



CBO PAPER

THE INCIDENCE OF THE
CORPORATE INCOME TAX

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PREFACE

This Congressional Budget Office (CBO) paper is part of CBO's continuing analysis of the incidence of federal taxes.

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SUMMARY AND INTRODUCTION

Public-sector economics has yet to resolve the issue of who bears the burden of taxes on corporate income. Economists recognize that the incidence--that is, the distribution of the burden of such taxation--falls ultimately on individuals and not on corporations. However, economists argue about who bears the largest burdens. In determining the economic effects of the corporate income tax, it is crucial to understand the mechanisms by which tax burdens are transferred. The incidence of the corporate tax is also an important factor in ascertaining the effects of tax proposals on different segments of the population.

A survey by the Congressional Budget Office (CBO) of recent research into corporate tax incidence, drawn primarily from academic publications, suggests a few general conclusions. CBO's survey emphasized general-equilibrium studies, which recognize the interaction between corporate decisions and the prices facing other markets and sectors of the economy. Taxpayers can bear the burden of corporate income taxes through the way in which they earn income (sources) or the way in which they spend it (uses). Most research focuses on the burden imposed on sources of income, making distinctions among returns from investment and labor in the corporate and noncorporate sectors of the economy. Even in those areas, disagreements exist over the extent to which investment capital and labor can move between sectors or be "substituted" for each other in the production process within a sector. Further complicating the issue are allowances for investment flows into and out of the United States. Although economists are far from a consensus about exactly who bears how much of the burden of the corporate income tax, the existing studies highlight the significant types of economic mechanisms as well as the empirical estimates necessary for further quantifying the burdens. CBO's review of the studies yields the following conclusions:

- o The short-term burden of the corporate tax probably falls on stockholders or investors in general, but may fall on some more than on others, because not all investments are taxed at the same rate.
- o The long-term burden of corporate or dividend taxation is unlikely to rest fully on corporate equity, because it will remain there only if marginal investment is not affected by those taxes. Most economists believe that the corporate tax system has some effect on investment decisions.
- o Most evidence from closed-economy, general-equilibrium models suggests that given reasonable parameters, the long-term incidence of the corporate tax falls on capital in general.

- o In the context of international capital mobility, the burden of the corporate tax may be shifted onto immobile factors (such as labor or land), but only to the degree that the capital and outputs of different countries can be substituted.
- o In the very long term, the burden is likely to be shifted in part to labor, if the corporate tax dampens capital accumulation.
- o Most attempts to distribute the burden of corporate taxation have neglected the possible importance of effects on the relative prices of products.

HOW THE INCIDENCE OF THE CORPORATE INCOME TAX IS DETERMINED

A corporation may write its check to the Internal Revenue Service for payment of the corporate income tax, but that money must come from somewhere: from reduced returns to investors in the company, lower wages to its workers, or higher prices that consumers pay for the products the company produces. Understanding the mechanisms through which those tax burdens are transferred is crucial in determining the economic effects of the corporate income tax.

From an economic perspective, individuals differ according to how they earn their income and how they spend it. Tax systems are usually not neutral about such differences. Typically, a bias in tax systems results in an inefficient allocation of resources and goods. Nonneutrality matters for equity as well, because differences in how people earn or spend their income may translate into differences in their ability to pay taxes. For example, differences between tax burdens on capital and labor income affect the distribution of taxes among families, because capital income is more heavily concentrated among upper-income families. Differences between burdens on producers and consumers are significant because the distribution of income among purchasers of goods and services may be very different from the distribution of income among owners and stockholders, and somewhat different from the distribution among employees.

A focus on individuals or households is only the first requirement in studying tax incidence. Assessing the economic incidence of a tax is not as simple as matching up people with the legal entities that are taxed. Tax burdens typically do not remain on those who work for, invest in, or purchase products from businesses that are subject to the tax, but are shifted onto others in the economy through "substitution effects," or the ability of households and firms to reduce more heavily taxed activities and increase lightly taxed or untaxed activities. Changing

employment, investment, or consumption to avoid taxed activities is not without cost. Compared with a no-tax world in which resources and products are efficiently allocated, the larger the substitution effects, the greater the distortionary cost, or "excess burden," of taxation. The distortionary cost is over and above the tax revenues collected. And regardless of the efficiency of the status quo, the larger the substitution effects, the more likely that total tax burdens will be shifted to those who are not directly taxed. Knowing something about the existence and magnitude of these substitution effects is thus critical in determining both the efficiency costs and the economic incidence of taxation.

In this context, determining the incidence of the corporate income tax is an especially daunting task because the tax's relevant substitution effects are so difficult to understand. At the most fundamental level, economists disagree about what the corporate income tax actually taxes. At a higher level, they disagree about what the corporate tax does to relative prices, or incentives. And finally, there are many more ways in which firms can substitute inputs or stockholders can adjust portfolios and thus ease the burden of corporate taxes, than there are ways for individuals to change their economic behavior (such as through reduced labor supply or reduced saving) in attempts to reduce personal taxes. The puzzle about corporate tax incidence in large part reflects economists' failure to integrate fully, or reach a consensus on, models of corporate behavior. Thus, the disagreement about the burden of the corporate tax stems not simply from different assumptions about the parameters of a model, but from fundamental disagreement about the model itself. As a result, authors of the current literature on corporate tax incidence still debate the theoretical assumptions and have not yet concentrated on making empirical estimates or establishing parameters. (See p. 28 for additional surveys of this literature.)

Most economists view the corporate income tax as a tax levied on the return from the equity capital of corporations, but avoidable by firms, their stockholders, or their consumers through various types of substitution. Among those are the following kinds of substitutions:

- o *Factor:* The corporation can substitute labor for capital in its mix of inputs. That tends to spread the tax burden to capital in general (and not just corporate capital) and to provide gains to labor.
- o *Financial:* The corporation can adjust financial policies, such as substituting debt for equity financing. Such measures tend to reduce returns from some forms of investment and raise returns from others.
- o *International:* Investors can shift physical capital or investment out of a taxed country into other countries ("capital flight"). The burden

of the corporate tax is thus shifted onto immobile factors of production (labor or land).

- o *Intertemporal*: Investors can decrease the amount they save (substitution of consumption among time periods) as a result of the decreased net rate of return from capital. That substitution shifts the burden onto labor by reducing the total amount of capital, thus decreasing the productivity of labor and hence wages.
- o *Portfolio*: Investors can substitute other forms of investment for corporate stock. That reduces the value of corporate assets (capitalization effects) and tends to shift the burden from new investors onto holders of existing stock.
- o *Intersectoral*: Higher prices of products produced by firms encourage consumers to move away from those products toward noncorporate products (the "output effect"). The resulting reduction in the firm's output level tends to shift the tax burden toward the factor (capital or labor) that is used intensively in the corporate sector because the demand for that factor has decreased.

Understanding the nature and extent of those substitution effects is crucial in understanding corporate tax incidence, because the effects determine how relative prices and real incomes adjust in response to the tax, and hence how individuals may face different tax burdens according to the ways in which they earn or spend their income.

DISTINGUISHING BETWEEN SHORT- AND LONG-TERM INCIDENCE

The literature on corporate tax incidence frequently makes the distinction between the short- and long-term incidence of the corporate income tax. The distinction sometimes refers to the standard textbook definitions of the planning horizons facing a firm; in the short term, the firm is able to change output level by adjusting its use of labor, but capital is fixed. In the long term, however, all inputs are variable and thus the entire scale of the firm can change. In such a context, the short-term incidence of the corporate tax is typically uninteresting, because no substitution effect takes place. If the tax is levied on the total profits of the corporation, the firm is dedicated to making a maximum profit, and its capital stock is fixed (perfectly inelastic), the burden of the tax falls completely on the firm's stockholders. The

short-term burden is not shifted, because the level of output aimed at maximizing profit is unchanged.¹

In order to depart from such a simple result and to shift the short-term burden away from corporate stockholders, it is usually necessary to adopt models of behavior in which firms do not seek to maximize profit. An example of that effect is the sales-maximization model introduced by economist William J. Baumol, in which the maximization of revenues (and not profits) implies that the firm reacts to an increase in the corporate tax by reducing output.² Because output is reduced, the price of output rises and the returns from all factors, including labor, fall. The burden of the corporate tax is thus shifted partly to consumers and the suppliers of other factors, and the division of burden depends on the elasticity of demand for the firm's output in relation to the elasticity of supply, in other words, on the sensitivity of consumers to price changes compared with that of producers.

The standard result (that the burden is not shifted) can also be modified if one accounts for a possible shifting of portfolios on the part of investors, as suggested by economist Martin S. Feldstein.³ Initially, the corporate tax is fully capitalized into reduced stock prices, but because the relative yield and stability of corporate stock is unchanged, the price reduction induces some investors to buy corporate stock and sell other investments. As a result of that portfolio substitution, corporate stock prices are bid back up to some extent, so complete capitalization does not occur. Thus, those who hold corporate stock and do not change portfolios do not bear the full burden of the tax, which is spread among all investors in general. That shifting among investors, however, may not spread the tax among different income groups in the population nearly as much as shifting from stockholders to consumers or workers.

It is an oversimplification, however, to characterize the short-term burden of the corporate income tax as falling on stockholders or investors. The corporate tax is not neutral with respect to the incomes of different corporations; instead, it treats corporations differently depending on how their income is earned. For example, depreciation allowances differ by type of capital investment, so the effective tax rates facing firms depend on their mixes of types of capital.⁴ As such, saying that the

1. This result is described in Richard Goode, *The Corporation Income Tax* (New York: Wiley, 1951).

2. See William J. Baumol, *Economic Theory and Operations Analysis* (Englewood Cliffs, N.J.: Prentice-Hall, 1965).

3. See Martin S. Feldstein, "The Surprising Incidence of a Tax on Pure Rent: A New Answer to an Old Question," *Journal of Political Economy*, vol. 85 (1977), pp. 349-360.

4. See Don Fullerton and Yolanda Kodrzycki Henderson, "A Disaggregate Equilibrium Model of the Tax Distortions Among Assets, Sectors, and Industries," *International Economic Review*, vol. 30, no. 2 (May 1989), pp. 391-413.

short-term incidence of the corporate tax falls on stockholders may really imply that it falls more heavily on stockholders of some firms than on those of others.

In other contexts, the distinction between short and long term refers to the nature of market equilibrium; in the short term (in "transition"), prices are still adjusting, but in the long term the economy reaches a "steady state," with all factor supplies growing at the same rate and relative prices remaining unchanged. Using that distinction, some recent literature focuses on the importance of the capitalization effects of taxes and the transitional incidence among different generations of taxpayers.⁵

More specifically related to corporate tax policy, some economists have demonstrated that various types of capital income tax reforms produce effects on asset prices that can be significant and sometimes surprising. For example, investment incentives (such as an investment tax credit or accelerated depreciation allowances) may result in capital losses for owners of existing assets, as well as declines in the value of a firm, because the required rate of return from capital falls.⁶ But the traditionally positive relationship between investment tax credits and firm value is obtained if the prospect of excess returns from new investment outweighs the decline in the value of existing assets.⁷

Several authors have emphasized that because investment tax credits are aimed at new capital, they stimulate investment more than do corporate tax cuts.⁸ Those types of analyses require distinctions between old and new capital and the specification of conditions for equilibrium in the asset market. Economists now concur that tax reforms that have similar long-term effects on the cost of capital can have very different short-term effects, and that transitional redistributions can alter steady-state outcomes.

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5. See Christophe Chamley and Brian D. Wright, "Fiscal Incidence in an Overlapping Generations Model with a Fixed Asset," *Journal of Public Economics*, vol. 32 (1987), pp. 3-24, and James M. Poterba, "Comments on Chapter 2 (The Distribution of the Tax Burden)," in John M. Quigley and Eugene Smolensky, eds., *Modern Public Finance* (Cambridge, Mass.: Harvard University Press, 1994), pp. 50-52.
 6. See Alan J. Auerbach and Laurence J. Kotlikoff, *Dynamic Fiscal Policy* (Cambridge, England: Cambridge University Press, 1987).
 7. This point is made in Andrew B. Lyon, "The Effect of the Investment Tax Credit on the Value of the Firm," *Journal of Public Economics*, vol. 38 (1989), pp. 227-247.
 8. See Lawrence H. Goulder and Lawrence H. Summers, "Tax Policy, Asset Prices, and Growth," *Journal of Public Economics*, vol. 38 (1989), pp. 265-296.

GENERAL-EQUILIBRIUM ASSESSMENTS OF LONG-TERM CORPORATE TAX INCIDENCE

Economist Arnold Harberger wrote the seminal study on tax incidence more than 30 years ago. He was the first to derive the general-equilibrium effects of a tax. The general-equilibrium methodology recognizes that tax changes in one market can affect prices and quantities in other markets, and that long-term tax burdens depend on how much these variables must change before a new equilibrium is achieved. Harberger's initial model became the inspiration for more recent tax models, which add detail but are based on the same fundamental principle that price adjustments in general equilibrium are important in determining tax burdens.

The Harberger Model: Theme and Variations

In his general-equilibrium study, Harberger emphasized that the burden of a partial factor tax (that is, one applied to factor inputs in a particular sector of the economy) must be shifted to factors in general as long as factors can move freely across sectors.⁹ More specifically, although the short-term burden of the corporate income tax falls on corporate capital, in the long term perfect mobility and the ability to substitute capital between corporate and noncorporate sectors implies that capital will move from the corporate to the noncorporate sector until the rates of return (after taxes) are equal among all types of capital. Thus, if the net return from corporate capital falls, the net return from noncorporate must capital fall as well, and capital in general, not corporate capital specifically, will bear the burden of the corporate income tax.

Harberger's model does not, however, rule out the possibility that the corporate income tax may affect labor. In the simple two-good (corporate and noncorporate) and two-factor (capital and labor) model using fixed total supplies of capital and labor, two types of substitution effects influence the distribution of the corporate tax burden between capital and labor. Those effects are the corporate firm's substitution of labor for capital in response to a higher gross-of-tax cost of capital, or the "factor-substitution effect," and consumers' substitution away from purchases of the corporate product to purchases of the noncorporate product in response to an increase in the relative price of the corporate good, or the "output effect."

Although the effect of factor substitution implies that the net return from capital in relation to labor must fall in order for the noncorporate sector to absorb the

9. Arnold C. Harberger, "The Incidence of the Corporation Income Tax," *Journal of Political Economy*, vol. 70 (1962), pp. 215-240.

capital that the corporate sector releases, the output effect could imply the opposite if the corporate sector is more labor-intensive than the noncorporate sector. That is because a reduction in output by a labor-intensive corporate sector implies that the demand throughout the economy for labor will fall and the demand for capital will increase, raising the net return from capital in relation to labor.

Depending on the degree to which consumers can substitute noncorporate for corporate output, and the extent to which firms in each sector can substitute capital for labor, the burden of the tax could end up on capital (in the form of reduced return from capital), labor (in the form of a reduction in the wage), or some combination of the two. The elasticity of substitution between capital and labor, or the substitutability of capital and labor in production, is an important factor.¹⁰

Generally, the greater the elasticity of substitution between capital and labor in the corporate sector, the greater the burden on capital. A smaller elasticity in the noncorporate sector also increases the burden on capital. The combination of the high elasticity of substitution in the corporate sector and a low elasticity of substitution in the noncorporate sector implies a large factor-substitution effect on the relative return from capital. That is because a high elasticity on the corporate side implies that the sector is very responsive to a change in relative factor prices. Thus it releases a lot of capital and absorbs a lot of labor. A low elasticity for noncorporate firms implies that the noncorporate sector is less sensitive to relative factor prices, requiring a large change in net factor prices before the noncorporate sector accommodates the corporate sector's factor adjustments by changing its own mix of capital and labor.

It is also true that as the elasticity of demand for the corporate good increases, the burden on the factor used intensively by the corporate sector will increase. That is the "output effect." Harberger's derived expression for the change in the net rate of return from capital in relation to the net wage shows that the burden of a tax on corporate capital could end up falling most heavily on labor, but only if the corporate sector is labor intensive and the output effect dominates the effect of factor substitution.

In some special cases, capital bears precisely 100 percent of the burden. In other words, capital income in the entire economy falls by exactly the amount of tax revenue collected. That can occur when both sectors have the same factor proportions and the same elasticities of substitution, or if the factor substitution elasticities and elasticity of demand for the good are all equal. It is also possible to

10. The elasticity of substitution between capital and labor equals the percentage change in the capital-to-labor ratio (quantity of capital demanded divided by quantity of labor demanded), divided by the percentage change in the ratio of the per-unit cost of capital to the per-unit cost of labor. This number will always be less than or equal to zero, so a "high" elasticity implies a large absolute value.

have a case in which capital or labor bears more than 100 percent of the burden, implying that there is an increase in income for the other factor. Thus, theoretically, anything is possible in terms of the division of the burden between capital and labor.

Using what he regarded as reasonable parameter values, however, Harberger concluded that capital bears around 100 percent of the corporate tax burden. Although the corporate sector is labor-intensive, he finds that the output effect is smaller than the factor substitution effect. That conclusion falls within the range of estimates derived using more complex versions of the Harberger model.¹¹ Those later models follow Harberger's basic structure, but further break down industry and consumer groups. The number of equations thus becomes very large, and the solutions for relative prices must be determined by numerical simulation rather than analytical derivation.

Results from computable versions of the Harberger model suggest that the incidence on capital is not very sensitive to the number of industries in the model, but is very dependent on the assumed elasticities of substitution.¹² Although most simulations indicate that at least 100 percent of the burden falls on capital, that result is weakened substantially as the capability of substituting between capital and labor in the corporate sector is reduced. For example, if the elasticity of substitution in the corporate sector is reduced from 0.75 to 0.25, the elasticity of substitution between capital and labor in the noncorporate sector remains constant at 0.25, and the consumer demand elasticity remains at 1.0, capital's share of the tax burden falls from more than 100 percent to about 30 percent.

The effects of the corporate income tax on economic incentives are also important in determining economic inefficiencies. The substitutions between corporate capital and labor and between corporate and noncorporate outputs cause tax burdens to exceed tax revenues. The "excess burden" of a tax is defined as the dollar value of the welfare loss minus the tax revenue collected. Purely efficient taxes result in welfare losses precisely equal to the tax dollars collected, so that excess burden is zero. Greater responsiveness to changes in relative prices not only implies that tax burdens are more likely to be shifted, but also that the inefficiency of the tax is likely to be greater. Using his general-equilibrium model, Harberger

11. These models are described and applied in the following studies: John B. Shoven and John Whalley, "A General Equilibrium Calculation of the Effects of Differential Taxation of Income from Capital in the U.S.," *Journal of Public Economics*, vol. 1 (1972), pp. 281-321; John B. Shoven, "The Incidence and Efficiency Effects of Taxes on Income from Capital," *Journal of Political Economy*, vol. 84 (1976), pp. 1261-1284; and Charles L. Ballard, and others, *A General Equilibrium Model for Tax Policy Evaluation* (Chicago: University of Chicago Press, 1985).

12. See Shoven, "The Incidence and Efficiency Effects of Taxes on Income from Capital."

determined that the excess burden of the corporate income tax is likely to be about 0.5 percent of national income.¹³

Despite the smallness of the inefficiency in relation to the entire economy, most economists characterize the corporate tax as a relatively inefficient one, because the excess burden of the tax is large compared with the tax revenue collected from it. For example, corporate tax receipts in 1994 were only about 2.1 percent of the gross national product (GNP), implying that if the excess burden of the corporate income tax is 0.5 percent of GNP, it is nearly 24 percent of corporate tax revenues.¹⁴

The assumptions made in the basic version of the Harberger model are subject to several criticisms. For example, the model does not acknowledge that corporate and noncorporate firms, facing very different effective tax rates, might produce the same or very similar goods. Corporate taxes affect average effective tax rates by industry, which are computed according to taxes as a fraction of reported profits. The model does not specify the user costs of capital and marginal effective tax rates, which measure the effect of the corporate tax on the cost of capital more accurately than the average tax rate, and a firm's financial behavior is treated as if it were independent of taxes. In addition, the total supplies of factors in the economy are assumed to be fixed, which is not true either in a world with savings or if factors are mobile internationally. Although the model used by economists Charles L. Ballard, Don Fullerton, John B. Shoven, and John Whalley specifies labor-supply and savings decisions on the part of consumers, it does not take into account overlapping generations or a life-cycle model of consumption behavior.¹⁵ Finally, the Harberger model assumes that markets are perfectly competitive, which seems unreasonable for some industries that are subject to corporate taxation.

In response to the criticism that the model does not acknowledge that corporate and noncorporate firms might produce the same or similar goods, economists Jane G. Gravelle and Laurence J. Kotlikoff introduced the "Mutual Production Model" (MPM) and the "Differentiated Product Model" (DPM).¹⁶ In the MPM, corporate and noncorporate firms produce identical goods, and the existence of the corporate sector, despite its higher effective tax rate, is explained by an

13. See Arnold C. Harberger, "Efficiency Effects of Taxes on Income from Capital," in Marian Krzyzaniak, ed., *Effects of the Corporation Income Tax* (Detroit: Wayne State University Press, 1966), pp. 107-117.

14. See Congressional Budget Office, *The Economic and Budget Outlook: An Update* (August 1995), p. 22, table 8.

15. Ballard and others, *A General Equilibrium Model*.

16. Jane G. Gravelle and Laurence J. Kotlikoff, "The Incidence and Efficiency Costs of Corporate Taxation When Corporate and Noncorporate Firms Produce the Same Good," *Journal of Political Economy*, vol. 97, no. 4 (1989), pp. 749-780; Jane G. Gravelle and Laurence J. Kotlikoff, "Corporate Tax Incidence and Inefficiency When Corporate and Noncorporate Goods Are Close Substitutes," *Economic Inquiry*, vol. 31 (1993), pp. 501-516.

advantage of scale in production and differences in skills among individuals. The MPM assumes that individuals who have the most entrepreneurial skill will establish their own proprietorships (in the noncorporate sector) and enjoy a technological advantage over the large corporate firms, but their advantage is subject to decreasing returns to scale. Individuals who are not efficient enough to become their own bosses become corporate managers or workers, and corporate firms must produce at more than a minimum scale. Because potential noncorporate entrepreneurs range from least efficient to most efficient, increases in the corporate tax rate thus induce some corporate managers or workers (the next-most skilled) to become entrepreneurs and expand the noncorporate sector.

In the DPM, corporate and noncorporate firms coexist within industries because consumers view the outputs as very close, but not perfect, substitutes. (For example, McDonald's hamburgers are not exactly the same as hamburgers from the local diner, and Budweiser beer is not exactly like beer produced by a microbrewery.)

In contrast to the Harberger model, where the cross-elasticity of demand between corporate and noncorporate output is small (because the products from the two sectors are very different), the MPM implies an infinite, and the DPM a very high, elasticity of substitution in consumption between corporate and noncorporate outputs within the same industry. It is thus not surprising that the excess burden of the corporate tax is much higher in both the MPM and DPM.

Gravelle and Kotlikoff estimate that the inefficiency of the corporate income tax is likely to exceed 1 percent of consumption, or about twice the magnitude of that produced by the Harberger model. In her survey of literature on the efficiency costs of the corporate income tax, Gravelle concludes that "the cost of the misallocation of physical resources may be more than half the revenue gained from the corporate tax."¹⁷ The resulting incidence, however, is not nearly as different. Most of the Gravelle and Kotlikoff simulations indicate that capital bears almost or more than the full burden of the corporate tax. Just as in the Harberger model, in order for labor to bear a substantial share of the burden, the elasticity of substitution between capital and labor must be low in the corporate compared with the noncorporate sector (see Table 1).

Although it is clear that the issue of incidence among factor incomes depends critically on the substitution elasticities, the recent literature is noncommittal about which combination of values seems most reasonable. Estimates do exist, however, and suggest that the elasticities of substitution between capital and labor vary widely among industries; agriculture exhibits one of the lowest elasticities (around 0.7), and

17. See Jane G. Gravelle, *The Economic Effects of Taxing Capital Income* (Cambridge, Mass.: MIT Press, 1994), p. 81.

TABLE 1. COMPARING THE CORPORATE TAX BURDEN FALLING ON CAPITAL UNDER THREE MODELS OF TAX INCIDENCE

Elasticity of Substitution Between Capital and Labor ^b	Percentage of Corporate Tax Burden Falling on Capital ^a		
	Differentiated Product Model ^c	Harberger Model	Mutual Production Model ^c
Corporate = 0.50			
Noncorporate = 0.50	78	82	141
Noncorporate = 1.00	70	73	71
Noncorporate = 2.00	60	61	27
Corporate = 1.00			
Noncorporate = 0.50	108	108	147
Noncorporate = 1.00	100	100	100
Noncorporate = 2.00	88	87	63
Corporate = 2.00			
Noncorporate = 0.50	137	127	157
Noncorporate = 1.00	131	122	129
Noncorporate = 2.00	121	112	103

SOURCE: Jane G. Gravelle and Laurence J. Kotlikoff, "Corporate Tax Incidence and Inefficiency When Corporate and Noncorporate Goods Are Close Substitutes," *Economic Inquiry*, vol. 31 (1993), p. 512, table VI.

- a. The percentage of corporate tax burden falling on capital is defined as the decline in capital income (caused by corporate taxation) divided by corporate tax revenue, times 100.
- b. Expressed as the absolute value of the percentage change in (quantity of capital/quantity of labor) divided by the percentage change in (price of capital/price of labor).
- c. As developed by Gravelle and Kotlikoff.

chemicals and motor vehicles have two of the highest (around 1).¹⁸ Because the agricultural industry is primarily noncorporate, and the chemicals and motor vehicles industries are primarily corporate, those elasticities might be interpreted as favoring the view that capital bears nearly the full burden of the corporate tax.

The work of Gravelle and Kotlikoff refines the distinction between corporate and noncorporate outputs, but it does not distinguish between marginal and average effective tax rates. Marginal tax rates are most useful for determining the effects of taxes on economic decisions because they reflect the change in tax bill that would result from the next dollar increase in the tax base. Average tax rates equal average tax liabilities per dollar in the tax base and so have less effect on decisions at the margin.

Economists Don Fullerton and Yolanda Kodrzycki Henderson do not differentiate between corporate and noncorporate goods in consumption, but they do allow tax provisions to cause differences in the corporate and noncorporate user costs of capital, implying differences in the marginal effective tax rates on corporate versus noncorporate capital.¹⁹ The divergence in marginal rates, however, turns out to be much smaller than that between average rates. Fullerton and Henderson thus find the inefficiency of the corporate tax to be much lower than that estimated by Harberger or others who specify average tax rates. The smaller difference in effective tax rates in turn implies smaller substitution effects and a smaller shifting of the corporate tax burden. The reduction in the magnitude of substitution effects (and the smaller excess burden that results) also depends on Fullerton and Henderson's assumption that the personal taxation of corporate dividends affects only the small fraction of investment financed by new shares. The authors assume, however, that financial decisions are made independently of corporate tax policy.

Corporate Taxation and Financial Decisions

Other recent literature looks more closely at the interaction between corporate financial policy and tax incentives. For example, economist Joseph E. Stiglitz has argued that the corporate income tax should have no effect on marginal investment decisions for firms that borrow money because interest expenses are deductible.²⁰

18. See, for example, the surveys by Vern Caddy, "Empirical Estimation of the Elasticity of Substitution: A Review," preliminary working paper OP-09 (IMPACT Project, Industrial Assistance Commission, Melbourne, Australia, 1976); and K.A. Reinert and D.W. Roland-Holst, "Parameter Estimates for U.S. Trade Policy Analysis," unpublished manuscript (International Trade Commission, April 1991).

19. See Fullerton and Henderson, "A Disaggregate Equilibrium Model."

20. Joseph E. Stiglitz, "Taxation, Corporate Financial Policy and the Cost of Capital," *Journal of Public Economics*, vol. 2 (1973), pp. 1-34, and Stiglitz, "The Corporation Tax," *Journal of Public Economics*, vol. 5 (1976), p. 303.

The corporate income tax has no effect on marginal effective tax rates for those firms as well as for firms that reinvest profits (retain earnings) to finance new investment, as long as firms use retained earnings only if the after-tax return on such investment exceeds the implicit return that could be earned from retiring debt. The Stiglitz result is an extreme one, however, because it also requires other assumptions, such as the absence of inflation and depreciation allowances equaling economic depreciation.

The traditional view of dividend taxation is that the U.S. tax system double-taxes the returns from equity-financed investments, first at the corporate level and then through personal taxes on dividend income.²¹ Corporate equity in the form of retained earnings is also double-taxed through capital gains taxation at the personal level. But capital gains are taxed at a lower effective rate because the tax is deferred until realization of the gains, and, for higher-income taxpayers, capital gains are taxed at a lower rate than other income. Taxation of dividends, in the traditional view, thus raises the marginal cost of corporate capital, reduces the incentive to invest, and causes large distortions between the corporate and noncorporate sectors.

Since the late 1970s, however, some economists have argued that the additional, personal-level tax on dividend income has little or no effect on the cost of capital, because marginal investment is financed primarily through retained earnings, and a dividend tax reduces both the implicit cost of retaining (in dividend income currently forgone) and the return from retaining (in future dividend income). Retained earnings are "trapped equity" and can be consumed only if distributed and subject to the dividend tax. That "new view" of dividend taxation implies that the extra tax on dividends has no effect on investment.²² In contrast, the double taxation of retained earnings through capital gains taxation on a personal level will affect marginal investments by corporations.²³ The effective rate of taxation is quite low, however, because capital gains taxes are deferred until they are realized. Hence, the new view suggests that the corporate income tax raises the cost of corporate capital above the cost of noncorporate capital, but much more slightly than suggested by the old view.

The "nucleus theory" of the firm, developed by economist Hans-Werner Sinn, is an attempt to reconcile the old and new views of corporate and dividend

21. See Charles E. McLure, *Must Corporate Income Be Taxed Twice?* (Washington, D.C.: Brookings Institution, 1979).

22. See Mervyn A. King, *Public Policy and the Corporation* (London: Chapman and Hall, 1977); Alan J. Auerbach, "Wealth Maximization and the Cost of Capital," *Quarterly Journal of Economics*, vol. 93 (1979), pp. 433-446; and David F. Bradford, "The Incidence and Allocation Effects of a Tax on Corporate Distributions," *Journal of Public Economics*, vol. 15 (1981), pp. 1-22.

23. See the survey by Peter Birch Sorensen, "Changing Views of the Corporate Income Tax," *National Tax Journal*, vol. 48, no. 2 (1995), pp. 279-294.

taxation.²⁴ This theory recognizes that there are important differences among the financing practices of corporations, depending on their ages. Immature or rapidly growing firms are more likely to rely on a "nucleus" of new share issues for equity finance and are therefore more likely to face a higher cost of capital when dividends are subject to double taxation. Only mature firms earn enough profits to allow all marginal investments to be made through retentions. Thus, the old view is more likely to hold for young firms and the new view more likely to apply to mature firms.

These competing views are relevant to the incidence question, because if corporate or dividend taxes have no incentive effects, they are effectively lump-sum taxes and the tax burden falls solely on holders of existing stock. More recently, attention has shifted to the empirical testing of these alternative hypotheses about dividend taxation.²⁵ Unfortunately, the existing evidence is mixed. Economist Alan Auerbach finds evidence that new share issues are a high-cost source of funds in relation to retained earnings, consistent with the new view that marginal investments will be made through retentions.²⁶ Economists James Poterba and Lawrence Summers, by contrast, obtain results that are more supportive of the traditional view, including a negative relationship between dividend taxes and payouts.²⁷ Economists Laurie Bagwell and John Shoven indicate the increasing importance of share repurchases and cash mergers and acquisitions as alternatives to dividends.²⁸ Their concept challenges the new-view assumption that dividend taxes must eventually be paid when distributing funds to the stockholders.

Other recent work has incorporated financial decisions made within a firm into the general-equilibrium analysis of capital taxation. In the context of corporate tax incidence, this refinement implies that tax burdens can differ among households according to the type of capital income that is earned. For example, a model developed by economist Joel Slemrod allows corporate financial policy (debt-equity ratios and dividend payout rates) to react to tax changes, and recognizes that different households hold different portfolios of capital. Under such specifications, any indexing of capital income for inflation would result in a shift toward equity finance

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24. Hans-Werner Sinn, "Taxation and the Cost of Capital: The 'Old' View, the 'New' View and Another View," *Tax Policy and the Economy*, vol. 5 (1991), pp. 25-54.
 25. The empirical evidence on the "new view" versus the "old view" is discussed in Charles McLure and George Zodrow, "The Study and Practice of Income Tax Policy," in John M. Quigley and Eugene Smolensky, eds., *Modern Public Finance* (Cambridge, Mass.: Harvard University Press, 1994), pp. 165-209.
 26. See Alan Auerbach, "Taxes, Firm Financial Policy, and the Cost of Capital: An Empirical Analysis," *Journal of Public Economics*, vol. 23 (1984), pp. 27-57.
 27. See James Poterba and Lawrence Summers, "The Economic Effects of Dividend Taxation," E. Altman and M. Subrahmanyam, eds., *Recent Advances in Corporate Finance* (Howewood, Ill.: Irwin, 1985).
 28. See Laurie Bagwell and John Shoven, "Cash Distributions to Shareholders," *Journal of Economic Perspectives*, vol. 3 (1989), pp. 129-140.

and away from debt finance, and would benefit households that face higher personal tax rates, for whom the retention of earnings has a sheltering effect, at the expense of households that are taxed at a lower rate.²⁹

Another manner in which a corporation's financial status may affect the incidence of the corporate income tax is through imperfect capital markets. As demonstrated by economists Steven Fazzari, R. Glenn Hubbard, and Bruce Petersen, recent empirical work on imperfect information and the theory of firm behavior indicates that many firms face "liquidity constraints," in which the cost of capital for projects financed internally is lower than that for projects funded externally.³⁰ In such a situation, the corporate income tax can affect the firm's investment plan by increasing the average tax rate on capital, even if the marginal tax burdens on new investment are not affected. Thus, inframarginal tax changes, or changes that have no effect on marginal tax rates, can have real effects on the level of economic activity, and tax burdens can be shifted away from the corporate firm's capital. Moreover, young and old firms are likely to be affected differently, and hence the households that invest in those firms would also be burdened in different ways.

The recent focus on these liquidity constraints ironically validates the assumption in earlier general-equilibrium models that average tax rates matter. In fact, the literature in the field of corporate finance has come full circle, returning to arguments that support a direct relationship between the financial and real decisions of firms, and away from the theory developed by economists Franco Modigliani and Merton Miller that denies it.³¹ The relationship between financial and real decisions has its origins in the role of financial instruments as signals to investors, which provide incentives to managers and entrepreneurs and determine the degree of control that investors have over the activities of corporations.

29. Joel Slemrod, "A General Equilibrium Model of Taxation with Endogenous Financial Behavior," in Martin Feldstein, ed., *Behavioral Simulation Methods in Tax Policy Analysis* (Chicago: University of Chicago Press, 1983). Other models with endogenous financial behavior include those discussed in Don Fullerton and Roger H. Gordon, "A Reexamination of Tax Distortions in General Equilibrium Models," in Feldstein, ed., *Behavioral Simulation Methods*; Harvey Galper, Robert Lucke, and Eric Toder, "A General Equilibrium Analysis of Tax Reform," in Henry J. Aaron, Harvey Galper, and Joseph A. Pechman, eds., *Uneasy Compromise: Problems of a Hybrid Income-Consumption Tax* (Washington, D.C.: Brookings Institution, 1988); and James Berkovec and Don Fullerton, "A General Equilibrium Model of Housing, Taxes, and Portfolio Choice," *Journal of Political Economy*, vol. 100 (1992), pp. 390-429.

30. See Steven M. Fazzari, R. Glenn Hubbard, and Bruce C. Petersen, "Financing Constraints and Corporate Investment," *Brookings Papers on Economic Activity*, no. 1 (1988), pp. 141-195; and Fazzari, Hubbard, and Petersen, "Investment, Financing Decisions, and Tax Policy," *American Economic Review*, vol. 78 (1988), pp. 200-205. This point is also emphasized in Poterba, "Comments on Chapter 2."

31. See Franco Modigliani and Merton Miller, "The Cost of Capital, Corporation Finance, and the Theory of Investment," *American Economic Review*, vol. 48 (1958), pp. 261-297, in which they demonstrate that under certain assumptions, the value of a firm must be independent of its debt-equity mix. This independence occurs because as firms issue more debt, the return on equity capital will have to increase as the risk borne by each unit of equity increases. The increased cost of equity capital results in an unchanged weighted cost of capital.

Dynamic and International Considerations

There are two main objections to Harberger's assumption of a fixed and immobile total stock of capital. First, although the total supply of capital may be fixed over the short term, in the long term the level can certainly be changed by savings and investment. Second, even over a relatively short period of time, capital may be able to "disappear" from the tax rolls by moving abroad. Those possibilities suggest ways in which the corporate tax burden might be shifted away from capital. Given the important implications for incidence, a number of researchers have looked at how relative returns from different factors are affected in moving to dynamic or international models.

In a dynamic setting, economist Peter A. Diamond constructs a simple, two-period model employing overlapping generations to demonstrate that a first-period tax on the return from capital, because of its negative effect on the accumulation of capital, will at least partially burden labor in the subsequent period.³² The empirical significance of that type of shifting, however, depends on the magnitude of the interest elasticity of saving, or the percentage increase in saving resulting from a 1 percent increase in the interest rate, but there is no consensus about this effect. The higher the interest elasticity of saving, the greater the tax burden on labor in future periods.

The shift toward labor is countered by the fact that income effects matter too. Furthermore, any redistribution of the tax burden from the young to the old, such as by a tax on existing capital, will increase future accumulation of capital and raise the wage rate in relation to the return from capital. Auerbach and Kotlikoff demonstrate that result using a 55-period model employing overlapping generations.³³ They show that investment incentives are more efficient in increasing the formation of capital than are reductions in taxes on interest income, because the former target new capital whereas the latter provide windfall gains to holders of existing capital. Such life-cycle models are useful not only for their evaluations of steady-state incidence, but also for the insights they provide on the transitional incidence discussed earlier.

In an open-economy setting, domestic saving differs from investment, so distinctions between taxes on saving and taxes on investment become more important. Economist Peter Birch Sorensen explains that the incentive effects of corporate and dividend taxes depend on the identity and tax status of the marginal

32. See Peter A. Diamond, "Incidence of an Interest Income Tax," *Journal of Economic Theory*, vol. 2 (1970), pp. 221-224. Martin Feldstein also demonstrates this result in "Incidence of a Capital Income Tax in a Growing Economy with Variable Savings Rates," *Review of Economic Studies*, vol. 41 (1974), pp. 505-513.

33. Auerbach and Kotlikoff, *Dynamic Fiscal Policy*.

shareholder.³⁴ For example, if the marginal investor is foreign, dividend tax relief will fail to stimulate investment unless that relief is extended to foreign shareholders.

In terms of tax incidence, an open economy implies that the corporate tax burden may be shifted to immobile factors as capital flows out of a country. Economists David F. Bradford and Joel Slemrod have shown that if capital is perfectly mobile among countries, the burden of a tax imposed on capital in one country will be spread evenly among all capital, regardless of the country in which it is ultimately used.³⁵ In contrast to the uniform burden among capital owners, there will be varying burdens on the owners of immobile factors (labor or land)--namely, losses to those in the taxing country and gains to those in other countries. In general, the smaller the taxing country, the larger the burden on that country's immobile factors. Despite this, Harberger has argued that in the open-economy context, U.S. labor is likely to bear a burden of two to two and one-half times the full burden of the U.S. corporate income tax.³⁶

Although the mobility of capital has been used to argue that at least part of the corporate tax burden falls on labor, economist Jane G. Gravelle cautions that these international models typically assume not only that capital is perfectly (costlessly) mobile among countries, but that the outputs produced by different countries can be substituted perfectly for one another. In simulations that use less-than-infinite elasticities within a single-output model, Gravelle finds that both the elasticity of product substitution (elasticity of substitution between domestically- and foreign-produced goods) and the "portfolio elasticity" (the elasticity of substitution between domestic and foreign capital investments) must be large in order for a substantial share of the burden to fall on labor.³⁷

Using what she feels are the most reasonable values for the elasticities of substitution among countries, Gravelle concludes that even in the setting of an open economy, the burden falls fully on capital. In contrast, the multioutput model specified by economists John Mutti and Harry Grubert allows for output as well as factor-substitution effects and generates significant shifting of the corporate tax

34. See Sorenson, "Changing Views of the Corporate Income Tax."

35. See David F. Bradford, "Factor Prices May Be Constant, But Factor Returns Are Not," *Economics Letters* (1978); and Joel Slemrod, "Effect of Taxation with International Capital Mobility," in Henry J. Aaron, Harvey Galper, and Joseph A. Pechman, eds., *Uneasy Compromise: Problems of a Hybrid Income-Consumption Tax* (Washington, D.C.: Brookings Institution, 1988).

36. See Arnold C. Harberger, "The ABCs of Corporation Tax Incidence: Insights into the Open-Economy Case" (prepared for the American Council for Capital Formation, June 1994).

37. See Jane G. Gravelle, "Corporate Tax Incidence in an Open Economy," in National Tax Association, *Proceedings of the 86th Annual Conference on Taxation*, 1993 (Columbus, Ohio: NTA, 1994).

burden onto labor, even with only a modest degree of capital mobility and substitution elasticities that are less than infinite.³⁸

Mutti and Grubert's model is also dynamic and specifies an interest elasticity of saving that they vary (from 0 to 0.4 units) in their simulations. Their determination of greater shifting of the corporate burden to labor may be partly explained by a lower assumed factor-substitution elasticity and their dynamic framework, but even when one examines parameter values more similar to those of Gravelle, it is difficult to reconcile Mutti and Grubert's predictions with hers. The remaining differences are probably caused by the specific structures of the models.

For example, in the Mutti and Grubert model, consumers may choose among three different domestically produced goods plus two foreign-produced goods. In Gravelle's model, consumers substitute only between one domestic and one foreign output. Unfortunately, the actual extent of international capital mobility is difficult to measure directly and remains an open issue. Economists Martin Feldstein and Charles Horioka present empirical evidence that leads them to conclude that international capital mobility is very limited, although their evidence is not necessarily contradictory to perfect capital mobility.³⁹

In the international models cited, the effects of capital mobility on the incidence of capital taxation are at least partly driven by a "small-country assumption," that is, that a country's supply of capital is perfectly elastic at the given world rate of return. Joel Slemrod emphasizes that a large country, however, can take advantage of its capacity to influence the world rate of return and can improve the welfare of its residents by imposing a tax that reduces the international movement of capital.⁴⁰ Reducing the flow of capital improves welfare for a capital-exporting country by raising its return on foreign investments, and improves welfare in the case of a capital-importing country by reducing the price it pays for imported capital.

Similarly, economist Anne Sibert argues that in a large open economy, compared with a small one, the movement of capital to other countries is less likely to burden labor (the immobile factor) because changes in the world interest rate may

38. See John Mutti and Harry Grubert, "The Taxation of Capital Income in an Open Economy: The Importance of Resident-Nonresident Tax Treatment," *Journal of Public Economics*, vol. 27 (1985), pp. 291-309.

39. See Martin Feldstein and Charles Horioka, "Domestic Savings and International Capital Flows," *Economic Journal*, vol. 90 (June 1980), pp. 314-329. For an explanation of why the Feldstein-Horioka evidence is not necessarily a contradiction of perfect capital mobility, see Richard E. Caves, Jeffrey A. Frankel, and Ronald W. Jones, *World Trade and Payments*, 6th ed. (New York: Harper Collins, 1993), pp. 524-526.

40. Slemrod, "Effect of Taxation with International Capital Mobility."

boost wages.⁴¹ Sibert shows that if the domestic economy is running a sufficiently large current-account deficit, a rise in a home investment tax could cause the world interest rate to decline and home wages and investment to rise (instead of fall). Although she cautions that "reasonable parameter values would probably preclude [a gain to labor]," she does conclude that "labor in a large deficit country may not be as badly hurt by a tax on capital as it would be if the country were running a surplus."⁴²

Thus, both the dynamic and the international models open up the possibility that the burden of a tax on capital might be shifted to labor by means of the growth or movement of capital. What that suggests about the significance of such shifting, however, depends on what one believes about the responsiveness of savings and the degree and nature of the mobility of international capital.

Recharacterizing Consumer and Producer Behavior

Finally, other variants of the Harberger model change some of the most fundamental assumptions. Economists Don Fullerton and Diane Lim Rogers (the author of this paper) developed a life-cycle model to determine tax incidence among households characterized by lifetime, not annual, income.⁴³ On an annual basis, capital income taxes are markedly progressive; however, over a lifetime the incidence of capital taxation depends on the relationship between the entire time-path of income and the entire time-path of consumption. Generally, households with lifetime-income profiles that peak earlier and to a greater degree are the households who save more and thus bear a larger share of the burden associated with capital taxation. Fullerton and Rogers find that capital taxation still appears progressive in a lifetime context (because households with high lifetime income generally have more pronounced peaks in income). They also find, however, that the effective burdens from capital-income taxation do not rise consistently with lifetime income (because the timing of the peak does not fall consistently with income). That is, some categories of households with higher lifetime incomes face lower burdens as a share of their lifetime income compared with some categories that have lower lifetime incomes.

The corporate tax has little effect in the Fullerton-Rogers model, in large part because the model uses 1984 as the benchmark year, and the corporate tax had relatively little effect on the cost of capital at that time. In 1984 there was not much

41. See Anne Sibert, "Taxing Capital in a Large, Open Economy," *Journal of Public Economics*, vol. 41 (1990), pp. 297-317.

42. *Ibid.*, p. 307.

43. See Don Fullerton and Diane Lim Rogers, *Who Bears the Lifetime Tax Burden?* (Washington, D.C.: Brookings Institution, 1993).

of a "tax wedge" between gross costs of capital and the net returns from capital, because of generous depreciation allowances and the investment tax credit. The wedge became more significant after the Tax Reform Act of 1986, which both repealed the investment tax credit and reduced the value of depreciation allowances. Their simulations of the corporate tax suggest that the small burden that exists is shared by capital and labor, so relative factor returns are unchanged. That result is a product of negligible output effects and very small factor-substitution effects and contrasts with the conclusions of Harberger and others. Although the corporate tax does affect the prices of certain types of corporate goods in relation to their noncorporate counterparts, the Fullerton-Rogers model assumes that corporate and noncorporate firms within a given industry have the same ratios of capital to labor (changes in output therefore do not affect relative factor returns). The corporate tax has little effect on the overall corporate cost of capital; there is therefore little overall substitution into labor.

Although relative factor returns are unaffected by the corporate tax, a pattern of burdens among households still emerges as a result of effects according to the uses of income. The corporate income tax raises the prices of some goods in relation to others, because it taxes different types of capital at different rates. In the Fullerton-Rogers benchmark based on 1984 law, the corporate tax favors equipment and intangible capital over other types of capital. Because goods consumed by lower-income households tend also to be those made using technologies produced by structure-, inventory-, or land-intensive methods, the corporate tax appears regressive. Thus, the Fullerton-Rogers study highlights the importance of considering how relative output-price effects contribute to the overall incidence of the corporate tax.

The inefficiency of the corporate income tax also remains high in the Fullerton-Rogers model, especially in relation to the small amount of tax revenue raised. (The authors determine that the efficiency cost is about 65 percent of revenue.)

For the sake of simplicity, most general-equilibrium models of taxation assume that markets are perfectly competitive. Economists Michael L. Katz and Harvey S. Rosen show that this standard assumption is far from innocuous.⁴⁴ In a situation in which only a few producers dominate the market, a tax on corporate capital would raise marginal costs and induce firms to reduce their levels of output to the cartel level, at which the firms' combined profits are maximized. Because the increase in profits before taxes may exceed the level of tax revenues collected, profits after taxes can be increased by the tax, implying that more than 100 percent of the

44. See Michael L. Katz and Harvey S. Rosen, "Tax Analysis in an Oligopoly Model," *Public Finance Quarterly*, vol. 13, no. 1 (1985), pp. 3-20.

tax burden is shifted. That contrasts with results obtained under either perfect competition or monopoly, in which a corporate tax must reduce profits.

Finally, results from the standard models of tax incidence depend crucially on the assumption of prices that are fully flexible. Economist James M. Poterba has argued that the recent literature on "menu costs," or the inability of firms to change prices often, challenges the fundamental lesson in incidence theory, namely that the statutory incidence between producers and consumers is irrelevant in determining the economic incidence.⁴⁵ Fully flexible prices also imply that only relative prices matter. If prices are less than perfectly flexible, incidence may in fact be affected by absolute price changes. For example, increases in the overall price level may generate tax burdens that are different from those resulting from decreases in overall factor incomes, even in a static context in which there is no saving and consumption thus equals income.

DISTRIBUTING THE BURDEN IN PRACTICE

For economists who analyze the effects of actual corporate tax policies, the primary goal in assessing the distributional effects of taxes lies in determining how burdens correspond to people's ability to pay. Instead of answering that question by constructing new general-equilibrium models, the typical strategy is to translate results from existing models and other academic research into assumptions about incidence that are applied to detailed microdata on households.⁴⁶

Incidence Assumptions Used in Microdata Studies

In attempting to impute corporate tax liabilities to individuals, researchers often consider a variety of possibilities, according to the patterns of incidence suggested by existing literature. For example, in one study CBO focused on the factor-income distinctions among households, considering two variants of corporate tax incidence, one in which burdens are allocated according to capital income, the other in which burdens are allocated according to labor income.⁴⁷ Because capital income is more highly concentrated at the upper end of the income distribution, allocation according to capital income results in a highly progressive corporate tax burden, and allocation according to labor income results in a more proportional pattern of effective tax rates.

45. See Poterba, "Comments on Chapter 2."

46. For an overview and critique of the methods of distributional analyses used at the policy level, see the various articles in David F. Bradford, ed., *Distributional Analysis of Tax Policy* (Washington, D.C.: American Enterprise Institute, 1995).

47. See Congressional Budget Office, *The Changing Distribution of Federal Taxes: 1975-1990* (October 1987).

Economists Joseph A. Pechman and Benjamin Okner also consider the possibility of effects on the prices of goods in the following five allocations of the corporate tax burden: (1) to dividends; (2) to capital income in general; (3) half to dividends, half to capital income in general; (4) half to dividends, one-fourth to consumption, and one-fourth to wages; and (5) half to capital income in general and half to consumption.⁴⁸ As discussed below, however, because Pechman and Okner assume no effects on the relative prices of goods, their uses-side (consumption) versus sources-side (income) distinctions are not very meaningful, except to the extent that the total consumption of a household might differ from its total income.

The staff of the Joint Committee on Taxation (JCT) has in the past suggested that the corporate tax burden should be distributed to owners of corporate capital. Their reasoning is that the short-term burden falls on corporate capital alone, and that even if in the long term the burden is shifted to capital in general, or even labor, the amount of shifting that could take place within the five-year budget window is negligible.⁴⁹ The JCT also indicates the importance of distinguishing between old and new capital. Corporate tax changes with targeted incentives may not benefit all savers, so there is a need to distinguish individuals by investment activity and type. Most recently, however, the JCT has chosen to avoid distributing the corporate tax burden, stating in unpublished distributional tables that the "corporate income tax is not included due to uncertainty concerning the incidence of the tax."⁵⁰

In practice, the long-term burden of the corporate income tax is usually assumed to fall on capital in general, following the Harberger result.⁵¹ Even under that assumption, the practice of distributing the corporate tax burden among individuals is not straightforward. Although Pechman uses several variants in allocating the corporate tax to households, he ascribes any portion of the corporate income tax borne by capital to each individual's total capital income less taxes. This capital income includes the assignment of corporate retained earnings and estimated accrued capital gains in noncorporate assets to households on the basis of their dividend income. Economist Martin S. Feldstein focuses on improving that allocation of

48. See Joseph A. Pechman and Benjamin Okner, *Who Bears the Tax Burden?* (Washington, D.C.: Brookings Institution, 1974). A later analysis using the same methodology can be found in Pechman's later book, *Who Paid the Taxes, 1966-85* (Washington, D.C.: Brookings Institution, 1985).

49. See Joint Committee on Taxation, *Methodology and Issues in Measuring Changes in the Distribution of Tax Burdens* (1993).

50. See footnote 3 in unpublished tables titled "Distributional Effects of the Tax Provisions Contained in the Contract With America Tax Relief Act of 1995" (Joint Committee on Taxation, 1995).

51. This is the assumption currently made by the U.S. Treasury in its distributional analyses of tax policies. See James R. Nunns, "Distributional Analysis at the Office of Tax Analysis," in David F. Bradford, ed., *Distributional Analysis of Tax Policy* (Washington, D.C.: American Enterprise Institute, 1995), pp. 111-119.

corporate tax burdens to capital in general.⁵² He includes the capital income received by pension funds, distinguishes between real and nominal capital income, and accounts for automatic reductions in personal tax payments, which partially offset increases in corporate tax burdens.

Distinctions Between Effects on the Sources of Income and Effects on the Uses of Income

Empirical studies often distinguish between the effects of "sources-side" incidence, or effects on factor incomes, and "uses-side" effects, or effects on prices of goods. Most of the time those distinctions are not meaningful, because only relative prices matter in characterizing economic burdens.

For example, the Pechman studies treat the portion of the corporate tax that is allocated to consumption as a proportional consumption tax. Because there are no distinctions among different goods, in a world with no saving the portion of the burden on consumption could really be viewed as analogous to a proportional tax on both capital and labor income. More specifically, if consumption equals income, Pechman's variant (5), described above, is analogous to allocating three-fourths of the corporate tax burden to capital income and one-fourth to labor income. In a dynamic context, however, the proportional consumption tax is not perfectly equivalent to a proportional income tax, because annual consumption need not equal annual income, and is instead likely to be analogous to a regressive income tax, because consumption as a share of income is higher for those with lower annual income.

Economists Shantayanan Devarajan, Don Fullerton, and Richard A. Musgrave compare microdata methods that assume incidence with general-equilibrium methods that calculate incidence. They examine incidence according to the common assumption that taxes on factor incomes produce effects mainly through the sources side (decreases in factor prices or changes in relative factor prices) and taxes on goods affect people primarily through the uses side (increases in the overall price of goods or changes in the prices of some goods in relation to others).⁵³ But again, that sources-side versus uses-side distinction is not very meaningful in a static world in which only relative prices matter. The more useful distinction is among changes in real income (either through increases in the overall price level or decreases in factor incomes), effects on relative factor prices (change in return from capital in relation to labor), and effects on relative output prices (changes in prices

52. See Martin S. Feldstein, "Imputing Corporate Tax Liabilities to Individual Taxpayers," *National Tax Journal*, vol. 41, no. 1 (1988), pp. 37-59.

53. Shantayanan Devarajan, Don Fullerton, and Richard A. Musgrave, "Estimating the Distribution of Tax Burdens: A Comparison of Different Approaches," *Journal of Public Economics*, vol. 13 (1980), pp. 155-182.

of corporate in relation to noncorporate output, or prices of certain types of consumer goods in relation to others).

In practice, however, the nominal changes and distinctions between sources and uses may matter. As previously mentioned, prices might not be fully flexible because of menu costs or contracts. In addition, any relating of transfer payments to the price level (such as that which occurs with Social Security benefits) may suggest that taxes that raise the prices of goods (on the uses side) may burden some individuals more than others, depending on the source of those people's income. Economists Edgar K. Browning and William R. Johnson have used that point to argue that the burden of sales and excise taxes should be distributed in proportion to factor incomes rather than in proportion to consumption.⁵⁴ Finally, the fact that people save implies that distribution according to consumption versus income really does matter.

The Role of Consumption

Very few empirical studies of corporate tax incidence have examined the role of consumption. The primary focus has been on the distinction between capital and labor income, despite the fact that the distribution of the corporate tax burden may also depend on differences in individuals' propensity to save (how much income is consumed) and in the types of goods they consume. For example, even in a world in which only relative prices matter, if corporate taxes cause both an increase in the overall price of goods and changes in the prices of some goods in relation to others, such an effect can generate burdens that are not proportional to income, even if relative factor prices remain unchanged. The reason is that in practice, unlike in Harberger's simple model, both the bundles of goods consumed and total consumption as a share of income may differ among consumers.

Economists Gerald E. Auten and Laura T.J. Kalambokidis highlight the potentially important role of consumption in corporate tax incidence.⁵⁵ Auten and Kalambokidis emphasize that in practice the corporate income tax is not a pure corporate income tax, but a hybrid of a pure income tax and a tax on cash flow. A pure income tax would allow depreciation deductions equal to the rate of economic depreciation. A pure tax on cash flow would allow the expensing, that is, the full write-off, of all capital costs. Because the current corporate tax specifies depreciation allowances that exceed economic depreciation and allows a small portion of physical capital costs to be expensed, it falls somewhere in between the

54. See Edgar K. Browning and William R. Johnson, *The Distribution of the Tax Burden* (Washington, D.C.: American Enterprise Institute, 1979).

55. See Gerald E. Auten and Laura T.J. Kalambokidis, "The Effect on the Distribution of the Tax Burden of Replacing the Corporate Income Tax with a Consumption Tax" (U.S. Treasury, Office of Tax Analysis, 1995).

two pure taxes. Some general-equilibrium models are able to take into account the hybrid nature of the corporate tax, by tracing the ways in which deductions for depreciation affect the costs of various types of capital, the net rate of return from capital in relation to labor, and the prices of goods. At the policy level, however, such models are not typically used to distribute tax burdens, because it is difficult to align detailed microdata on households with the complicated theoretical framework of those models.

Auten and Kalambokidis propose a practical methodology that recognizes that at least some of the corporate tax burden falls on consumption. Although they treat a majority of the corporate tax (76 percent) as a pure income tax, they interpret the remainder (24 percent) as a corporate cash flow tax with a deduction for employee compensation. They distribute the income tax component according to the capital income of households and distribute the cash flow portion as a consumption tax plus a tax cut for wage earners. Auten and Kalambokidis determine the 76/24 split by comparing the implicit costs of capital under the taxes on pure income and cash flow with the costs implied by the actual corporate tax structure. Unlike the assumptions of the Fullerton-Rogers model, Auten and Kalambokidis do not distinguish between corporate and noncorporate goods in allocating the consumption component among households. In addition, they assume that corporate wages are distributed similarly to wages in general. For the allocation of the consumption-tax component among households, Auten and Kalambokidis determine the saving periods implied by both the questions about financial planning periods and the data on asset holdings from the 1989 Federal Reserve Board Survey of Consumer Finances. Current-year savings are translated into consumption-tax burdens by approximating the present value of future consumption, which in turn implies a present value of future tax liabilities. Not surprisingly, the authors find that the treatment of a portion of the corporate tax as a cash flow tax makes the corporate tax look less progressive than under the standard method, in which the burden is allocated to capital income only.

CONCLUSION

Clearly, there is no consensus in the literature about taxation on the subject of who bears the burden of the corporate income tax. Individuals can bear burdens according to the sources of their income or the uses of that income. The incidence among factors dominates the discussion, but even there, disagreements persist over the extent of factor mobility and the degree of substitutability among factors and goods. On a more fundamental level, issues about whether dividend taxes increase the cost of capital and whether average tax rates matter remain unresolved. Nevertheless, as Peter Birch Sorensen says, "the extent of disagreement over the incidence of the

corporation tax should not be exaggerated."⁵⁶ Some (although weak) conclusions can be drawn from this survey of the literature:

- o The short-term burden of the corporate tax probably falls on stockholders or investors in general, but may fall on some more than on others, because not all investments are taxed at the same rate.
- o The long-term burden of corporate or dividend taxation is unlikely to rest fully on corporate equity, because it will remain there only if marginal investment is not affected by those taxes. Most economists believe that the corporate tax system has some effect on investment decisions.
- o Most evidence from closed-economy, general-equilibrium models suggests that given reasonable parameters, the long-term incidence of the corporate tax falls on capital in general.
- o In the context of international capital mobility, the burden of the corporate tax may be shifted onto immobile factors (such as labor or land), but only to the degree that the capital and outputs of different countries can be substituted.
- o In the very long term, the burden is likely to be shifted in part to labor, if the corporate tax dampens capital accumulation.
- o Most attempts to distribute the burden of corporate taxation have neglected the possible importance of effects on the relative prices of products.

The literature suggests that in assigning the burden of the corporate tax among households, various distinctions are important. Among those are the share of income earned from capital, the form of capital income (interest versus dividends, corporate shares versus other investments), the age and type of corporate shares held, the mix of corporate and noncorporate outputs purchased, and the amount and timing of consumption. Much of the remaining uncertainty over the incidence of the corporate tax could be resolved with more and better empirical estimates of the parameters that are critical to the models. In addition, further research is needed into the effects of corporate taxes on the financial decisions of firms and households, the incidence of corporate taxes through consumption levels and patterns, and the effects of imperfect competition.

56. Sorensen, "Changing Views of the Corporate Income Tax," p. 292.

**APPENDIX: ADDITIONAL SURVEYS ON THE INCIDENCE
OF THE CORPORATE INCOME TAX**

Surveys that focus on corporate taxes or tax incidence in general include the following:

Atkinson, Anthony B., "The Distribution of the Tax Burden," in John M. Quigley and Eugene Smolensky, eds., *Modern Public Finance*, (Cambridge, Mass.: Harvard University Press, 1994).

Atkinson, Anthony B., and Joseph E. Stiglitz, *Lectures on Public Economics* (New York: McGraw-Hill, 1980), ch. 5 - 7.

Auerbach, Alan J., "Taxation, Corporate Financial Policy, and the Cost of Capital," *Journal of Economic Literature*, vol. 21 (1983), pp. 905-940.

Auerbach, Alan J., "Public Sector Dynamics," in John M. Quigley and Eugene Smolensky, eds., *Modern Public Finance*, (Cambridge, Mass.: Harvard University Press, 1994), ch.3.

Davies, David G., *United States Taxes and Tax Policy* (Cambridge, England: Cambridge University Press, 1986), ch. 6.

Gravelle, Jane G., "The Corporate Income Tax: Economic Issues and Policy Options," *National Tax Journal*, vol. 48, no. 2 (1995), pp. 267-277.

Kotlikoff, Laurence J., and Lawrence H. Summers, "Tax Incidence," in Alan J. Auerbach and Martin Feldstein, eds., *Handbook of Public Economics*, vol. 2 (Amsterdam: Elsevier Science Publishers, 1987), pp. 1043-1092.

Sorensen, Peter Birch, "Changing Views of the Corporate Income Tax," *National Tax Journal*, vol. 48, no. 2 (1995), pp. 279-294.