they sell the bonds for a capital loss (assuming a small price level effect). In terms of housing, the middle-aged cohort owns 45 percent of housing value and 41 percent of housing equity (the difference generated by the elderly borrowing less than younger families); thus middle-aged households stand to lose the most from a decrease in the relative price of housing.

To summarize, Table 2 suggests that, even without specific rules designed to mitigate transition losses, transition losses from tax reform will not be concentrated solely on older households.

6.2 Distribution by Net Worth Class

Table 3 presents the distribution of asset holdings by net worth class. Because much of the interesting variation in portfolio composition occurs among wealthier households, we present statistics for relatively fine groupings at the top of the wealth distribution. For our short-run analysis, the current distribution of assets provides information on whether relatively wealthy households bear less of the burden caused by the transition to a consumption tax. If tax reform does not fundamentally change portfolio composition across wealth groups,[14] this distribution also provides information on the long-run effects of tax reform if tax reform has differential effects on rates of return across asset types.

If either the transition tax on existing wealth were distributed uniformly across assets or portfolio shares were constant across wealth groups, then the rich would certainly bear more of the tax: households in the top 5 percent of the net worth distribution have 57 percent of the net worth. However, the rich are not like everyone else--their ownership in different assets varies considerably from their proportion of household wealth. For example, they own 86 percent of tax-exempt bonds (a relative loser under tax reform), over 70 percent of corporate equity owned by households (ambiguous as a winner or loser), 64 percent of the tax basis in active business assets (a relative loser under proposals that disallow depreciation allowances), 71 percent of other real estate (a loser relative to other assets), but only 23 percent of primary residences (a relative loser). While the burden of the fall in housing values relative to other capital would be distributed more evenly across net worth groups than other short-run effects of tax reform, even this component of the transition burden falls heavily on the top of the net worth distribution since the top 10 percent of the wealth distribution has 40 percent of total housing equity. To the extent that the transition to a consumption tax would levy a burden on the owners of existing capital, Table 3 confirms what could be labeled the "Willie Sutton" hypothesis of transition incidence: wealthy households bear a tax on the components of old capital affected by the reform because those households own most of the wealth.

6.3 Distribution by Current Annual Income

In Table 4, we present the same statistics as in Table 3, with households sorted by annual self-reported income rather than wealth. Because the correlation between net worth and annual income among the SCF households is only 0.26, Table 4 potentially suggests a different distributional pattern than Table 3.[15] Annual income is an alternative to net worth as a measure of current "ability to pay" taxes. Neither table perfectly measures either current or lifetime ability to pay taxes given the pattern of income and wealth over the life cycle. Misclassifications are most likely for old and young households. For example, some "middle-class" retired households may have a relatively low current income, but relatively high net worth; the income table would classify these households as relatively poor, while the net worth table would place them among the rich.

As expected, a comparison of Tables 3 and 4 reveals that net worth is less concentrated among high-income households than it is among high-net-worth households. The top 5 percent of households in the income distribution owns 43 percent of the net worth,

compared to the 57 percent of the net worth held by the top 5 percent of the net worth distribution. While this difference in concentration holds for each asset, the size varies across assets. Relative to the bottom half of the net worth distribution, the bottom half of the income distribution owns much more of the liquid assets (25 percent to 6 percent), active business assets (12.6 percent to 0.3 percent), and housing equity (24 percent to 6 percent). Households that are in the bottom half of the income distribution but not the bottom half of net worth distribution can be considered "low-income-but-high-net-worth" households. One explanation for the change in the concentration of liquid assets is that these low-income-but-high-net-worth households have a high demand for liquidity in order to spend out of wealth. The shift in business assets suggests that some small businesses generate (or report) low income. The shift in housing equity probably reflects older families in the low-income-but-high-net-worth group that do not have mortgages.

Explanations for why a household's rank in the net worth distribution differs from its rank in the income distribution could have important implications for assessing tax reform using "income" as the measure of ability to pay. For example, because only 4.6 percent of households in the bottom half of the income distribution own non-corporate business assets, the transition losses associated with disallowing depreciation of existing basis could fall on a small number of households whose annual income is not very high. Of course, under the current tax system a household with a small business but low annual income does not reap much benefit from the existing depreciation allowances because having a low income implies a low marginal tax rate. With progressive tax rates, this transition loss is, then, smaller for those households than for high-income households.

Overall, the concentration of net worth among high-income families (albeit weaker than the concentration among high-net-worth families) suggests that any short-run tax on existing wealth would appear quite progressive (or, any short-run forgiveness of anticipated taxes on income from existing assets would be regressive).

6.4 Distribution of Inframarginal Returns

As discussed earlier, the difference between the Comprehensive Business Income Tax (as a representative fundamental income tax reform) and the Flat Tax (as a representative fundamental consumption tax reform) lies in their treatment of the opportunity cost of capital. Both tax bases include returns in excess of the opportunity cost of capital. However, CBIT taxes the opportunity cost of capital, while the Flat Tax does not. Hence one way of capturing the long-run distributional differences between the two proposals is to examine the distribution of marginal projects. That is, among households that save, relative to CBIT a consumption tax favors households that invest through marginal projects.

Inframarginal projects are likely to be concentrated in holdings of active businesses, assets which are overwhelmingly concentrated among the top of the wealth distribution (the top 5 percent of the wealth distribution owns 84 percent of active business interests).[16] To the extent that middle and upper-middle groups in the net worth distribution generate most of their returns through marginal projects and own relatively

few assets with potential inframarginal returns, they would benefit relatively more from removing the opportunity cost of capital from the tax base. The rich would, of course, also benefit from this reform, but they would still pay taxes on their economic profit. While an accurate division of capital income into "opportunity cost" and "economic profit" would require intricate calculations (based on information beyond that in available data), our conclusion coincides with the intuition that households get rich by having good ideas (or good luck) rather than by clipping bond coupons.

The question of which households would benefit from repealing the tax on the opportunity cost of capital by moving from a broad-based income tax to a consumption tax remains. One could consider more precisely the distribution of inframarginal projects among households if it were possible to measure differences in households' average q, the ratio of the market value of an asset to its replacement cost. A high value of q reflects inframarginal returns to ideas, patents, or market power. If one could calculate q values for household businesses, it would be possible to investigate whether inframarginal projects are concentrated among high-income or high-net-worth households.

We construct average q proxies for active business holdings by households in the SCF. The survey asks detailed questions on up to three active businesses for each household; remaining active business assets are lumped together. In order to have data on both the market value and book value of assets, we are limited to using only the separately listed businesses for each household. To avoid outliers in the construction of average q, we limit the sample to households who own interests in active businesses with at least $1,000 of book value. To calculate average q, we divide the sum of the household's market value of different active businesses by its share of these firms' book value.

Table 5 reports median q values for the sample as a whole, by net worth class, by current income class, and by age group.[17] For both net worth and current income groupings, median q values are substantially higher in the top 5 percent of the respective distributions.[18] This variation does not reflect just differences in the age of the business owner; median q values do not vary much across the youngest, middle, and oldest age groupings. While these calculations must be interpreted cautiously, they are consistent with the idea that inframarginal investment projects are concentrated among high-net-worth and high-income households. Assets with potential economic profit are relatively more concentrated among high-net-worth households than assets expected to return the opportunity cost of capital (e.g., bonds, liquid assets, and housing). To the extent that distributional analysis of consumption taxes assumes that all returns to new capital are untaxed, it understates the progressivity of the consumption tax.

7. DISTRIBUTIONAL IMPLICATIONS OF TAX REFORM

7.1 Distributional Analysis in Current Practice

In practice, of course, distributional analysis does not demonstrate equity effects of alternative tax regimes or proposals. It simply provides information that may help policymakers make judgments about equity. Distributional analysis requires decisions

about the time period, the definition of well-being, the household unit of analysis, and incidence assumptions. For many reforms, principled arguments can be made for alternative resolutions of these decisions. Unfortunately, the principal producers of distributional analysis for policymakers--the Treasury Department, Joint Committee on Taxation, and Congressional Budget Office--do not always use the same definitions and assumptions (see the discussion in Hubbard, 1995). Below, we contrast the approach we have suggested with procedures generally employed in (Washington) practice.

We have argued that it is straightforward to think of a consumption tax as a combination of a wage tax and a cash flow tax on returns from existing capital and returns from inframarginal investments. This approach suggests that the burden of the tax be distributed to factor returns as a change in labor and capital taxation (see also Browning and Johnson, 1979, and Joint Committee on Taxation, 1993).[19]

In conventional distribution tables, distributing the burden of the tax to wage income and income from old capital would increase the progressivity of taxes at low- and high-income relative to the case of distribution by consumption. Calculations by the Joint Committee on Taxation (1993) indicate that, if the burden is assigned to real wages and income from existing capital as earned, the burden of a five-percent broad-based consumption tax is approximately proportional to (a broad concept of) income. If, instead, the burden is assigned as consumption occurs, the same tax appears regressive. Even the JCT approach of distributing the burden of the consumption tax on returns to labor and existing capital understates the progressivity of the tax. First, in conventional distribution tables, distributing the burden of the tax to wage income and old capital income would increase the progressivity of taxes at low- and high-income levels relative to the case of distributions by consumption. In addition, if we think of the broad-based consumption tax as a subtraction-method value-added tax (or business transfer tax), inclusion of a household-level wage tax could increase progressivity measured on an annual income basis (e.g., by means of a refundable wage credit).

Indeed, recent analyses of distributional implications of fundamental tax reform by the Joint Committee on Taxation and the Treasury Department suggest that a switch from the current income tax to a flat tax is not likely to be dubbed "regressive" even under currently used assumptions. As we noted above, the JCT analysis indicates that a broad-based consumption tax is roughly proportional by income class. Incorporating government transfers in the analysis would likely make the predicted change more progressive to the extent that transfers are increased in response to any change in the price level.

In the tradition of distributional analysis using annual income to measure ability to pay, Gale, Houser, and Scholz (1996) compare the current tax system with various versions of the Flat Tax. In their base comparison, they assume individual income taxes are borne by the taxpayer, payroll taxes are borne by workers, and business income taxes are borne by all owners of capital.[20] Their analysis includes the graduated rates of the current tax system and household exemptions from recent proposals for a Flat Tax. They find that for most income groups, a Flat Tax would not significantly change average tax burdens.

There are two notable exceptions. First, low-income households would pay higher taxes due to the repeal of the Earned Income Tax Credit (though such a credit could be included in a modified Flat Tax). Second, a Flat Tax would decrease taxes of households in the top one percent of the income distribution.

Our emphasis on consumption tax reform as a two-stage reform highlights its similarity with the fundamental reform of the income tax (CBIT) suggested by the Treasury Department. As with the Flat Tax, CBIT would apply to all businesses, corporate and non-corporate. Deductions for neither interest nor dividend payments would be permitted, and a tax would be collected at the entity level at a rate equal to the highest marginal personal rate (as in the Flat Tax). Interest receipts, dividends, and capital gains from asset sales would be excludable from investors' income, so that the base for the individual tax is wages. In principle, the difference between CBIT and the consumption tax described here is that investment expenditures are expensed under the consumption tax, while (an approximation to) economic depreciation is permitted under CBIT.[21] Hence CBIT taxes the returns to marginal investments, which are not taxed under the business component of the Flat Tax.

7.2 Distribution Tables by Tax Regime: Proposed Methodology

To assess differences in tax burdens across tax regimes and for different incidence assumptions for broad-based consumption taxes, we construct distribution tables for tax burdens. Because the current tax base differs from a consumption tax both in its differential treatment of capital taxation and by its inclusion of the opportunity cost of capital in the tax base, we compare four different tax regimes: (1) a comprehensive income tax with uniform capital income taxation; (2) a stylized version of the current income tax base capturing the main features of differential capital taxation; (3) a broad-based consumption tax assuming the burden of the tax falls on wages[22]; and (4) a broad-based consumption tax assuming the tax base includes inframarginal returns and returns to risk-taking but excludes the opportunity cost of capital from the tax base.

To concentrate on differences in the tax bases, we analyze a flat rate structure for all tax systems with the same marginal tax rate for households and business entities. While the graduated tax rates of the current tax system add progressivity to the tax base, they also create many timing issues which complicate the analysis. For example, graduated rates lead to individuals' tax rates varying over time due to income fluctuations; with tax rates varying over time, households can alter the timing of the realization of capital gains or the receipt of retirement income to minimize their tax payments. This tax-minimizing behavior complicates measuring the effective tax rate on such income. In addition, differences in household and business tax rates can affect organizational form decisions and create timing incentives for the transfer of income from businesses to households. To mimic some of the progressivity introduced from graduated tax rates, we can estimate tax burdens under a flat rate structure with a generous household exemption.[23]

For each tax regime or incidence assumption, we compute a measure of the tax base for each household in the SCF. All four cases include reported labor income. Labor income

includes wages, salaries, and pension benefits.[24] The more difficult issues arise in measuring capital income and the share of capital income to be included in each tax base. Because reported capital income excludes many items such as unrealized capital gains and imputed rent on owner-occupied housing, we construct measures of expected income using each household's stock of various assets and expected rates of return on different assets. The different tax bases include varying portions of imputed capital income depending on the tax rules and our incidence assumptions.

7.2.1 Expected Returns and Asset Income

Table 6 summarizes the types of assets included in our analysis, the expected rates of return, and the proportion of each asset's return included in the tax base ("inclusion rates") for various tax regimes. We chose these expected rates of return to correspond roughly to average values from the 1980s. Using these historical data should capture households' expectations in 1989, the year represented in the SCF household wealth data.[25] The historical data approximate the differences in risk characteristics and inframarginal returns between assets. In addition, these historical returns may reflect differences created by investor responses to differential capital taxation under current tax rules. We simplify our analysis by assuming that expected rates of return do not depend on the choice of tax regime. Actual tax reform could change both the absolute level of rates of return and the relative differences across assets; however, the direction and size of the changes in expected rates of return is uncertain (see, e.g., Feldstein, 1995). We also assume that household portfolio allocations remain constant across the different tax regimes.

Treasury bonds have an expected return of 10 percent, which exceeds the return on liquid assets (5 percent) and CDs (9 percent), reflecting the value of liquidity and banking services. Tax-exempt bonds, with a return of 8.5 percent, bear an implicit tax relative to Treasury bonds. Corporate bonds earn a risk premium of two percentage points over Treasury bonds.

The return on corporate equity reflects the pre-tax return on corporate investments. Thus we impute corporate-level income to households with corporate equity. Stock market data indicates investors earned a 16.5 percent return during the 1980s in the stock market (high by historical standards but only a 6.5 percent premium over Treasury bonds). This return includes both dividends and capital gains. To adjust this return for taxes paid by corporations, we gross up this return by 25 percent. The return on retirement accounts assumes a portfolio of half corporate equities and half taxable (noncorporate) debt.

The return on housing (10 percent) reflects the imputed consumption flow and any expected appreciation in housing prices. We assign the same expected return to investment real estate and owner-occupied housing so that households should be indifferent between investing in owner-occupied housing and rental property. To the extent that investment real estate earns a risk premium, we have understated the return on these assets. Moreover, if housing bears an implicit tax due to its favorable tax treatment,

one could argue for owner-occupied housing having a lower expected return than other real estate.

For active businesses, we use reported income because it is unclear how to separate labor and capital income; furthermore, we expect substantially more heterogeneity in the returns to investing in active businesses than in financial assets. We assume passive businesses earn an expected return equal to the expected return on investing in the stock market (16.5 percent); because many passive businesses are not corporations, we do not impute a corporate tax liability to these returns.

7.2.2 Capital Income in the Various Tax Bases

The comprehensive income tax base is quite simple in theory--all forms of income are included in the tax base. Our calculation of expected income from various assets simplifies measuring this tax base relative to the alternative with unrealized gains and imputed rents. For corporate equities, we include the expected return on stocks as income accrues. Our one exception to the rule of not adjusting expected returns across the tax systems is the expected return on tax-exempt debt under a comprehensive income tax. A comprehensive income tax would include the interest on currently tax-exempt bonds. To prevent these bonds from being dominated by taxable bonds, we assign the same expected return to taxable and tax-exempt government bonds. In Table 6, this change appears as an inclusion rate greater than one for the income earned from tax-exempt bonds. For both the comprehensive income tax and current tax rules, we assume that the reported income from active businesses is a good measure of taxable income. In addition to including all forms of capital income, the comprehensive income tax would allow deductions for all interest paid.

The inclusion rates for the current income tax base reflect (albeit imprecisely) the major forms of differential capital taxation. Interest income (except on tax-exempt bonds) is included in the tax base. Corporate equity bears a "double tax" which leads to an inclusion rate of less than two both because corporations pay dividends from after-tax income and because special provisions for capital gains substantially reduce the personal-level tax on equity (e.g., deferral and the step-up of basis at death).[26] Owning stock through mutual funds bears a slightly higher tax since mutual fund ownership offers fewer personal tax advantages. If personal tax rates are constant over time, assets held in retirement accounts do not bear personal taxes. However, because equity investments held inside retirement accounts have associated corporate tax liabilities, we impute some tax liability to these accounts. On the one hand, if retirement accounts were held entirely in corporate equities, the inclusion rate would be one. On the other hand, if the accounts were entirely government debt, the inclusion rate would be zero. The returns on miscellaneous financial assets (e.g., whole life insurance) benefit greatly from deferral, leading to an inclusion rate of 0.25. Despite a small portion of housing capital gains being taxed, we approximate the current income tax as not taxing any of the return to housing. The tax base includes income from real estate, active businesses, and passive businesses. Following current tax rules, we allow for deductions for interest associated with mortgages, investment real estate, and margin loans.[27] Unlike the current tax base, our

stylized version does not allow for differences in other itemized deductions (such as charitable giving) or tax credits (such as the Earned Income Tax Credit) across households.

Under the traditional incidence assumption of distributing a consumption tax according to wage income,[28] the inclusion rates for all types of capital income are zero. Apportioning active business income between returns to capital and labor creates a problem for the consumption tax base. We estimate the expected return to capital from the active businesses by multiplying the market value of the business by the investor's pre-personal-tax alternative of earning 16.5 percent by investing in stock market equity. By using the market value of the active business, this measure of expected capital income captures any inframarginal returns which are capitalized into the market value of the business. Using an expected return for risky investments includes both the opportunity cost of capital and a risk premium into the expected capital income. The difference between realized active business income and this expected capital income figure measures the labor income from the business and any ex post good or bad luck for the year.

Under our incidence assumption that a consumption tax excludes the opportunity cost of capital but not inframarginal returns or the return to risk-taking, the tax base excludes returns on bonds (except the risk premium portion of corporate bonds), miscellaneous financial assets, houses, and real estate. The business cash flow tax component of the consumption tax implies a tax on the portion of equity returns attributable to risk or inframarginal returns. Because we estimate the gross expected return on equity to be 22 percent compared to a default-risk-free bond return of 10 percent, a substantial portion of the return to equity appears in excess of the return to waiting. Thus we include 60 percent of the returns to corporate equity in the tax base.[29] Given the portfolio allocation for retirement accounts, this assumed tax burden on corporate equity is consistent with an inclusion rate of 40 percent. The tax base excludes the returns to miscellaneous financial assets, owner occupied housing, and real estate. For active businesses, we want to remove the opportunity cost of capital from the reported income figure. We estimate the opportunity cost of capital as the default-risk-free return (equal to the return on government bonds) on the book value of capital. We use the book value of capital rather than the market value of capital to avoid measuring the return on any inframarginal value capitalized in the market value. We assume that passive assets are risky, and we use an inclusion rate of 60 percent for these returns.

7.2.3 Limitations from Using Wealth Data

While we estimate the distribution of the tax base using wealth data, several data limitations may affect our estimates. First, the labor income question in the SCF does not ask respondents to include non-cash compensation, such as fringe benefits. The current income tax base does not include these items; however, either a comprehensive income tax or a consumption tax (by not allowing employers to deduct the cost of noncash compensation) would include noncash compensation.

Second, because we use the expected returns to financial assets, our estimates do not include any ex post differences in rates of return across households. To the extent these differences in rates of return flow through business entities, the differences between expected and realized returns would be included in the tax base estimates in all cases except the consumption tax under the wage tax incidence assumption. However, the tax rate on the difference between expected and realized returns may be higher under current tax rules because these gains (or losses) are subject to more than one level of taxation. Overall, using realized rates of return rather than expected rates of return would have a similar effect on the tax base in all of the cases except the wage tax incidence assumption for the consumption tax. We also use expected rates of return in creating our income-based measure of well-being. Using realized rates of return would affect the ordering of households by placing households with good fortune higher in the income distribution and those with bad fortune lower in the income distribution.

Third, for financial assets, we assign the same expected rates of return to all households regardless of their levels of income or wealth. If affluent households systematically have a higher opportunity cost return on capital than less well-off households, then our assumption would lead to an understatement of the extent to which switching to a consumption tax would benefit affluent households. While ex post returns are almost certainly higher for better-off households (in terms of the ex post income or wealth distribution), it is less clear why expected rates of return (especially on financial assets) would vary by household.

7.2.4 Structure of Tax Rates

After imputing each household's tax base under the four tax regimes or incidence assumptions, we apply a tax rate structure to each household's tax base. As mentioned above, because our methodology is ill-suited for graduated tax rates, we focus on either a flat 25 percent tax or a flat 25 percent tax with household exemptions of $15,000 for single households and $25,000 for married households. For households with negative income, we classify the tax burden to be zero rather than paying a refund to the household. Because the tax rate and exemption levels are the same but the size of the tax base varies across regimes, total government revenues are not the same across tax regimes. For a given exemption level, these revenue differences do not affect the percentage of taxes paid across households because with a flat rate, tax payments are distributed in proportion to the tax base regardless of the tax rate. Of course, the differences across tax systems in the level of marginal tax rates and tax rates on different types of income will have efficiency consequences nor does our analysis include any behavioral changes induced by differences in tax rates.

7.3 Distribution Tables by Tax Regime: Evidence

In Table 7, we present the distribution of tax burdens by income group across our different incidence assumptions. For classifying household income, we use the imputed full household income, the tax base for the comprehensive income tax. By including the imputed income from owner-occupied housing, the inside build-up on defined

contribution pension plans, and unrealized capital gains, our measure of household income is closer in spirit to the family economic income measure of the Treasury Department's Office of Tax Analysis than income definitions used by the Joint Committee on Taxation of the Congressional Budget Office.[30] We use this broad measure of income because our analysis concerns the relative tax treatment of a broad spectrum of capital income. The table reports the percent of tax paid by each of twelve income groups. The first nine groups are the first nine deciles of the income distribution. The tenth group is the 91st to 95th percentile of the income distribution, the eleventh group is the 96th to 99th percentile of the distribution, and the twelfth group is the top one percent of the income distribution.

The top panel of the table presents the distribution of taxes paid for tax systems without a household exemption. We consider four tax regimes, as described in Table 6, labeled "Comprehensive income tax," "Current tax base," "Consumption tax, traditional," and "Consumption tax, modified." As a simple metric of the claim that consumption taxes disproportionately benefit high-income taxpayers, we compare the percent of the tax burden allocated to the top 5 percent of the income distribution. Under the four cases, this group would pay between 27.1 percent of taxes under the wage tax incidence assumption and 37.5 percent of the taxes under current income tax rules. Assuming that a consumption tax does not tax any capital income suggests that moving to a broad-based consumption tax would reduce the fraction of taxes paid by the top 5 percent of the income distribution by over 25 percent (a drop of over ten percentage points). Refining the incidence assumption for a consumption tax to exclude only the opportunity cost of capital suggests that the top 5 percent of the income distribution would pay 30.9 percent of taxes. Thus recognizing that the consumption tax base includes part of what is commonly called capital income weakens the argument that moving from the current tax rules to a broad-based consumption tax would favor high-income taxpayers. The ten-percentage-point decrease in the fraction of taxes paid by the top income group under a "wage" tax relative to the current tax base falls by over one-third after refining the incidence assumption for the consumption tax.

Comparing the current tax base with the "consumption tax" (assuming it only excludes the opportunity cost of capital), Table 7 suggests households in the fifth through tenth income groups would pay a higher fraction of taxes. However, the increase in taxes paid for these groups is smaller than that implied under conventional distributional assumptions.

The second panel of Table 7 calculates the distribution of the tax burden across income groups for a tax system with household exemptions.[31] Incorporating these household exemptions does not substantially change the conclusion from the top panel of the table. The decline in the fraction of taxes paid by the top 5 percent of the income distribution from moving to a broad-based consumption tax is again about one-third less under the assumption of the consumption tax excluding only the opportunity cost of capital rather than the assumption of a consumption tax exempting all capital income. Our estimated differences between the distribution of a consumption tax under our assumptions and under traditional assumptions would be larger if we use asset return data from the 1990s.

During the 1990s, default-risk-free nominal interest rates were much lower than in the 1980s; hence a smaller amount of capital income would be taxed by the income tax and not the consumption tax in the more recent period.

As an alternative to income as a measure of economic well-being, Table 8 presents the distribution of tax burdens over the distribution of net worth. Overall, the distribution of taxes paid is more evenly distributed across the net worth distribution than across the income distribution. One reason for this more even distribution is that annual fluctuations in income can affect both a household's tax payments and relative position in the income distribution but will have less effect on its position in the net worth distribution. In comparing the current tax base with the different incidence assumptions for the consumption tax, the same conclusion emerges from the net worth distribution as for the income distribution: the decrease in the fraction of taxes paid by the top 5 percent of the net worth distribution accompanying a switch to a broad-based consumption tax is about one-third smaller, assuming the consumption tax base includes part of capital income.

8. CONCLUSIONS

The desirability of fundamental tax reform depends on how it changes the efficiency, simplicity, and fairness of the tax system. Of the three elements, "fairness" appears to be the most controversial for recent proposals to move the U.S. tax system toward a broad-based consumption tax. Distributional consequences of these proposals depend on both short-run (transition) and long-run gains and losses. Our analysis classifies the components of the tax reform into a two-stage process. First, most elements of consumption tax reform are consistent with moving to a pure income tax with uniform capital taxation. Second, for moving from this pure income tax to a consumption tax, the key element of reform is replacing depreciation allowances for physical investment with expensing of capital assets.

The switch from a pure income tax to a consumption tax is likely to be less regressive than commonly assumed. Despite the claim that consumption taxes do not tax capital income, replacing depreciation allowances with expensing only eliminates the taxation of the opportunity cost of capital and not capital income attributable to inframarginal returns and luck (either good or bad). Because wealthier households receive a larger portion of what is often called their capital income in the forms treated similarly by income and consumption taxes (ex post returns to risk taking and inframarginal returns), a consumption tax is less regressive than would be suggested by assuming a consumption tax exempts all parts of capital income. Our distributional analysis suggests that more than one-third of the reduction in the share of taxes paid by very high-income households in switching from an income tax to a consumption tax is offset by this effect.

Our analysis illustrates the benefits of separating the parts of tax reform inherent to taxing consumption from those associated with a broad-based income tax. For the debate over fundamental tax reform, the advantages and disadvantages of eliminating differential capital income taxation can be separated from the choice between income and consumption as the tax base; moreover, in some cases, the elimination of differential

capital taxation may be the more important of the two issues. While we only analyze the equity consequences of tax reform, this separation is also likely to be important for assessing gains in economic efficiency and simplicity.

APPENDIX: EFFECTS OF FUNDAMENTAL TAX REFORM ON ASSET PRICES

In our estimation of the burden of a consumption tax, we treated conventional distributional assumptions as equivalent to those for a wage tax. That is, we abstracted from the "tax on old capital" associated with a cold-turkey switch from an income tax to a consumption tax. This assumption does not affect our comparison of the distribution of the tax burden under conventional distributional assumptions for a consumption tax and those we suggest here. We also believe that the tax on old capital is likely to be much smaller than conventionally believed, as we argue below for equities, debt, and housing.

A. EQUITY PRICES

A switch from the current income tax to a consumption tax affects stock prices both by changing the tax treatment of deductions for depredation and interest and by changing the taxation of capital income. As we argue below, tax reform can in principle either raise or lower stock prices at the time of the reform. In particular, we examine the effect of tax reform on equity prices by identifying impacts of tax reform on the demand for and supply of equities.

A.1 Demand for Equities

Four factors bode well for the demand for stocks in response to tax reform. First, the exemption from investor-level taxation of returns to saving should increase household saving and the demand for equities (and other financial assets). Second, the elimination of the capital gains tax increases the return on equities and reduces effective costs of trading equities (because the capital gains tax is both a tax on equity returns and a transaction tax), thereby stimulating investors' demand for equities. Third, to the extent that investor-level dividend taxes are capitalized in share prices, they reduce the value of equities[1]; by eliminating the tax on dividends, a consumption tax may increase the demand for equities and equity prices may rise. Fourth, to the extent that tax reform reduces the tax rate on business income, the present value of after-tax returns on business investments rises, and equity prices rise.

Two features of these arguments are noteworthy. First, taken in isolation, they suggest a significant potential stimulus to equity demand and stock prices from fundamental tax reform. Second, most channels are consistent with fundamental income tax reform as well as with the move to a consumption tax. A move toward integrating the corporate and individual income taxes would produce roughly similar consequences for equity demand.

Three potentially negative factors for equity demand and stock prices can be traced to elements of tax reform to the shift from depreciation of capital assets under the income

tax to the expensing of capital assets under the income tax to the expensing of capital assets under the consumption tax. Under the income tax, the effective cost per dollar of capital goods purchased equals $(1- t_cz), where t_c is the corporate tax rate and z is the present value of depreciation deductions for the invested dollar. Under the consumption tax, capital investment is expensed, so that z rises to unity, and effective cost per dollar of capital goods purchased falls to $(1- t_c). That is, one can think of investment incentives accompanying expensing as reducing the price of a capital good. If "new capital" purchased under the expensing (consumption tax) regime is otherwise the same as "old capital" in place under the depreciation (income tax) regime, the price of old capital will fall. In this sense, investment incentives reduce the stock market value of existing capital. This is the argument advanced by Hall (1996) in last year's volume. At the current corporate tax rate of 35 percent, the move from current law to expensing for equipment investment would imply a change in the value of (1- t_cz) from 0.71 to 0.65, for a predicted decline in equity values (holding other factors constant) of about 8 percent.[2]

One must also place such a reform in context. The United States legislated major changes in corporate tax rates (e.g., in the Tax Reform Act of 1986) and in investment incentives (e.g., in the Economic Recovery Tax Act of 1981 or in the Tax Reform Act of 1986) over the past two decades. Shifts in the value of investment incentives of a similar magnitude occurred as a consequence of the 1981 Tax Act (in which investment incentives were made more generous such as those accompanying a switch to a consumption tax) and the 1986 Tax Act (in which investment incentives were made less generous).

There is another consideration: A move from the current income tax to a consumption tax is likely to incorporate a business-level tax rate lower than the current corporate income tax rate of 35 percent. At a rate of 21 percent (argued by the Treasury Department to be a revenue-neutral rate), for example, the combination of expensing and the lower tax rate actually increases the value of (1- t_cz) to 0.79 from its current-law value of 0.71. The fall in the tax rate on business income raises the demand for business equity and stock prices, and stimulates the supply of business equity and investment.

Even if expensing effects dominate and the stock market value of old capital falls, this simple sketch assumes that firms can costlessly adjust their fixed capital stock to take advantage of changes in expected profitability or in the tax treatment of investment. This is unlikely to be true, however. Economic studies of investment have shown that firms face costs installing new capital goods, leading firms to smooth changes in the capital stock over time. If these "adjustment costs" are high, old capital remains valuable relative to new capital, and stock prices need not fall. If adjustment costs are low, the shift to expensing (in isolation) reduces stock prices. In their review of existing studies, Hassett and Hubbard (1997) conclude that adjustment costs are relatively low, so that focusing on the changes in t_c and z in analyzing tax reforms is likely to be sensible for estimating consequences for stock prices.

As a second factor adversely affecting the demand for equities, a cold turkey elimination of interest deductions would also reduce stock values. At the margin, the removal of interest deductions is balanced by the gain to the firm from expensing. However, removal

of interest deductions on existing debt generates no such offsetting gain and represents a loss for firms with debt issued under the income tax regime to the extent that such debt cannot be refinanced at lower interest rates.

Third, financial institutions managing long-term contractual saving for households currently are major players in the market for equities. In 1996, private pension funds held 13.5 percent of U.S. equities, with 8.5 percent held by state and local government pension plans and 4.3 percent held by life insurance companies. In addition, some of the equities held by mutual funds represent individually directed retirement saving through Individual Retirement Accounts, Keogh plans, and 401(k) plans. Under a consumption tax, all forms of saving receive preferential tax treatment. Hence saving through life insurance and pension plans becomes less relatively attractive than under current law. If households save the same amount in unrestricted savings vehicles as they do through current contractual arrangements and if households allocate this saving in the same way as institutional managers, then tax reform's negative impact on contractual saving will be offset by its positive effect on other saving. Some economists argue that many households might reduce overall saving absent contractual arrangements or might hold less equity than institutional managers. If true, the negative effect of tax reform on contractual saving might reduce the demand for equities.

A.2 Supply of Equities

Two factors are likely to affect the supply of equities in response to tax reform. First, the shift from depreciation to expensing raises businesses' demand for financing to fund new investment projects. Hence gross equity and debt issues should increase following tax reform. This effect will vary by industry, with greater volumes of expected new issues from firms in capital-intensive industries most directly benefited by tax reform. Second, the removal of the tax bias against equity financing inherent in the current tax system will lead corporations to increase the use of equity in their existing capital structure. Hence some equity issues may be expected to refinance outstanding debt obligations. This effect is also likely to vary by industry according to differences in desired leverage.

A.3 Summary

The conventional argument that equity prices should fall in response to consumption tax reform--because of the negative effect of expensing on the value of "old capital"--likely overstates the adverse short-run effect of tax reform on equity prices. Equity prices should decline by a lesser amount and may even increase modestly in response to tax reform. This is particularly true in cases for which it takes firms a significant period of time to make new capital investments; in this case, existing investments earn higher after-tax returns in response to the lower marginal tax rates following tax reform. In addition, some of the predicted impact on equity prices would materialize under broad-based income tax reform.

B. DEBT PRICES

The effect of tax reform on the prices of existing debt depends on the change in the economy's price level in response to tax reform. For a credit-invoice value-added tax (VAT) or retail sales tax, the domestic price of consumption goods should rise by the amount of the tax (assuming monetary accommodation of the tax change by the central bank). As a consequence, debtholders see a reduction in the value of nominal debt; the debtholders suffer a loss of purchasing power over domestic consumption goods equivalent to the amount of the tax. Under a destination-based VAT, foreign debtholders do not lose to the extent that they are buying trade goods; under an origin-basis VAT, if exchange rate adjustments are less than complete, foreign debtholders lose purchasing power. For a consumption tax of the Flat Tax form, it is less likely that the purchasing power of debt would change.

C. HOUSING PRICES

Conventional wisdom holds that, absent transition rules, a switch to a consumption tax would significantly reduce housing values, the principal asset for many households. As with equities, the analysis of the impact of tax reform on housing is not as straightforward as it might first appear.

In principle, broad-based consumption taxes impose the consumption tax on the service value of housing structures. In practice, none of the leading consumption tax proposals actually measures and taxes the value of the service flows from houses. They instead impose an equivalent tax at the time the houses are constructed. As a consequence, structures are taxed equivalently whether they are owned or rented.

To see this, consider the two housing tenure choices (that is, renting versus owning) separately. In the rental case, the owner would expense the new structure (as a capital investment) and would then pay tax on the rental receipts. If tax rates and interest rates do not change, the upfront subsidy and the ongoing tax have the same present value (as, for example, would be the case for an IRA). In the owner-occupied case, the same is true-- the lack of an upfront deduction (expensing) is just offset by the present value of not paying the tax on imputed rent. In both cases, housing does not enjoy the investment boom experienced in other capital goods because the tax would be extended to (previously untaxed) housing services.

Popular discussion focuses more on the loss of the home mortgage interest deduction. Understanding the consequences of elimination of the mortgage interest deduction requires the same analysis as that for taxable interest rates generally. In a closed economy, if all taxpayers are equally subject to interest taxation, removing both interest deductions and the taxation of interest income could result in a decline in mortgage interest rates by the amount of the tax. Because of the differential taxation of interest income, however, mortgage interest rates are likely to decline by less than the amount of the tax. Hence in the short run, the removal of the mortgage interest deduction should reduce prices of existing houses.

One must be careful about making "doomsday" predictions about the effects of tax reform on housing prices, however. Fluctuations in housing demand can be explained in large part by movements in the user cost of homeownership, which measures the marginal cost of an incremental amount of owner-occupied housing, including the foregone return on the owner's equity. Because mortgage interest is deductible under the income tax, increases in marginal tax rates reduce the user cost of homeownership, all else being equal, while decreases in marginal tax rates increase the user cost. Under a consumption tax, mortgage interest would no longer be deductible, thereby raising the user cost of homeownership and reducing housing demand, all else being equal.

Note, however, that fluctuations in nominal interest rates and expected rates of inflation also affect the user cost of homeownership. High interest rates, all else being equal, raise the user cost. High expected rates of inflation, all else being equal, reduce the user cost of homeownership because households deduct the nominal rather than the real interest cost. Poterba (1991) examines variation in the user cost of homeownership between 1970 and 1990 traceable to tax and non-tax sources. He finds that marginal tax rate variation explains virtually none of the change in the user cost of homeownership for households with adjusted gross income of $30,000 or $50,000. Households with adjusted gross income of $250,000 experienced tax-induced increases in the user cost of capital following the reduction in marginal rates in the Economic Recovery Tax Act of 1981 and the Tax Reform Act of 1986. While the user cost rose by about 1.8 percentage points for high-income taxpayers between 1980 and 1990, the increase in the user cost including changes in interest rates and expected inflation rose by more than 7 percentage points. Hence one should not overstate the role played by tax considerations in explaining changes in the user cost of homeownership. One can also make this point by introspection. Mortgage interest rates declined by about 2 percentage points between November 1994 and December 1995, an amount not too different from the tax wedge for middle-income households. This change was not met by a boom in housing prices.

Another qualification to the predicted decline in owner-occupied housing prices in response to tax reform is that the user cost of rental property, which reflects the landlord's cost of investing in the property, also changes in response to tax reform. As with owner-occupied housing, the user cost of rental property rises with the elimination of interest deductibility. However, the move from depreciation to expensing reduces the user cost. On balance, if interest rates fall by less than the tax wedge of the marginal investor in rental property (likely a high-tax-bracket investor), the first effect dominates, and the user cost of rental property would rise in response to the switch to a consumption tax. The higher rental user cost implies that real rents would rise, blunting the downward pressure on owner-occupied housing from tax reform.

To summarize, a switch from the current tax system to a flat tax or other broad-based consumption tax will likely depress house prices in the short run, but only modestly. The largest such declines should be concentrated in regions in which there are many homeowning households with currently high marginal tax rates--for example, the New York and Chicago metropolitan areas and parts of California. To the extent that housing

investment is highly leveraged in these areas, some increase in mortgage default rates might be expected.

1. See, for example, Auerbach (1979), Bradford (1981), and King (1977). There is significant disagreement among economists about the extent to which dividend taxes are capitalized in share prices (see the review of evidence in U.S. Department of the Treasury, 1992).
2. Auerbach (1996) estimates that the change from the current tax system to expensing under the Hall-Rabushka Flat Tax would, all else being equal, reduce equity values by 5.7 percent. If transition relief is granted--in the form of allowing all existing assets to continue to receive depreciation allowances--the loss in equity values from expensing falls to 1.7 percent.
3. "Flat tax" proposals, generally modeled on Hall and Rabushka (1983,1995), include those by then--Treasury Secretary Nicholas Brady (1992) and Representative Richard Armey. One could also consider a national retail sales tax, supported by, among others Representative Bill Archer and Senator Richard Lugar. Recent value-added tax proposals include the plan by Representative Sam Gibbons to introduce a subtraction-method value-added tax in the United States.

The Unlimited Savings Allowance (USA) tax (described in Alliance USA, 1995), introduced by Senators Pete Domenici and Sam Nunn in April 1995, proposes a proportional tax on business value added. The individual level tax in the USA system is a "consumed income tax" which excludes net saving from taxable income.

Not all recent proposals for fundamental tax reform have emphasized consumption taxation; see, for example, the proposals for broad-based income tax reform in U.S. Department of the Treasury (1992).

- 2 This argument is an old one, tracing its roots to John Stuart Mill's evaluation of capital income taxation as inherently representing double taxation (see Mill, 1895, Book V, Chapter II). A similar argument appears in Musgrave (1959).
- 3 The business cash flow tax has a long pedigree among economists seeking to apply consumption tax principles to business taxation. An early exposition appears in Brown (1948); implementation issues are discussed in King (1975), Institute for Fiscal Studies (1978), Aaron and Galper (1985), and Hubbard (1989).
- 4 If entrepreneurs face financing constraints, they may underinvest in the project that yields inframarginal returns. In this case, the firm's tax savings from expensing may be invested in the inframarginal project.
- 5 One can argue that, absent capital-market imperfections, the government cannot bear systematic risk beyond that obtained in market outcomes (see, e.g., Bulow and Summers, 1984, and Gordon, 1985). Our point is simply that, for a given level of systematic risk the government can bear the risk in both income and consumption taxes. Hence the experiment we consider still permits an analysis of differential tax incidence.
- 6 Warren (1996) and Zodrow (1995) also discuss the relative treatment of risk under alternative tax bases.

- 7 Both our setup and that of Kaplow are obviously highly stylized. The treatment of the risk premium under an income tax or under a consumption tax will differ from what is suggested in these setups if borrowing or short-sale restrictions are present, if loss offsets are not perfect, and if tax rates change over time. It is not obvious, however, that these modifications would affect the equivalence of the tax on the risk premium under the two systems.
- 8 The equivalence in the conventional view is true for analyzing the present value of government revenues provided the government discounts the uncertain revenues generated by a consumption tax at the risky market-determined rate of return (see Zodrow, 1995). However, distributional analysis is typically done on the basis of realized outcomes. From this perspective, two investors with identical wage income but different portfolios will have different tax liabilities under either an income tax or a consumption tax but not under a wage tax.
- 9 The actual corporate "income" tax is a combination of an income tax and a consumption tax (see, e.g., Auten and Kalambokidis, 1995)
- 10 The Treasury Department's Office of Tax Analysis uses this assumption, for example, in the preparation of distributional analysis. The Congressional Budget Office generally assumes that half of the corporate tax is borne by capital income and half by labor income. The Joint Committee on Taxation does not distribute the burden of the corporate tax.
- 11 Hubbard (1985), Scholz (1994), and Poterba and Samwick (1996) present evidence on how portfolio shares very with tax rates, much of which is consistent with theories that taxes affect portfolio allocation.
- 12 We use 1989 data, rather than the more recent 1992 data, because in several instances we use information on the book value of active business assets owned by households which was included in the 1989 SCF but not the 1992 SCF. While along many dimensions the 1989 and 1992 data are similar, Poterba and Samwick (1995,pp. 328-331) discuss some apparent differences. Relative to the 1992 data, the 1989 data indicate that net worth and equity ownership are more concentrated at the very top of the net worth distribution. These differences may suggest that even with oversampling of wealthy households the SCF totals are sensitive to outliers or that the distribution of some assets can fluctuate in the short run.
- 13 While the SCF contains information on defined benefit pensions, we exclude this information in our tabulations. Imputing pension wealth requires a complicated and, to some extent, arbitrary set of assumptions. In addition, because the taxation of this wealth would not be significantly changed by the proposed reforms, we emphasize assets over which households have direct control.
- 14 This is an unrealistic assumption for asset choices that are driven primarily by the tax code. For example, the concentration of tax-exempt bonds among wealthy households is unlikely to survive a tax reform that eliminates the high-income-tax-rate clientele for taxexempt bonds.
- 15 The correlation is 0.41 within the young age group, 0.27 within the middle-aged group, and 0.43 within the oldest group.
- 16 Publicly traded corporations may also have inframarginal projects. However, the expected future value of these inframarginal returns is capitalized into share

prices when investors buy equity. Thus a portion of these returns would accrue to the company founders. Subsequent "discoveries" of inframarginal projects by the corporation would affect such equity returns as ex post good luck.

- 17 We report medians, rather than means, of the samples because outliers can unduly affect the means.
- 18 An alternative explanation for the positive correlation between net worth and measured average q is that households that report inflated values of the market value of their active business would thereby increase their observed wealth and measured average q. To check whether this measurement issue changes our results, we recalculated the ordering of average q using the book value of active business assets in net worth rather than the market value. Under this alternative, any measurement error in book value would induce a negative correlation between average q and net worth. With this alternative net worth measure, the pattern between average q and net worth is weaker. While this alternative suggests that the net worth results (though not the income results) should be interpreted with caution, it does not permit us to discriminate between the measurement-error explanation and the explanation that higher-net-worth households actually have active businesses with a higher q.
- 19 This is in contrast to the approach of Pechman and Okner (1974) and Pechman (1985), in which consumption taxes are allocated to annual consumption.
- 20 A fundamental difference between our analysis and that of Gale, Houser, and Scholz is that we emphasize differences in characteristics associated with risk and inframarginal returns across assets (neither of which are included in the basic Harberger (1962) incidence assumptions).
- 21 The CBIT proposal described in U.S. Department of the Treasury (1992) contains additional, complicating features not described here.
- 22 The conventional description of the imposition of a proportional consumption tax is the combination of a proportional wage tax and a proportional tax on cash flow from existing projects--a tax on "old capital" (see, e.g., Auerbach and Kotlikoff, 1987, and the application in Joint Committee on Taxation, 1993). Any tax on old capital would be included in the consumption tax base (as conventionally described as excluding all capital income) and in our modified tax base (which includes some capital income); hence abstracting from the tax on old capital does not affect the difference in the distribution of taxes paid under the two depictions, our emphasis here. One could alternatively interpret our exercise as assuming full transition relief for old capital or as reflecting the arguments in the Appendix that the effect of the tax reform on equity prices is unlikely to be as adverse as suggested by conventional analysis.
- 23 As will become clear below, because our measures of the tax bases capture accrual income rather than realized income, even these simple tax rate structures would not correspond to annual tax burdens generated by a simple fiat rate system using current tax rules.
- 24 For retirees in the late 1980s, most retirement benefits were from defined benefit pension plans. The current tax system and consumption tax proposals would include these benefits in the tax base. In principle, a comprehensive income tax would tax workers on these benefits and the associated capital income as they

are earned; in practice, however, a comprehensive income tax would probably resort to taxing benefits when received.

- 25 We do not use the 1992 SCF data because we use questions on the book value of active business assets which were not asked in the 1992 survey.
- 26 As an example of the inclusion rate of 1.35 for corporate equities, assume a pre-tax rate of return of 22 percent, a flat 25 percent tax rate for corporations, a flat 25 percent tax rate for dividends and realized capital gains, and a target dividend yield equal to 20 percent of the total return on equity. We assume that through deferral and other provisions the effective tax rate on capital gains is one-third of the tax rate on dividends. For a pre-corporate-tax return of 22 percent, the shareholder's total return is 16.5 percent. This total return implies a dividend yield of 3.3 percent which would equal 2.475 percent after the dividend tax. The capital gain of 13.2 percent faces an effective tax rate of 8.333 percent; hence the after-tax capital gain is 12.1 percent. The total after-tax shareholder return is 14.575 percent. The total tax burden on the investment of 7.425 percent implies a total tax rate of 33.75. Expressed as a fraction of the flat 25 percent tax rate, this total tax rate implies an inclusion rate of 1.35. For mutual funds, the calculation is similar except we assume the effective tax rate on capital gains is one-half of the tax rate on dividends. These inclusion rates depend on the statutory tax rates, the value of deferral, and corporate dividend policy, but they do not depend on the gross rate of return.
- 27 While we allow all households to deduct these forms of interest, we do not adjust for changes in the probability that households will itemize.
- 28 Recall that we are abstracting from the portion of the consumption tax falling on "old capital."
- 29 For simplicity, we allocate corporate taxes in proportion to ownership of corporate equity rather than taking a general equilibrium approach which might suggest the incidence of corporate taxes falls on returns to all forms of capital.
- 30 See Hubbard (1995) for an overview of the methods of distributional analysis of the principal government tax policy agencies. Our measure does not conform to any specific agency's model because of differences in data. Specifically, given its focus on household wealth, the SCF asks fewer questions on transfer payments and non-cash compensation than other data sources.
- 31 Feenberg, Mitrusi, and Poterba (this volume) also describe the distributional implications of switching to a consumption tax (specifically to a national retail sales tax).

TABLE 1

Overall Household Portfolio Characteristics

```
Legend for Chart:

A - Percent of households with asset
B - Conditional median holdings (1000 $)
C - Conditional mean holdings (1000 $)
D - Aggregate value ($ billion)
```

E - Portfolio share (%)

	A	B	C
		D	E
Liquid assets	84.9	2.1	15.0
		1,182	5.9
CDs	19.4	12.0	31.4
		570	2.9
Taxable bonds	27.8	1.0	16.1
		416	2.1
Tax-exempt bonds	4.5	23.0	124.6
		522	2.6
Stock, direct	16.1	7.0	53.8
		806	4.0
Stock, mutual funds	5.8	7.0	23.7
		128	0.6
Retirement accounts	35.2	10.0	31.6
		1,034	5.2
Misc. financial assets	44.4	4.0	26.5
		1,094	5.5
Primary residence	62.7	70.0	105.0
		6,131	30.8
Real estate	20.0	42.8	159.7
		2,973	14.9
Active business	10.0	60.0	375.3
		3,492	17.5
Passive business	2.8	35.0	162.5
		429	2.2
Other real assets	84.1	7.9	14.5
		1,136	5.7
Mortgage debt	39.3	35.0	47.6
		1,746	8.8
Other debt	66.9	5.7	21.5
		1,339	6.7

Note:

Liquid assets include checking, savings, and money market accounts.

Taxable bonds include direct and mutual fund holdings as well as savings bonds.

Tax-exempt bonds include direct and mutual fund holdings.

Retirement accounts include IRAs, Keoghs, 401(k)s, 403(b)s, and similar plans.

Miscellaneous financial assets include annuities, whole life insurance, trusts, and other.

Real estate includes investment properties and second homes.

Active business implies an active management role.

Other real assets include vehicles, real personal property, and miscellaneous items.

Mortgage debt includes all debt secured by the primary residence.

Portfolio shares are the ratio of the value of the asset to the aggregate value of all assets.

All dollar figures are in 1989 dollars.

Source: Authors' calculations based on the 1989 Federal Reserve Survey of Consumer Finances.

<u>TABLE 2</u>

<u>Distribution of Assets by Age</u>

```
Legend for Chart:

A - Young
B - Middle-aged
C - Old
```

	A	B	C
Assets			
Liquid assets + CDs	6.85	25.79	67.36
Taxable bonds	3.87	21.49	74.64
Tax-exempt bonds	1.38	19.58	79.04
Stock, direct	7.05	26.67	66.27
Stock, mutual funds	1.13	36.17	62.70
Retirement accounts	7.55	48.42	44.03
Misc. financial assets	16.12	37.73	46.15
Primary residence	15.86	45.06	39.07
Real estate	4.95	47.37	47.68
Active business	14.56	44.49	40.95
Passive business	7.25	45.95	46.80
Other real assets	19.11	49.52	31.37
Liabilities			
Mortgage debt	31.65	54.62	13.73

Other debt	15.58	58.64	25.78

Other statistics

Net worth	9.34	39.00	51.66
Housing equity	9.58	41.26	49.16
Basis of direct equity	8.03	27.75	64.22
Basis of active business	11.83	53.96	34.21

Note: The entries are the percent of each asset or liability owned by each age group.

Source: Authors' calculations based on the 1989 Federal Reserve Survey of Consumer Finances.

TABLE 3

Distribution of Assets by Net Worth

```
Legend for Chart:

A - Wealth percentile--0-50
B - Wealth percentile--50-75
C - Wealth percentile--75-90
D - Wealth percentile--90-95
E - Wealth percentile--95-99
F - Wealth percentile--99-100
```

	A	B	C
	D	E	F

Assets

	A	B	C
	D	E	F
Liquid assets + CDs	5.52	13.14	20.68
	13.57	20.11	26.98
Taxable bonds	1.70	5.98	12.31
	11.22	19.68	49.10
Tax-exempt bonds	0.30	0.65	4.59
	8.90	22.55	63.00
Stock, direct	1.48	3.35	12.95
	9.89	28.79	43.54
Stock, mutual funds	1.84	5.77	11.23
	11.01	39.25	30.90
Retirement accounts	3.78	11.95	27.73
	17.46	23.31	15.78
Misc. financial assets	4.70	10.33	14.27
	11.08	20.06	39.57
Primary residence	9.32	27.63	27.80

	12.67	15.22	7.36
Real estate	2.48	4.93	12.13
	9.36	29.95	41.14
Active business	0.31	2.67	5.14
	8.05	22.56	61.27
Passive business	0.43	3.01	6.99
	4.93	20.48	64.16
Other real assets	17.87	21.89	17.46
	10.33	20.04	30.59
Liabilities			
Mortgage debt	18.52	33.59	24.28
	9.81	10.11	3.69
Other debt	19.76	12.16	12.87
	5.97	21.99	27.25
Other statistics			
Net worth	2.87	11.74	17.09
	11.51	21.75	35.04
Housing equity	5.65	25.26	29.20
	13.81	17.26	8.83
Basis of direct equity	2.11	3.66	14.45
	10.26	26.94	42.58
Basis of active business	0.84	5.67	11.97
	17.44	22.43	41.66

Note: Wealth is defined as total assets less total liabilities (net worth). It excludes pension and Social Security wealth. The entries are the percentage of each asset or liability owned by each net worth group.

```
Wealth cut-offs:

Median                                              $ 45,250
75 percentile                                         136,300
90 percentile                                         319,640
95 percentile                                         544,000
99 percentile                                       2,064,400
```

Source: Authors' calculations based on the 1989 Federal Reserve Survey of Consumer Finances.

TABLE 4

Distribution of Assets by Current Income

Legend for Chart:

A - Income percentile--0-50
B - Income percentile--50-75
C - Income percentile--75-90
D - Income percentile--90-95
E - Income percentile--95-99
F - Income percentile--99-100

	A	B	C
	D	E	F
Assets			

Liquid assets + CDs

	A	B	C
	25.11	19.05	14.38
	9.79	16.43	15.23

Taxable bonds

	A	B	C
	10.89	19.50	11.36
	9.50	9.04	39.71

Tax-exempt bonds

	A	B	C
	3.57	8.48	4.33
	14.08	20.24	49.30

Stock, direct

	A	B	C
	5.98	11.58	12.54
	9.56	24.50	35.84

Stock, mutual funds

	A	B	C
	4.90	10.40	14.99
	12.36	26.97	30.37

Retirement accounts

	A	B	C
	6.13	16.95	23.28
	16.80	21.23	15.61

Misc. financial assets

	A	B	C
	10.52	16.50	14.98
	15.64	16.83	25.52

Primary residence

	A	B	C
	20.49	23.04	22.76
	12.66	13.61	7.45

Real estate

	A	B	C
	6.85	11.09	14.82
	10.86	25.70	30.68

Active business

	A	B	C
	12.63	8.89	9.45
	5.22	17.92	45.89

Passive business

	A	B	C
	8.90	16.21	8.03

	8.22	17.17	41.46

Other real assets

	19.11	20.71	21.14
	9.34	11.70	18.00

Liabilities

Mortgage debt

	11.35	23.02	28.37
	16.41	14.70	6.16

Other debt

	11.04	16.49	15.65
	9.92	23.27	23.64

Other Statistics

Net worth

	15.14	15.78	15.35
	10.26	17.41	26.07

Housing equity

	24.13	23.04	20.52
	11.17	13.17	7.96

Basis of direct equity

	7.03	10.15	14.62
	9.18	23.35	35.68

Basis of active business

	11.35	11.16	17.67
	10.36	17.38	32.09

Note: The entries are the percent of each asset or liability owned by each income group.

Income cut-offs:

Median	$ 25,000
75 percentile	43,000
90 percentile	69,000
95 percentile	100,000
99 percentile	223,000

Source: Authors' calculations based on the 1989 Federal Reserve Survey of Consumer Finances.

TABLE 5

Median Values of q for Households in the SCF

Sample	Median q value	Approximate number of households
Full sample	1.17	577
Net worth		
0-50 percentile	1.00	18
50-75 percentile	1.13	47
75-90 percentile	1.14	62
90-95 percentile	1.00	53
95-99 percentile	1.58	135
99-100 percentile	2.07	261
Current income		
0-50 percentile	1.00	52
50-75 percentile	1.15	62
75-90 percentile	1.25	74
90-95 percentile	1.00	47
95-99 percentile	1.50	105
99-100 percentile	1.36	237
Age		
Young	1.17	56
Middle-aged	1.19	296
Old	1.16	224

TABLE 6

Rates of Inclusion of Types of Income Under Various Tax Regimes

Legend for Chart:

A - Income Type

B - Expected rate of return

C - Tax regime or incidence assumption--Comprehensive income tax

D - Tax regime or incidence assumption--Current income tax base

E - Tax regime or incidence assumption--Consumption tax with
    wage tax incidence

F - Tax regime or incidence assumption--Consumption tax
     excluding opportunity cost of capital

A	B	C	D
		E	F

Labor income	n/a	1	1
		1	1
Liquid assets	5%	1	1
		0	0
CDs	9%	1	1
		0	0
Treasury bonds	10%	1	1
		0	0
Corporate bonds	12%	1	1
		0	(12% - 10%) / 12%
Tax-exempt bonds	8.5%	10% / 8.5%	0
		0	0
Stocks, direct	22%(a)	1	1.35
		0	0.6
Stocks, mutual funds	22%(a)	1	1.45
		0	0.6
Retirement accounts	16%(b)	1	0.7
		0	0.4
Misc. financial assets	9%	1	0.25
		0	0
Houses	10%	1	0
		0	0
Real Estate	10%	1	1
		0	0
Active business	Reported income	1	1
		Less 16.5% of market value	Less 10% of book value
Passive business	16.5%	1	1
		0	0.6
Debt	10%	-1	-1 + (mortgages investments)
		0	0

(a) The return on corporate stock includes an estimate of corporate taxes paid. Specifically, we assume an investor-level return of 16.5 percent (a 6.5 percent premium over government bonds) and gross up by a 25 percent effective corporate tax rate.

(b) The return on retirement accounts assumes a portfolio evenly divided between corporate stock and government bonds.

Source: Based on assumptions described in the text.

TABLE 7

Distribution of Tax Burden by Household Income

```
Legend for Chart:

A - Income groups--1
B - Income groups--2
C - Income groups--3
D - Income groups--4
E - Income groups--5
F - Income groups--6
G - Income groups--7
H - Income groups--8
I - Income groups--9
J - Income groups--10
K - Income groups--11
L - Income groups--12
```

	A D G J	B E H K	C F I L
No exemption			
Comprehensive income tax			
	0.28	1.43	2.53
	3.75	5.07	6.54
	8.27	10.42	14.57
	10.95	16.38	19.81
Current tax base			
	0.32	1.52	2.60
	3.66	5.10	6.51
	8.20	10.00	13.97
	10.68	16.11	21.34
Consumption tax, traditional			
	0.38	1.87	3.25
	4.53	6.33	7.80
	10.02	12.04	15.84
	10.85	13.35	13.76
Consumption tax, modified			
	0.34	1.70	2.95

4.15	5.84	7.30
9.41	11.40	15.15
10.89	14.59	16.29

Exemption: $15,000 for a
single person, $25,000 for
a married household

Comprehensive income tax

0.00	0.00	0.00
0.53	1.61	3.63
5.73	8.94	14.95
13.04	22.08	29.47

Current tax base

0.00	0.00	0.01
0.42	1.41	3.01
4.79	7.62	13.63
12.80	22.55	33.76

Consumption tax, traditional

0.00	0.00	0.01
0.57	1.93	3.97
6.59	10.42	16.80
14.09	20.52	25.09

Consumption tax, modified

0.01	0.00	0.01
0.50	1.69	3.57
6.01	9.47	15.52
13.71	21.54	28.00

Note: The income ranges are:

1	<$4,046	First decile
2	$4,046-$9,804	Second decile
3	$9,804-$15,355	Third decile
4	$15,355-$21,688	Fourth decile
5	$21,688-$28,807	Fifth decile
6	$28,807-$36,391	Sixth decile
7	$36,391-$45,698	Seventh decile
8	$45,698-$59,525	Eighth decile
9	$59,525-$88,700	Ninth decile
10	$88,700-$136,263	90th-95th percenile
11	$136,263-$388,730	95th-99th percentile
12	>$388,730	99th-100th percentile

Full household income is defined in the text.

Source: Authors' calculations from the Survey of Consumer Finances.

Note: The SCF includes five observations for each household with imputed values for missing data. The number of households for each cell is an approximation since it represents the number of total observations divided by five. The reported medians reflect the population-weighted sample of households with active businesses with book value exceeding $1,000.

Source: Authors' calculations based on data from the 1989 Survey of Consumer Finances.

TABLE 8

Distribution of Tax burden by Household Net Worth

```
Legend for Chart:

A - Net worth groups--1
B - Net worth groups--2
C - Net worth groups--3
D - Net worth groups--4
E - Net worth groups--5
F - Net worth groups--6
G - Net worth groups--7
H - Net worth groups--8
I - Net worth groups--9
J - Net worth groups--10
K - Net worth groups--11
L - Net worth groups--12
```

	A / D / G / J	B / E / H / K	C / F / I / L
No exemption			
Comprehensive income tax	2.37	2.24	3.71
	4.67	5.34	7.54
	8.17	10.62	13.59
	9.87	15.03	16.84
Current tax base	2.89	2.63	4.27
	5.18	5.51	7.48
	7.83	9.92	12.69
	9.23	14.83	17.55
Consumption tax, traditional	3.83	3.44	5.63
	6.88	7.28	9.96
	9.95	12.20	13.49
	8.76	10.62	7.95
Consumption, modified	3.46	3.11	5.10
	6.24	6.67	9.08
	9.21	11.44	13.26
	8.96	12.18	11.29

```
Exemption: $15,000 for a single
person, $25,000 for a
married household

Comprehensive income tax            0.94         0.75         1.46
                                     2.38         2.92         5.30
                                     6.15         9.49        13.99
                                    11.57        20.09        24.96

Current tax base                     1.29         0.92         1.75
                                     2.72         2.94         5.07
                                     5.56         8.16        12.58
                                    10.78        20.60        27.62

Consumption tax, traditional         2.03         1.45         2.77
                                     4.36         4.47         8.25
                                     8.32        11.82        14.53
                                    11.31        16.17        14.26

Consumption tax, modified            1.72         1.23         2.36
                                     3.72         4.13         7.11
                                     7.36        10.59        13.92
                                    10.99        17.73        19.15
```

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