# Who Bears the Corporate Tax?
## A Review of What We Know

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**Abstract**

This paper reviews what we know from economic theory and evidence about who bears the burden of the corporate income tax. Among the lessons from the recent literature are:

1. For a variety of reasons, shareholders may bear a certain portion of the corporate tax burden. In the short run, they may be unable to shift taxes on corporate capital. Even in the long run, they may be unable to shift taxes attributable to a discount on "old" capital, taxes on rents, or taxes that simply reduce the advantages of corporate ownership. Thus, the distribution of share ownership remains empirically quite relevant to corporate tax incidence analysis, though attributing ownership is itself a challenging exercise.

2. One-dimensional incidence analysis – distributing the corporate tax burden over a representative cross-section of the population – can be relatively uninformative about who bears the corporate tax burden, because it misses the element timing.

3. It is more meaningful to analyze the incidence of corporate tax changes than of the corporate tax in its entirety, because different components of the tax have different incidence and incidence relates to the path of the economy over time, not just in a single year.

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# INTRODUCTION

Who bears the corporate income tax? The answer to this question is important to our understanding of the distribution of tax burdens, but it has been elusive. In his classic series of analyses of the incidence of the U.S. tax system, Pechman (e.g., 1985) provided alternative scenarios with different assumptions about the incidence of the corporate tax, reflecting his uncertainty about which assumption was best. (He did not do this for the individual income tax.) Distributional analyses provided by U.S. government agencies have, on most occasions, simply ignored the corporate tax. Thus, the Tax Reform Act of 1986, which was estimated to reduce individual income taxes and increase corporate income taxes, could illogically be characterized as being revenue-neutral while providing a tax cut for each income class of a nine-class breakdown.[1]

This episode illustrates why it is important to understand the incidence of the corporate tax. Although the tax accounts for a small share of federal revenues, *changes* in the corporate income tax and its associated revenues have often been a significant part of revenue legislation. Moreover, because its incidence is often perceived to fall on the affluent, assignment of the corporate tax burden can have a significant impact on the assessed progressivity of the tax system as a whole.

The most evident difficulty in assigning the corporate tax burden is that, unlike most taxes, there is no guidance given by statutory incidence. While we may start with a working assumption that individual income taxes or sales taxes are borne by the people who are legally liable for them, for example, there is no comparable assumption for the corporation income tax,

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[1] U.S. Joint Committee on Taxation (1986, Table 1). This approach was hardly without its critics. See, for example, Feldstein (1988), who also took issue with Pechman's methodology and developed one particular way of allocating the corporate tax changes of TRA86 based on the distribution of real capital income.

given the cardinal rule of incidence analysis that only individuals can bear the burden of taxation and that all tax burdens should be traced back to individuals.  Thus, we must rely on deeper assumptions from the start; and, with corporations increasingly becoming multinational enterprises, the individuals at risk of bearing the U.S. corporate tax burden clearly include those beyond our own national borders.

This paper reviews what we know from economic theory and evidence about the burden of the corporate income tax.  While the ultimate incidence of the tax remains somewhat unresolved, there have been many advances over the years in our thinking about how to assign the corporate tax burden; we don't have all the answers, but we do have a much better idea where to look for them.  I begin with some basic facts about the corporate income tax, and then move to the evolution of thought about its burden, starting from a fairly simple approach based on the ownership of corporate shares.  After considering Harberger's (1962) landmark contribution, I then discuss a variety of important issues absent from that analysis, including dynamics, investment incentives, corporate financial policy, risk, imperfect competition, the choice of organizational form, international capital flows, and managerial incentives.  My focus is on the federal corporate income tax.  States, too, impose corporate income taxes, but the incidence of these taxes is also influenced by additional factors, notably the degree of capital mobility across states and the formulas states use to apportion income according to the location of sales, assets and employment, so that tracing the incidence would lead me too far astray from my main task.[2]

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[2] For further discussion, see McLure (1980) and Gordon and Wilson (1986).

# CORPORATE TAXATION IN THE UNITED STATES

The U.S. corporate income tax, in fiscal year 2004, accounted for 10 percent of federal revenues, or 1.6 percent of GDP. Figure 1 provides these two measures annually since 1962. From the figure, it is obvious that corporate revenues have declined over time as a share of revenues and of GDP. The ratios move closely together, consistent with the fact that revenues have been relatively stable as a share of GDP. The corporate tax today is far less important than in the 1960s, when it regularly accounted for more than 20 percent of revenue. Very recently, there has been concern that corporations have used increasingly aggressive strategies to limit tax liabilities. While these concerns may be valid, they are not responsible for the sharp decline in the importance of the corporate tax shown in Figure 1. Discounting year-to-year movements and cyclical fluctuations in this volatile stream of revenue induced by the volatility of corporate profits themselves, there is little trend over the past two decades. Looking back over the decline that occurred between the 1960s and the 1980s, Auerbach and Poterba (1987) assigned a significant share to changes in tax policy, but found other factors, such as changes in corporate financial policy, to be important as well.

Corporations vary enormously in size. While most corporations are relatively small, the preponderance of corporate income tax revenue comes from large corporations. In 2001, for example, 0.04 percent of all corporations, those with assets above $2.5 billion, accounted for 62 percent of all corporate income taxes (Treubert 2004, Table 1).

Simple economic theories tend to distinguish between corporate and non-corporate enterprises, but there are many entity types with hybrid characteristics. Perhaps most relevant to the current discussion are S corporations, which share many of the legal attributes of traditional

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C corporations[3] (perhaps the most important being limited liability), but have their income taxed directly to individual owners, as is the case for non-corporate ownership structures. When thinking of the incidence of the corporate tax, we treat S corporations as part of the non-corporate sector, although the ability of an entity to choose between C- and S-corporation forms has clear implications for the incidence of additional taxes on C corporations. The importance of S-corporation status has grown steadily over the years. As of 1986, about one-fourth of all U.S. corporations were S corporations; by 1997, this share had risen to more than half (Luttrell, 2005, Figure A).[4] In 2001, S corporations accounted for almost a quarter of before-tax corporate profits (Treubert 2004, Figure B).

For various types of business, including sole proprietorships and partnerships as well as S corporations, income from the business is assigned to the business's individual owners and then aggregated with the other incomes of these owners and subject to the individual income tax. The incomes of C corporations, by contrast, are subject to a distinct tax on corporate income that treats the corporation as an entity subject to taxation. Shareholder income from C corporations in the form of dividends and capital gains is then subject to additional taxation under the individual income tax.

## AN INITIAL APPROACH TO CORPORATE TAX INCIDENCE

Perhaps the simplest and oldest theory of corporate tax incidence is that the tax falls on corporate shareholders in proportion to their ownership. This theory may be implicit in the

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[3] The letters S and C stand for the corresponding subchapters of Chapter 1 of the Internal Revenue Code.

[4] An alternative to the S corporation that also provides limited liability and pass-through tax treatment is the Limited Liability Company (LLC). LLCs offer more flexibility than S corporations in some dimensions, notably in not restricting the number of investors. They, too, have also grown in importance in recent years, although as of 2002 S corporations accounted for considerably more net income ($183.5 billion) than did LLCs ($48.6 billion). See, respectively, Luttrell (2005, Figure C) and Wheeler and Parsons (2004, Figure I).

minds of those who view the corporate tax as very progressive, for individual share ownership is highly concentrated among higher income individuals. In 2001, for example, 90 percent of families in the top income decile held stock (either directly, or indirectly through mutual funds or retirement accounts), with a median value among those holding stock of $248 thousand. For the population as a whole, 52 percent held stock, with a median holding of just $34 thousand (Aizcorbe et al. 2003, Table 6), and with the fraction holding stock rising steadily with income.

But even this simple method of assigning the burden of the corporate tax is not so simply applied. First, a corporation may have both preferred and common shares, and more than one class of common shares, each category of shares conferring different rights to the corporation's income. If an increase in the rate of corporate taxation reduces a corporation's after-tax income, it is not always clear how much of this reduction will be borne by different categories of shareholders. Indeed, this ambiguity is one of the reasons why S-corporation status is available only for corporations with one class of shares – to assign income to shareholders we must have a clearly defined way of doing so.

Second, even where the assignment of income is clear, not all shareholders are individuals. Table 1 provides a breakdown of the ownership of U.S. corporate equity at the end of 2004. Households owned less than half of all equity directly, with substantial fractions held by various institutions and financial intermediaries. Ownership through mutual funds, the second-largest ownership category, is not a major issue, because tax provisions allow the pass-through of income directly to individual owners of mutual fund shares. But the other major class of institutional owners, nonprofit institutions and retirement funds, poses a more difficult problem.[5]

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[5] This problem applies not only to these institutions' direct holdings of corporate equity, but also to their indirect holdings via mutual funds.

Among pension funds, we may distinguish one category, defined-contribution plans and other tax-sheltered vehicles, for which the accounts are owned by beneficiaries. For these accounts, it is natural to treat the individual beneficiaries as the ultimate owners of shares held in the funds. But for the remaining assets, held in the funds of defined-benefit plans, the assignment of ownership is less obvious. For private-sector defined-benefit plans, the first thought might be to assign the assets in these funds to the corporations that maintain them (and hence ultimately to the shareholders of those corporations), because the corporations are using the pension funds to meet pension liabilities. According to this line of reasoning, any fluctuations in the fund balances attributable to changes in corporate income taxation will require offsetting contributions by the corporations; hence the shareholders of these corporations bear the burden of these changes. But this reasoning breaks down if pension liabilities are responsive to the health of the pension fund, either because of influences on the relative bargaining power of employers and employees, or because of the ability of employers to "put" pension liabilities to the Public Benefit Guaranty Corporation (PBGC) at a cost lower than the actuarial pension liability.[6] In this case, a portion of the pension fund really "belongs" to employees[7], but the breakdown between employers and employees is an empirical issue on which there is little evidence. A similar ambiguity arises with respect to public-sector defined-benefit plans, with taxpayers assuming the role taken by shareholders in the case of private-sector plans.

For the remaining tax-exempt entities – nonprofit institutions such as universities and foundations – there are no owners to which incidence can be assigned. Presumably, the incidence of corporate taxes that reduce the income of such entities is borne in some measure by beneficiaries (through reduced services), donors (through increased contributions), employees

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[6] The 2005 PBGC takeover of some of United Airlines' pension plans is a recent example.

[7] See Bulow and Scholes (1983) for further discussion.

(through reduced compensation), and perhaps others with more indirect connections, such as vendors.  As with the division of "ownership" for defined-benefit pension plans, how the burden of reduced non-profit funds would be borne is an issue on which there is little evidence.

Another category of shareholders not represented in Table 1 (because their holdings are netted out) is corporations themselves.  The assignment issue is not a problem; if corporation A owns shares in corporation B, then the portion of B's corporate tax we allocate to A can be attributed back to A's shareholders.  But the tax burden will be different because of the additional level of corporate ownership.  Corporations receive a deduction from taxable income of only 70 percent of dividends received, meaning that such dividends face an effective tax rate of 10.5 percent (30 percent of the current corporate tax rate of 35 percent); there is no deduction for inter-corporate capital gains.  Thus, the corporate tax burden on shareholders' income increases as that income passes through additional corporations.

It would be an interesting exercise to confront each of the assignment problems just discussed and trace all corporate income taxes back to individual taxpayers, to determine the incidence pattern implied by the "simple" approach of assigning corporate taxes to shareholders. That this has not been done probably reflects both the difficulty of the exercise and the fact that the shareholder-incidence method has been perceived to have little theoretical credibility.  But, as discussed below, incidence has a dynamic dimension that is often ignored.  Even if shareholders eventually shift some, most or even the entire corporate tax burden to others, this shifting need not occur immediately.  To the extent that adjustment takes time, some of the corporate tax may indeed be borne by shareholders, and so the exercise just outlined would remain useful.  Indeed, other considerations discussed below indicate that shareholders may be unable to shift the tax even in the long run.

Once we move beyond the assignment of the corporate tax burden based on information about direct or indirect corporate ownership, an economic model is needed. Only with such a model can we estimate how the corporate tax affects the real incomes of different groups in the population through its impact on factor returns and product prices. In one of the most influential papers ever written in the field of public finance, Harberger (1962) followed this strategy, analyzing the incidence of the corporation income tax using a two-sector general equilibrium model. Harberger's contribution has had a lasting impact on incidence analysis and provides a useful benchmark against which to compare subsequent developments in the literature.

## THE HARBERGER MODEL

Grouping all production in the U.S. economy into two sectors according to whether production was predominantly carried out by corporate or non-corporate businesses, Harberger characterized the corporate tax as an additional tax levied on capital income originating in the corporate sector, layered on top of the individual income tax collected on capital income from both sectors. He then estimated incidence through the changes in factor prices and product prices that would result from a small increase in the corporate tax.

Harberger's main conclusion is probably the most familiar aspect of the paper. In particular, under reasonable assumptions regarding the two sectors' production elasticities of substitution and consumers' elasticity of substitution between the two sectors' products, Harberger showed that the corporate income tax was borne fully by owners of capital, economy-wide. This finding has two important elements. First, capital bears the entire tax; it is not shifted to labor or consumers, the other potential victims in the model. Second, it is *all* capital, not just corporate capital, that bears the tax. Thus, if corporate capital accounts for 25 percent of the economy's capital, its individual owners will bear 25 percent of corporate taxes; the other 75

percent will be shifted to owners of non-corporate capital. Intuitively, the lower after-tax return that would be available in the corporate sector because of the higher tax burden drives capital into the non-corporate sector, pushing down the available non-corporate return and allowing the corporate return to recover. In equilibrium, the after-tax returns in the two sectors must be equal, and Harberger estimates that this new equilibrium level of after-tax returns will be lower by just the amount consistent with capital bearing the entire corporate tax.

Harberger's conclusion, which probably remains the most commonly held view on corporate tax incidence, indicated that the corporate tax was less progressive than under the shareholder-incidence assumption, because shareholders as a group (at least in 1962, when pension funds accounted for a much smaller ownership share) were more affluent than owners of capital as a whole, a large share of which is owner-occupied housing. But aggregate capital ownership is more concentrated among higher income individuals than consumption or labor income, and so the corporate income tax could still be seen as contributing to tax progressivity.

Another message of Harberger's work, though, was that the corporate income tax distorted the allocation of capital between corporate and non-corporate uses in a way that an overall capital income tax did not. If the incidence of the two taxes were the same, then, the only "contribution" of the corporate tax was gratuitous deadweight loss. Indeed, the subsequent optimal taxation literature supported the notion that taxes that distort production decisions are to be eschewed when sufficient other tax instruments are available (Diamond and Mirrlees 1971). Thus, Harberger's analysis has also lent support to the view that corporate tax is not a necessary or desirable component of an efficient, progressive tax system.

Harberger's analysis spawned a vast literature over several years that extended and challenged his initial results. The simplicity of Harberger's technique – comparative static

analysis of small changes in a two-sector model – proved not to be a major source of concern given that similar findings resulted from analysis using a multi-sector computable general equilibrium model (Shoven 1976). But Harberger's analysis also relied on several more important simplifying assumptions. Two assumptions already mentioned are (1) that the corporate tax can be viewed as an add-on tax on capital income originating in the corporate sector, and (2) that production in a particular sector must be exclusively either corporate or non-corporate. Other key assumptions include: (1) free mobility of factors across sectors, (2) fixed economy-wide factor supplies, (3) competitive markets and constant returns to scale, implying that all corporate profits represent normal returns to capital, (4) a closed economy, (5) no risk, and (6) no differences in spending patterns among individuals and between individuals and government. All of these assumptions have been examined in the literature.

## DYNAMICS

Even if the Harberger model paints an accurate picture of the long-run effects of the corporate tax, few would argue that these effects are observed immediately. Labor, and especially capital, cannot freely shift from one sector of production to another. While computers can be moved from one office to another, it is considerably more difficult to turn a nuclear power plant into a tractor. Thus, it is probably more reasonable to think of the shifts predicted by the Harberger model as occurring over time, with some capital moving right away and other capital shifting more gradually, for example, as capital in the corporate sector wears out and is replaced by different types of capital in the non-corporate sector. It is tempting to view this as simply a transition phenomenon, i.e., that the incidence is temporarily at variance with Harberger's predictions but consistent with them in the long run. But the period of transition may be long, and its influence on incidence is immediate and quite important.

Figure 2 illustrates the impact of gradual adjustment of capital to an increase in the corporate tax, under the assumptions that the economy is in long-run equilibrium at date 0 and there is an unexpected introduction of a corporate tax at date 1. Initially, the economy-wide rate of return, both before-tax and after-tax, is $r_0$. At date 1, the tax is imposed after capital allocation has been fixed, so there can be no change in the before-tax returns in either sector – as capital is in fixed supply in the corporate sector, it must absorb the entire tax through a lower after-tax return. Over time, as capital shifts from the corporate sector to the non-corporate sector, the before-tax return in the corporate sector rises and the after-tax return in the non-corporate sector falls, with the after-tax returns in the corporate and non-corporate sectors, $r_{net}$ and $r_{nc}$, respectively, gradually coming together at a new equilibrium value of $r_2$. According to Harberger's analysis, the economy-wide decline in the net return to capital from $r_0$ to $r_2$, multiplied by the capital stock, will roughly equal the tax revenue collected in the long run.

What is the incidence of the corporate tax in this instance? In terms of returns to capital, the impact is felt initially by corporate capital and then spreads to all capital. But, in terms of capital *owners*, the answer is quite different with respect to timing. The distinction is due to *capitalization* – the reflection in asset values of anticipated differences in returns to capital. While capital and the returns to capital adjust slowly, asset values and asset returns adjust instantaneously. Because investors will demand the same after-tax rate of return on corporate and non-corporate assets, corporate assets must drop in value, relative to non-corporate assets, by an amount roughly equal in present value to the gap between the returns $r_{nc}$ and $r_{net}$. Thereafter, investors in corporate and non-corporate assets will receive equal rates of return at every point in time. What will this rate of return be? The answer depends on the technology of adjustment. Under the *q*-theory of investment envisioned by Tobin (1969) and developed by Hayashi (1982),

Summers (1981) and others, the surge in demand for non-corporate capital will temporarily increase the full cost of installed capital in that sector, driving up non-corporate asset prices relative to replacement cost. This, in turn, will reduce the asset-based return on non-corporate capital – and hence corporate capital as well – below $r_{nc}$ during the adjustment process.

We have, then, a pattern of incidence that must be characterized not only in terms of rates of return to capital, but also asset values. The corporate tax introduced at date 1 will be borne partially by current owners of corporate capital, through an initial drop in asset values, and partially by future investors in corporate and non-corporate capital, through lower rates of return. The total burden borne by these three groups as a whole will exceed the total burden of the tax, because initial owners of non-corporate capital will gain from an increase in asset values.[8] The allocation of the burden among these groups will depend on the adjustment technology. If adjustment is instantaneous, Harberger's analysis applies and the burden will fall entirely on future capital owners. If adjustment occurs at a glacial pace, then virtually the entire burden will be borne by existing corporate shareholders.

The distinction between changes in asset values and changes in asset returns is important, even if all investors hold the same portfolio of corporate and non-corporate assets, because the *timing* of incidence differs. Whereas lower asset returns occur over time, changes in asset values occur immediately. This distinction can be best understood in a generational context. For older asset holders who have accumulated capital and have short planning horizons, the change in asset values will be most relevant. For younger individuals who have accumulated little wealth but have longer planning horizons, the change in the rate of return will matter more. Thus, we can think of the different components of the corporate income tax burden in generational terms: a

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[8] Indeed, one can consider additional groups of winners and losers from gradual adjustment to changes in the corporate tax burden. For example, Goolsbee (2003) finds that workers in industries that produce capital goods experience an increase in wages in response to tax-induced increases in investment demand.

reduction in asset values that primarily hits the old, and a reduction in rates of return that primarily hits the young.

The pattern of incidence would be different for an anticipated increase in the corporate tax rate as adjustment would begin as soon as the future tax increase became known, leading to a smaller initial decline in corporate asset values and more of the burden being shifted to new investors. Thus, prior announcement of a corporate tax increase could be used to cushion the burden on existing asset owners, but, if one moves beyond a world of fixed factor supplies, it would affect economic efficiency as well: tax-induced reductions in rates of return distort saving and investment decisions, while unexpected drops in asset values do not.

A final caveat should be issued here regarding the distinction between share ownership and exposure to fluctuations in share prices. With the growing use of stock options and other financial derivatives, it has become easier and cheaper over time to hedge all or some risks associated with stock price fluctuations. In theory, one could use derivatives to hedge the risks of tax changes, shifting the burden onto counterparties to the derivative transactions. While this is unlikely an important issue at present, the pace of financial innovation suggests that it may become one in the future.

Two important conclusions so far are (1) that it is misleading to allocate the burden of a corporate tax increase to all capital, even if that result holds in the long run after capital has completely adjusted, and (2) that it is difficult to convey the incidence story in a one-dimensional breakdown of households, say by wealth, income, or asset ownership; the generational incidence pattern is extremely important as well.

## INVESTMENT PROVISIONS

The corporate income tax is not simply a uniform tax on economic income originating in the corporate sector. The deviations in the tax base from economic income, in turn, affect the incidence of the corporate tax itself. One deviation relates to investment provisions. A second, discussed in the following section, involves the deductibility of corporate interest payments.

As modeled by Harberger, the base of the corporate income tax equals income from all corporate capital. In particular, income from capital goods of different vintages is taxed at the same rate. In reality, capital goods of different ages receive different treatment, even though they are subject to the same statutory corporate tax rate, because of differences in depreciation provisions. This is true not only if the law has changed over time (in which case different vintages would be written off according to different schedules), but even if the law has remained constant, for depreciation allowances do not track the actual economic depreciation of assets. Given that an asset's income equals its gross returns less depreciation, depreciation allowances that fall short of economic depreciation lead to a tax base greater than income, and allowances in excess of economic depreciation lead to a narrower tax base.

Having depreciation allowances smaller or larger than economic depreciation simply leads to effective tax rates higher or lower than the statutory corporate tax rate. But allowances that follow a different pattern over time than economic depreciation can also induce differences in the relative treatment of new and existing assets. This distinction is illustrated in Figure 3, which depicts various potential depreciation schedules for an asset that decays at 10 percent per year. Economic depreciation for such an asset would follow the declining-balance method, starting with a 10-percent deduction in the first year of ownership and following the pattern labeled "economic." A proportionate reduction in each year's allowances would result in the

pattern labeled "reduced." Following economic depreciation, but based on historic cost rather than current cost, would lead instead to the pattern labeled "historic cost," starting at the same point as the original schedule but falling faster as prices rise. An historic-cost schedule allowing faster write-off, perhaps to compensate for the erosion of allowances due to inflation[9], might look like the pattern labeled "historic cost, accelerated." Such a depreciation schedule is accelerated relative to economic depreciation both by historic cost accounting and explicit acceleration.

With accelerated depreciation schedules, new assets are more attractive than old ones of the same productivity because they convey future depreciation allowances that are higher in present value. Prior to 1986, an additional distinction was provided by the investment tax credit, which was received upon an asset's purchase but not available to capital already owned. The overall impact of such investment provisions on the value of capital can be assessed using the expression:

(1)     $V_{old} = V_{new}(1 - k - \tau z_{new} + \tau z_{old})$,

where $V_{new}$ is the value of a new unit of capital, $V_{old}$ is the value of an existing unit of equally productive capital, $k$ is the investment tax credit, $\tau$ is the corporate tax rate, $V_{new}z_{new}$ is the present value of depreciation allowances for the unit of new capital[10], and $V_{new}z_{old}$ is the present value of depreciation allowances for the unit of existing capital. For economic depreciation, $k = 0$ and $z_{new} = z_{old}$, so $V_{old} = V_{new}$. But typically $V_{old} < V_{new}$. Calculations in Auerbach (1983) found that the ratio $V_{old}/V_{new}$ fell to around 0.8 for corporate fixed capital after the Economic Recovery Act

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[9] This, indeed, was the approach taken by the Tax Reform Act of 1986, which sought to provide depreciation allowances equal in present value to economic deprecation but based on historic cost.

[10] $z_{new}$ is the present value of allowances per dollar of new capital.

of 1981, due to the combination of high inflation, accelerated depreciation, and the investment

tax credit.  The Tax Reform Act of 1986 reduced this discount substantially by lowering the

corporate tax rate (which reduces the importance of differences in depreciation allowances), and

eliminating the investment tax credit, with the drop in inflation over the same period working in

the same direction.  Auerbach (1996) estimated a comparable value for the mid-1990s of greater

than 0.9.

What impact does this old-capital discount have on the incidence of the corporate tax?

The discount,

(2)     $(V_{new} - V_{old})/V_{new} = k + \tau(z_{new} - z_{old})$,

reflects the fact that old capital's tax base is broader than new capital's.  An increase in the

corporate tax rate, therefore, increases the discount by $(z_{new} - z_{old})$ per each unit tax increase.

This differential increase represents a levy on existing capital – a portion of future corporate

taxes that are immediately capitalized into the value of existing assets.  The incidence of this

capitalized portion should be on existing shareholders, with only the remaining future corporate

taxes relevant for the incidence analysis already carried out.[11]

But, recall that this previous analysis also called for a division of the corporate income

tax into components, with some future corporate tax revenues capitalized into the value of

existing corporate assets, and the remaining revenues spread among future capital owners as

envisioned by the Harberger model.  Thus, we now have layers of decomposition.  Because

capital is slow to adjust, a portion of any corporate income tax increase will be borne by existing

shareholders.  Of the remaining portion, an additional piece will also be borne by shareholders,

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[11] Auerbach, Gokhale and Kotlikoff (1991) provide estimates of the impact of this adjustment on the generational
incidence of taxation.

in the form of a "surcharge" on existing assets that does not affect the incentives to accumulate capital within the corporate sector.

Using expression (2), one can also estimate the incidence of other changes in the tax structure. For example, an increase in corporate tax collections accomplished through a reduction in the generosity of depreciation allowances (a reduction in $z_{new}$) or a reduction in the investment tax credit, $k$, will reduce the old-capital discount. Thus, the effective increase in the corporate tax on new capital will be higher than is reflected in future corporate tax collections, for a portion of these collections will go to provide a *windfall* to existing capital.

There have been few attempts in the literature to consider the combined capitalization effects of corporate tax changes attributable to gradual capital-stock adjustment and the distinction between old and new capital. One example is Auerbach's (1989) estimates of the impact of the Tax Reform Act of 1986 on the value of corporate equipment and structures. That analysis found that TRA86 increased corporate taxes at the margin of new investment, leading to a small decline in the value of existing assets following the logic of the previous section, but also provided substantial windfalls to existing capital through the corporate tax rate reduction and investment tax credit repeal. The net impact was a substantial increase in existing asset values, estimated at from 9-14 percent for equipment and 4-14 percent for structures, with the results varying with assumptions about the speed of capital stock adjustment and expectations regarding the tax reform. Thus, changes that were estimated to have little net impact on corporate tax revenues[12] nevertheless could have significant incidence effects, the result of a combined increased burden on new capital and reduced burden on existing capital. These were predictions

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[12] The 1986 act contained a number of other corporate tax provisions that accounted for a projected overall increase in corporate tax revenues. See Auerbach and Slemrod (1997), Table 1.

based on theory, of course, although contemporaneous empirical evidence provided some support (Cutler 1988).[13]

## CORPORATE FINANCIAL POLICY AND SHAREHOLDER TAXES

As discussed above, one of Harberger's assumptions was that the corporate tax rate was imposed as an increment, over and above the individual tax rate that applied in both corporate and non-corporate sectors. This would be a reasonable characterization of the situation in the United States prior to 2003 if all corporate-source income were paid out as dividends, for until 2003 dividends were taxed as ordinary income after the corporate tax had been applied. But only a share of corporate earnings are distributed as dividends, and only a share of the returns to corporate capital accrues as corporate earnings – a large portion passes out of the corporation as interest payments on corporate debt.

With corporations having the option to issue debt, the interest payments on which are deductible at the corporate level, and to retain earnings, thereby trading off current dividends for capital gains on which taxes may be lower and can be deferred, how much "double taxation" does corporate capital actually face? In the extreme, if corporations finance all their investment by borrowing, there is no corporate tax imposed on investment; indeed, corporate tax liability is reduced, because *nominal* interest payments – a portion of which simply compensates lenders for a loss in purchasing power – are tax deductible.

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[13] One can apply the same methodology to the most recent changes in capital recovery provisions, the temporary "bonus depreciation" schemes of 2002 and 2003. The provisions (described in more detail by Desai and Goolsbee 2004) provided immediate write-off rather than depreciation for 30 percent (under the 2002 legislation) or 50 percent (under the 2003 legislation) of qualifying investment purchases (equipment investment, plus special purpose structures with tax lifetimes of 20 years or less); this accelerated write-off acted like a small, temporary investment tax credit. The reduction in market value due to the new-old capital distinction should have been approximately 1-2 percent of the affected capital stock, with a portion of this being offset by gradual adjustment to the increased incentive to invest. The size of this latter effect depends not only on adjustment costs but also on expectations regarding the permanence of the provisions, but under reasonable assumptions the net overall impact predicted is a decline in value of less than 1 percent of the affected capital stock.

Corporate capital structures are not exclusively debt, of course, but the presence of the debt-equity choice means that we must look more closely at the reasons for equity finance. While some theories argue simply that debt capacity is limited, and so that some corporate capital must be subject to double taxation, other theories suggest that the choice of equity capital indicates a tax *preference* for equity, i.e., that the overall tax on equity income is lower than that on debt income, so that the burden implied by debt finance represents an upper bound for the burden on corporate capital. Because the tax imposed on debt finance – with single taxation to the recipient – is similar to that on non-corporate capital, these theories, in turn, suggest that corporate capital may be *favored* by the tax system, rather than being discriminated against. This implies, in turn, that the presence of the corporate income tax may not discourage corporate activity, but also that increases in the corporate tax rate may simply be borne by shareholders who, as a result, derive lower benefits from the corporate tax structure.

Two such theories are those developed originally by Stiglitz (1973) and Miller (1977). Stiglitz argued that equity would be used by firms to finance only that portion of their value in excess of invested capital. For example, an entrepreneur already in possession of patents or other valuable intangible assets might be able to turn an investment of $1 million in plant and equipment into an enterprise worth $1.5 million. If the entrepreneur incorporated, he would wish to finance the $1 million investment using borrowed funds, so that the returns to capital could be sheltered from the corporate tax. But issuing any additional debt, up to the corporation's full value of $1.5 million, would require an immediate taxable distribution of funds to the owner/entrepreneur.[14] Thus, Stiglitz argued, corporate equity supported intangible assets within the corporation that had been accumulated without tax at either the corporate or individual level,

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[14] The firm could, of course, invest additional borrowed funds in interest-bearing assets, with no net tax impact, but this action would not represent any change in the value of its equity.

and that would remain free of tax as long as the corporation could avoid paying dividends and the investor could avoid selling shares. Until then, only the additional income on these assets would be taxable annually, at the corporate level. Indeed, one can show that the decision of whether to cash in immediately or maintain ownership of the intangible assets in the form of equity depends only on whether the corporate tax rate is higher or lower than the individual tax rate, assuming that the tax treatment of the asset sale would be the same at different points in the future.[15] That is, the effective tax rate on this component of equity is simply the corporate tax rate $\tau$ – there is effectively no double taxation of corporate equity that arises in this manner.

As it is empirically reasonable that the corporate tax rate will be less than or equal to the ordinary tax rate, $t_p$, for well-to-do shareholders, this theory suggests that corporate equity may bear no higher burden than corporate debt, and hence that the corporate income tax imposes no additional burden. Further, given the same assumptions about the relationship between $\tau$ and $t_p$, the entrepreneur would gain nothing from eschewing the corporate form at the outset, for selling the intangible asset held in a non-corporate enterprise would still generate a tax liability at the capital gains tax rate, $t_g$, and the annual returns on the asset held in non-corporate form would be taxed at rate $t_p$; the decision of whether to incorporate or not depends, again, on whether $\tau$ is lower or higher than $t_p$. Thus, a small increase in $\tau$ that maintains the inequality $\tau < t_p$ would be borne by the entrepreneur-shareholders, at least to the extent that their original innovation activity was unaffected.

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[15] Cashing in immediately would yield $(1-t_g)$ for each dollar inside the firm, assuming capital gains tax treatment at rate $t_g$. If the assets remained in equity form, they would accumulate at the rate $r(1-\tau)$, where $r$ is the before-tax rate of return and $\tau$ is the corporate tax rate. Cashing in at some future date $T$ would thus yield a net amount of $(1+r(1-\tau))^T(1-t_g)$, providing an annual return of $r(1-\tau)$ per dollar of funds retained as equity. Had the funds been withdrawn, they would have earned an annual return $r(1-t_p)$, where $t_p$ is the ordinary individual tax rate.

While interesting and influential in its impact on subsequent research, Stiglitz's theory fails to characterize most of the equity in the corporate sector.  Recall that the theory predicts that debt will be used to finance capital expenditures.  Hence, corporate debt should equal the corporate capital stock or, on a flow basis, borrowing should equal capital expenditures.  In fact, capital expenditures typically far exceed borrowing. In 2004, for example, U.S. non-farm, non-financial corporations had $900 billion in capital expenditures and obtained $231 billion through credit markets (Board of Governors 2005, Table F.102).  What can explain the remaining portion of equity? Here, the theory of Miller (1977) comes in.  Miller focused on the heterogeneity of individual investors, arguing that, under a progressive tax system, there may be some investors in a high enough tax bracket that the extra taxation at the corporate level is more than offset by the preferential individual tax treatment of equity income.

The after-tax return to equity holders from a dollar of pre-tax corporate returns is $(1-\tau)(1-t_e)$, where $t_e$ is the effective individual tax rate on equity income.  The return to debt holders is $(1-t_p)$.  Hence, even though there is double taxation of equity income, equity faces a lower tax burden if:

(3)     $(1-\tau)(1-t_e) > (1-t_p)$; or $t_p - t_e > \tau(1-t_e)$.

That is, the taxes saved at the individual level exceed the net additional corporate taxes. According to Miller's theory, investors with a tax preference for equity would hold equity, those with a tax preference for debt would hold debt, and corporations would be indifferent between the two, issuing enough of the two securities, in the aggregate, to satisfy the demands of investors.  Assuming that the equity tax rate is some fraction of the ordinary tax rate, say $t_e = \lambda t_p$, the decision to hold equity, from the second equation in (3), becomes:

(4)     $t_p(1-\lambda) > \tau(1-\lambda t_p)$, or $t_p > \dfrac{\tau}{1 - \lambda(1 - \tau)} \equiv t_p^*$.

Expression (4) implies that investors will sort by personal tax rate; those with a personal tax rate below some critical level, $t_p^*$, will hold only debt, and those with a higher tax rate will hold only equity, with those at that critical tax rate indifferent.  If the corporation's before-tax rate of return equals $r$, then it will pay equity holders $r(1-\tau)$ and debt-holders $r$, reflecting the corporate-level tax differences.  This sorting equilibrium is shown in Figure 4.

Even with investor heterogeneity, is it plausible that a significant share of investors will have a tax preference for equity, based on expression (3)?  Currently, the U.S. top rates of tax on corporations and individuals are 35 percent, so this would be impossible.  Even before recent tax cuts, the top individual rate in recent years has not been substantially higher than the corporate rate since before 1981.  Thus, a very low effective equity tax rate would be required, and this seems inconsistent with the fact that a substantial share of equity earnings come to investors as (until 2003) fully taxed dividends.  However, according to the "new view" of dividend taxation (Auerbach 1979, Bradford 1981, King 1977), the effective rate of individual tax on equity may be the capital gains rate, adjusted for deferral – a very low rate – even if dividends are distributed, when retained earnings are the source of equity finance, as they are for most large corporations.  Further, the relevant corporate tax rate in expression (3) may be below the statutory rate if corporations face limits on their ability to deduct additional interest payments, an issue that has been found to be relevant empirically in various studies.[16]  Thus, through potentially low values of $t_e$ and $\tau$, expression (3) may be satisfied for a number of investors, and

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[16] See Auerbach (2002) for further discussion.

it is these investors' portion of shareholder wealth, not of the shareholder population, that

determines the extent of equity preference in the Miller model.

The Miller model has interesting implications for the incidence of the corporate tax.

Because investors holding equity are taxed at a lower rate than they would be holding debt, the

corporate tax is a tax shelter – equity-holders would be worse off if corporate-source income

were treated just like non-corporate income. Thus, an increase in the corporate tax rate will

reduce the tax benefit from holding equity, but, unless the preference for equity over debt

disappears, will not affect portfolio choice.

The dashed line in Figure 4 illustrates the impact on equilibrium of an increase in the

corporate tax rate from $\tau$ to $\tau'$. Investors with personal tax rate above $t_p'^*$ will continue to hold

equity, but will receive a lower return for doing so – they bear the full brunt of the corporate tax

increase; investors with tax rates between $t_p^*$ and $t_p'^*$ will shift from equity to debt; doing so

allows them to avoid a portion of the corporate tax increase; and investors with a personal tax

rate below $t_p^*$ will not be affected at all. Unlike in the Harberger model, there is nowhere for

those with tax rates above $t_p'^*$ to go, because equity is still their tax preferred asset – after-tax

returns on different assets are not equal for them.[17] Thus, there is no shift out of corporate equity

for investors with wealth above $t_p'^*$ and, because debt is always an option, no need for capital to

shift out of the corporate sector, even for those investors with tax rates between $t_p^*$ and $t_p'^*$ who

now choose not to hold corporate equity.[18]

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[17] This specialization highlights another requirement of the Miller model, that investors not be able to hold unlimited short positions in either debt or equity.

[18] These conclusions, like those of the original Harberger model, are based on the assumption of fixed wealth. If corporate shareholders' wealth accumulation declined in the face of higher tax rates, this could drive up before-tax returns to all investors, partially offsetting the initial impact of the corporate tax.

According to the Miller model, then, an increase in the corporate tax is largely borne by corporate shareholders – yet another way in which shareholders may bear the corporate tax. But, leaving aside whether expression (3) is satisfied for an adequate portion of shareholder wealth, there is another serious challenge to the Miller model – investors clearly do not specialize. A large share of the portfolios of tax-exempt institutional investors takes the form of equity, and at least some corporate bonds are held in the portfolios of higher income individuals.

As discussed by Auerbach and King (1983), the Miller model breaks down when assets are risky and investors must balance the objectives of diversification and tax minimization. High-bracket investors may wish not to hold only equity, and low-bracket investors may wish to hold a portion of their portfolio in higher-yielding risky assets such as equity. Tax preferences will influence portfolios – those in higher brackets will still gravitate toward assets, like equity, with more favorable individual tax treatment. This modification of the model implies that the incidence conclusions based on the simple Miller model are overly strong; while high-bracket investors suffer more from an increase in the corporate tax, because of their higher concentration in equity, even tax-exempt investors will bear some of the burden as well. A second implication is that corporate bonds and non-corporate equity are no longer perfect substitutes, tax considerations aside, so that investors fleeing from corporate equity may need to look outside the corporate sector for their investments.[19]

Thus, the predictions of the Harberger model, that owners of corporate capital are hit initially by an increase in the corporate tax and that this leads to a shift of capital outside the corporate sector, are partially reestablished by modifying the Miller model to incorporate risk.

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[19] Some equity investors would also flee the corporate sector if the Miller model were extended to include an additional tax-favored asset, e.g., tax-exempt municipal debt. In that case, investors in the very highest individual tax brackets would choose to hold municipal bonds, and an increase in the corporate tax rate would make such bonds attractive to individuals near the equity-municipal bond margin. As with a shift of investors into the non-corporate sector, this would spread the incidence of the tax increase to the returns on other assets.

**The Incidence of Corporate Integration Proposals**

The previous discussion shows that having two levels of tax on corporate-source income doesn't necessarily imply double taxation of that income, in the sense of a cascade of corporate and individual rates. The structure of corporate and individual taxation may allow some investors to face marginal tax rates on corporate-source income that are little higher or even lower than their tax rates on ordinary income. Just as having two levels of tax doesn't equate simply to double taxation, reducing tax rates at one level doesn't translate simply into marginal tax rate reductions.

Proposals for the "integration" of corporate and individual income taxes typically do not involve full integration of the two taxes, in the sense of treating C corporations like S corporations or partnerships. As mentioned above, this would be difficult, given the complexity of allocating income to different classes of shareholders in the modern C corporation. Rather, integration proposals and integration schemes in practice elsewhere in the world generally involve reduced taxation of dividends, reflecting the assumption that dividends face a higher individual tax burden and that firms can choose to pay earnings as dividends (or can be deemed to have done so) to qualify for the tax benefit[20]. What is the incidence of adopting such schemes, starting from the current U.S. system?

A first observation is that schemes can be made roughly equivalent regardless of whether they are imposed at the corporate or shareholder level. For example, a dividends-paid deduction for the corporation (also called a split-rate system) equates to a dividends-received credit for corporate taxes paid (also called an imputation system) as long as the latter is refundable to shareholders (such as tax-exempt investors) whose tax liability is insufficient to cover the credit.

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[20] See Graetz and Warren (1998) for a detailed discussion of various integration mechanisms developed in two studies during the early 1990s, one by the U.S. Treasury and the other by the American Law Institute.

Each of these schemes, the standard approaches to integration in practice, amounts to a reduction in the tax rate on dividends. This leads to a second observation, that the incidence of a corporate tax reduction depends on the manner in which corporate taxes are reduced. Reducing the corporate tax rate and reducing the tax rate on corporate dividends are not the same policy, even if the tax reductions are both implemented through a reduction in corporate tax payments and have the same revenue costs. Indeed, under the new view of equity taxation discussed above, the dividend tax does not impose a marginal tax rate on new corporate capital investment, but is capitalized into the value of corporate shares. Thus, a reduction in that tax does not reduce the marginal tax rate on corporate capital, but simply increases the value of corporate shares.[21] This highlights yet another possible way, in addition to those already explored above, in which an increase in corporate taxation, in this instance an increase in the rate of tax on dividends, would be borne by existing shareholders rather than being spread to other current and future owners of all capital.

## RISK

Since the work of Domar and Musgrave (1944), economists have noted that taxes on capital income provide insurance as well as imposing burdens. Consider an arms-length asset-market investment that yields a risky rate of return at rate $r$, which has an expected value greater than the safe rate of return, $i$. We may decompose the return on the risky asset into two components, the safe rate of return and the excess return,

(5)     $r = i + (r - i)$

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[21] Under the same theory, a reduction in the corporate tax rate *would* lower the cost of corporate capital.

As has been established in the literature[22], a proportional tax system that provides a full loss

offset (that is, the same tax rate applies whether income is positive or negative) imposes a burden

on investors only to the extent that the first component on the right-hand side of (5), the risk-free

return, is taxed. Put another way, for a hypothetical tax system that imposes a tax rate $t$ on the

safe return and a tax rate $t^*$ on the excess return, leaving the investor with an after-tax return of

(6)      $i(1 - t) + (r - i)(1 - t^*),$

the investor is indifferent to the value of $t^*$. The reason is that the investor can undo taxation of

excess returns simply by holding more of the risky asset and less of the safe asset.

This result, combined with the empirical observation that the real, safe rate of return is

very close to zero, led Gordon (1985) to suggest that the corporate income tax imposes few

economic distortions, although it collects tax revenue on average (i.e., in expected value). One

could also express this argument as saying that the corporate tax has little incidence to attribute,

because it imposes little burden. What of the revenues the government collects? Under Gordon's

view, the revenues have positive expected value, but have little *market* value to the investors

who forgo them, because of their risk. If capital markets already spread risk efficiently,

moreover, these revenues will be of no greater value to the government than to taxpayers,

because any pooling that could reduce aggregate risk would already have been done by the

private sector. Hence, under this argument, a uniform corporate tax is of little consequence, and

we need not devote much thought to concerns about its distortions and its incidence.

This theory, however, must confront an obvious empirical contradiction. Since excess

returns on the risky asset must sometimes be negative – otherwise, the risky asset would

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[22] For a good exposition of this and related results, see Kaplow (1994).

dominate the safe asset – corporate tax revenues should sometimes be negative as well, even if they are positive on average. There are basically three different explanations for this contradiction, with different implications for tax incidence.

The first explanation is that corporate earnings include more than a normal safe rate of return and an excess return to risk-taking, i.e., economic rents. If such rents are included in the corporate tax base, revenue will be positive. The incidence and distortions associated with this component of revenue depend on whether the rents respond to taxation. Pure economic rent in a competitive market will not respond, and hence a tax on it would be borne by shareholders.

The second explanation is that the tax on excess returns isn't symmetric, as characterized in expression (6). As the overall return to capital equals gross returns less actual depreciation, a tax on excess returns would include depreciation allowances that track actual depreciation. As depreciation allowances do not vary in this way, taxpayers face a higher burden than expression (6) implies (Bulow and Summers 1984). Also, the tax on excess returns should be negative when excess returns are negative, but loss offsets are limited; this, too, increase the prospective tax burden on investors. In both of these cases, the corporate tax would impose a net burden on investors even if the safe rate of return were zero, with corporate investment being discouraged and incidence analysis once again relevant.

The third possible reason for corporate revenues being positive is that private capital markets may not be fully efficient. If individual investors do not fully pool risks, then assets that are risky from the investor's perspective, and hence yield excess returns, may not be as risky from the government's perspective; only the risks common to all assets would remain once the government pooled its revenue from the assets. In this case, the revenue would have value to the government, but not to the taxpayers, and could be positive in all *aggregate* states of nature; and,

because the revenue, once pooled, could then be redistributed to taxpayers or spent by government, it ultimately would have value to the population of taxpayers.  In this case, the corporate tax on excess returns would have *negative* incidence – it would impose no initial burdens but would make at least some individuals better off.  However, this potential explanation for persistently positive corporate tax revenues would not seem particularly relevant, given the very large share of tax revenues attributable to extremely large companies, the vast majority of which are easily traded on major stock exchanges.

In summary, the fact that corporate revenues are risky reduces the burden of corporate taxation.  Given that corporate tax revenues are always positive, though, the corporate tax cannot be seen simply as a symmetric tax on excess returns. The necessary modification of theory could mean higher burdens on shareholders, higher burdens on capital-owners more generally, or, less plausibly, negative burdens, depending on why corporate revenues are positive.

## IMPERFECT COMPETITION

We have evaluated the impact of a tax on the normal return to corporate capital and on the excess return to corporate capital that is attributable to risk.  But are there other components of corporate profits with which we must deal? The question of economic rents has already come up in the discussion above.  Once one subtracts the normal return to capital providers and the return to risk, any profits that remain represent a rent received by the corporation's owners.  But this rent could come from many sources, with different consequences for incidence.

Corporate rents could simply represent the earnings on ideas, as discussed above in relation to Stiglitz's (1973) theory.  In this case, the corporation tax might effectively be a tax on entrepreneurial labor, for it would reduce the present value of the efforts that lead to the

development of intangible capital; that is, the garages of Silicon Valley might have been used to store cars if the corporate tax rate had been higher.

Corporate rents can also arise in a competitive model if there are decreasing returns to scale in production. In this case, theory tells us that a tax on rents imposes no distortions and is borne by shareholders. Finally, corporate rents can arise from imperfect competition. In the simplest case of monopoly provision, the consequences are the same – a tax on corporate rent is not distortionary, because a monopolist is already maximizing before-tax rent and cannot do better once the tax is imposed. But under more complicated types of imperfect competition, before-tax rents due to imperfect competition could respond to taxation[23].

In an oft-cited empirical study, Krzyzaniak and Musgrave (1963) examined the behavior of corporate taxes and corporate profits over time and came to the startling conclusion that *after-tax* profits rose in the short run in response to increases in the corporate tax rate: shareholders actually benefited from corporate tax increases, even in the short run! This conclusion necessarily points to imperfect competition, because theory under competitive markets predicts that a tax on corporate rents cannot be shifted at all, and (as discussed above in relation to Figure 2) a tax on corporate capital will only gradually be shifted over time. The study's methodology does not allow one to identify the nature of corporate responses, but, presumably, corporations in the world of Krzyzaniak and Musgrave raise profits by restricting output and increasing product prices, thereby passing the corporate tax on to the consuming population.

The presence of imperfect competition would also influence the corporate response to taxation of the normal return to capital. Noncompetitive rents occur in the first place because producers restrict output below the competitive level. A further tax on one of these inputs, in

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[23] For one such analysis of tax incidence in this environment that takes the Harberger model as its starting point, see Davidson and Martin (1985).

this case capital, would lead to further restriction of output.  Starting from a point where output is already restricted, it is possible that producers will over-shift in response to this tax as well – prices could rise by more than the increase in costs.[24]  Thus, as corporations respond to the increase in the corporate tax rate, there could be an even greater shift of capital out of the corporate sector than the Harberger model predicts, although this is not an unambiguous prediction.  One thing is sure, though – a tax on production in an industry in which output is already restricted by imperfect competition will be more distortionary than one in a competitive environment, because it exacerbates an already existing distortion.

## THE STRUCTURE OF PRODUCTION

A key assumption of the Harberger model is that corporate and non-corporate enterprises produce different commodities.  This was obviously a simplification, given that Harberger divided industries into corporate and non-corporate sectors based on each industry's *predominant*, not universal organizational form.  As a logical matter, though, having corporate and non-corporate producers of the same commodities poses a problem for incidence analysis, for if production methods and organizational form (for tax purposes) can be chosen separately, then the corporate form will be adopted if and only if its tax treatment is preferred.  Thus, the coexistence of corporate and non-corporate entities producing the same commodity requires either (1) that organizational form and production techniques are not independent, or (2) that producers have access to different technologies, some of which benefit from corporate tax treatment and others that achieve a lower tax burden outside the corporate sector.

Gravelle and Kotlikoff (1989) model the corporate-non-corporate distinction following the first of these approaches, assuming that incorporation facilitates operation on a larger scale,

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[24] See the discussion in Auerbach and Hines (2003)

while non-corporate operation facilitates the use of entrepreneurial ability. With a scarcity of entrepreneurs, production will balance between the corporate and non-corporate sectors at the point where the non-corporate advantage provided by entrepreneurial ability is just offset by the scale economies provided by incorporation. In this model, and maintaining Harberger's other major assumptions, the corporate income tax is still bad for capital, which is driven out of the corporate sector, but it is good for entrepreneurs, whose services are in greater demand. The impact on labor is uncertain, depending on relative substitution elasticities in corporate and non-corporate production; if workers and entrepreneurs are sufficiently complementary, the increased demand for entrepreneurs will help workers as well.

Although they offer an explanation of the coexistence of corporate and non-corporate firms in the same industry, Gravelle and Kotlikoff do not test this explanation. Subsequent empirical analyses by Gordon and Mackie-Mason (1997) and Goolsbee (1998) find much smaller implied within-industry responses to changes in the relative taxation of corporate and non-corporate income, and hence much smaller implied deadweight losses from differential taxation than Gravelle and Kotlikoff report. These and other contributions to the literature also emphasize, following the second approach listed above, why differences among firms (with respect to risk, for example) might lead some to opt for corporate taxation and others to prefer taxation as non-corporate entities. In one result of note, Gordon and Mackie-Mason find that increases in the tax "price" of being in corporate form attract firms with negative taxable income while deterring firms with positive taxable income. This result also highlights the dynamic nature of the choice of organizational form. Although transition between corporate and non-corporate form is far from costless, the availability of the two forms may, over time, provide firms with a net tax benefit even if one form is usually preferred, by allowing them to switch

when tax incentives dictate.  This is unlikely to be a realistic option at an annual frequency, but it might be relevant over a firm's life cycle and especially in the transition from (usually loss-making) start-up to (usually profit-making) established company (Cullen and Gordon 2002).

While this more recent literature has made progress in understanding the impact of taxes, particularly the corporate income tax, on the choice of organizational form, and has provided estimates of the deadweight loss of this impact, there has been limited analysis of the implications for corporate tax incidence.

## INTERNATIONAL ISSUES

In recent decades, the U.S. economy has experienced a steady increase in the importance of international trade and capital flows.  Between 1987 and 2003, the net stock of private U.S. fixed capital, valued at current cost, rose from $10.71 trillion to $24.82 trillion[25], at an annual growth rate of 5.4 percent.  By comparison, U.S. privately-owned assets abroad, at current cost, rose over the same period from $1.39 trillion to $7.37 trillion, at an annual growth rate of 11.0 percent, and foreign-owned U.S. assets (excluding foreign official assets) rose from $1.44 trillion to $8.23 trillion, at an annual growth rate of 11.5 percent.[26]

The significance of the international investment channel has immediate implications for incidence analysis, because capital fleeing the U.S corporate income tax now has an alternative potential destination that is much bigger than the U.S. non-corporate sector and therefore much more able to absorb the capital without driving down the pre-tax rate of return.  But, aside from the expanded size of the relevant capital market, considering the international capital market affects corporate tax incidence analysis in three other important ways.  First, the corporate tax

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[25] U.S. Bureau of Economic Analysis (www.bea.gov, Fixed Asset Table 2.1, March 8, 2005).

[26] Nguyen (2005), Table 2.

burden need not be borne fully by domestic residents but, can, potentially, be partially

"exported" abroad. Second, there is an added dimension of tax rules to analyze, governing how

cross-border flows are treated by different countries; one must know whether the corporate tax is

essentially source-based or residence-based, for example. Finally, with other governments' tax

systems involved, their responses are relevant to analyzing the effects of U.S. tax changes.

With capital mobile in a large world capital market, one's intuition might be that capital

owners should be more able to avoid the burden of U.S corporate taxation. But this intuition is

misleading. As discussed by Bradford (1978) and Kotlikoff and Summers (1987), the total

burden on capital need not fall with the ability of the United States to affect the worldwide rate

of return, because at the same time the burden of U.S taxation is being spread over a larger total,

worldwide capital stock. What does fall as the United States becomes small relative to the world

capital market is its ability to export the burden of a source-based capital income tax, even if

some capital is foreign owned. How can this be so, if capital bears all of the tax? The answer, in

this model, is that the tax is *also* being borne by other domestic factors (in this case, land), while

comparable factors abroad gain.[27]

The tax treatment of cross-border flows adds considerable complexity to the analysis of

taxation and its effects, including incidence analysis. Unlike in the purely domestic context,

there is a distinction between where income is earned and where its owner resides, and the

concept of residence, itself, is applied not only to individuals but also to corporations. Countries

may seek to tax corporate income on a source basis, a residence basis, or some combination of

the two, and most countries follow this last approach, taxing at least some income at source at

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[27] Gravelle and Smetters (2001) argue that these domestic U.S. factors will bear little of the corporate tax in the long run, as the result of the large size of the United States and the additional market power conveyed by imperfect substitutability of foreign and domestic capital and commodities.

the corporate level, even if the corporation is owned abroad, and taxing at least some portfolio income of domestic residents on holdings of foreign assets.

But the effects of a change in, say, the U.S. corporate tax rate cannot even be considered without first characterizing the equilibrium that might result in this very complex tax environment. As in the analysis underlying the Miller model, an equilibrium with individuals possessing different relative tax preferences for different assets leads to specialization of the highest-bracket investors in the most tax-favored assets (Gordon 1986), but the number of possible allocations of assets among investors is increased by the fact that individuals may hold foreign assets in many countries and in a variety of ways (e.g., portfolio investment versus direct investment), and corporations (and, to a lesser extent, individuals) can change the location not only of their investments but also of their tax residence. To this complexity of individual and firm choices, one must add the strategic interactions of governments in their choice of tax systems. A thorough discussion of the effects of corporate taxation in this context is well beyond this paper's scope; the reader is referred to the survey by Gordon and Hines (2002). But some important threads of the literature as it relates to incidence can be highlighted.

**Residence versus Source Taxation**

Taxation of corporate capital income on a residence basis would seem to leave less scope for shifting than taxation on a source basis. In the former case, the U.S. tax rate would apply wherever the capital moved, so it would be harder to avoid. But residence is not immutable, particularly for corporations. Thus, a residence-based corporate income tax might induce less shifting of capital but more shifting of residence.[28]

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[28] An example is the corporate "inversions" of recent years, when U.S. companies relinquished "parent" status to foreign subsidiaries to become, for tax purposes, subsidiaries of foreign corporations. See Desai and Hines (2002).

It is also important to remember that the U.S corporate income tax, although sometimes referred to as being a residence-based tax, has many features that cause it to resemble a source-based tax. First, by allowing tax credits for foreign income taxes, the U.S. tax collects little additional tax on foreign-source income of U.S corporations. Second, income of foreign subsidiaries is taxed only upon repatriation to the United States. Thus, little foreign-source income is subject to tax, and at low net tax rates.

**Tax Rate versus Tax Base**

As already discussed, changes in the corporate tax burden effected through changes in the tax base, as through depreciation provisions, have a different impact than equal-revenue changes in the corporate tax rate because the two policies have different relative effects on old and new capital. In the international context, there is an added reason why these policies' effects would differ – the ability of firms to locate corporate income independently from corporate capital through the mechanism of "transfer" pricing – the prices assigned to transactions between related parts of the firm located in different tax jurisdictions. Variations in transfer prices can be used to shift income among jurisdictions, but are responsive to the tax rates on additional income, not to investment-related provisions. Thus, transfer pricing reduces the relative efficiency of investment incentives. Simultaneous increases in the corporate tax rate and investment incentives that hold constant the marginal effective tax rate on new investment would no longer just impose a capital levy on existing corporate assets, but would be partially shifted through behavioral responses.

The corporate tax rate could have similar effects even if shifts in corporate income location were limited to actual changes in investment location, rather than to transfer pricing. If the use of capital in production in a given location is "lumpy" and does not obey the assumption

of constant returns to scale, then the investment decision also involves a discrete location decision; the decision will be not simply one of plant size in each location, but also of where to locate the plants. Without constant returns, there may be economic rents associated with the location decision, and the tax on these rents will depend only on the corporate tax rate. Thus, while the investment decision, conditional upon location, may be analyzed as in the domestic context, the location decision will depend on the combined burden on capital and rents, strengthening the impact of the corporate tax rate (Devereux and Griffith 2003). In this context, corporate shareholders can shift not only a tax on corporate capital, but one on rents as well.

## MANAGERIAL ISSUES

Economists stress that only individuals and not entities can bear tax burdens. From this perspective, it is difficult to see the logic of a separate tax on corporations. With no retreat from the position that only individuals bear taxes, though, there may be something to the view of the corporation as a separate entity to be taxed, in the sense that corporate managers, as a group, may be affected by the corporate tax in ways that differ from the effects of other taxes and may in turn have an objective different than profit maximization.

This discussion will relate primarily to the corporate tax rate, rather than to investment-related tax provisions, as the issues all concern the extent to which behavior by corporate managers, holding investment fixed, affects the reported corporate tax base.

In one limited sense, the corporate income tax should have no impact on the behavior of managers. As employee compensation is tax deductible, it is still in the corporation's interest to

pay employees, including managers, their before-tax marginal products.[29] But there are other respects in which the existence of the corporate tax may affect managerial behavior.[30]

First, the corporate income tax reduces the after-tax cost to shareholders of managerial underperformance. Thus, to the extent that the costs of monitoring and acquiring information about managerial performance are not deductible from the corporate tax, the effect of the tax may be to reduce efficiency in managerial performance. Even if managers receive lower compensation as a result, the incidence of the increased inefficiency is still to be considered; as with a decline in managerial input, the impact on capital and other factors would depend on relative complementarities in the structure of production.

Second, tax compliance is largely a managerial decision, and a quite substantive one given the great complexity of the corporate tax system. It is customary to distinguish between (legal) tax avoidance and (illegal) tax evasion, but the choices are better characterized as being along a continuum of legal probability. In the standard model of individual income tax evasion the individual trades off tax savings from successful evasion against the penalty if caught. The impact of an increase in the tax rate depends on a number of factors, including the agent's risk aversion and the penalty structure.[31] In the corporate context the situation is even less clear because it is difficult to know what motivates managers to evade on behalf of shareholders.

The incidence of corporate tax evasion depends upon the "technology" of tax evasion. Following Slemrod (2004), we can think of two questions that affect the outcome. First, is evasion general or limited to a few managers? In the former case, evasion will reduce taxes for

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[29] This does not hold exactly for stock options, which are deductible only when exercised rather than when granted, but the offsetting deferral of individual income tax should roughly offset this delay.

[30] There will also be ways in which the structure of corporate and shareholder taxes may affect managerial decisions, for example the decision whether to distribute earnings in response to the taxation of dividends.

[31] See Slemrod and Yitzhaki (2002) for further discussion.

all concerned and may reduce effective tax rates, driving down the before-tax rate of return to capital; the effect would be like a corporate tax cut, though one with a lesser reduction in deadweight loss because of the resources wasted through evasion arrangements.  In the latter case, the taxes saved will not be eroded through a reduction in before-tax returns, so the reduced burden will benefit the shareholders and possibly managers.  The second question involves the relationship between evasion and the scale of operations.  If evasion is not part of the "constant returns" technology, but rather more of an inframarginal activity, then it is more of a lump-sum transfer to shareholders, even if it is widely practiced.  As in the discussion at various points above, there is an important distinction here between the treatment of old and new capital; in this case, the question is whether the "evasion tax cut" extends to new capital.

But the corporate tax evasion game is different from the individual game in a very fundamental way, for there are not just two players, but (at least) three: the government, the manager, and the shareholder.  The manager decides not only what to report to the government, but also what to report to the shareholder, and these decisions are as distinct as tax accounting and financial accounting.  This leads to interesting interactions that have only recently been explored.  As discussed by Desai and Dharmapala (2004), one needs to consider the technology that governs the two processes of hiding resources from the government and hiding resources from shareholders.  Quite plausibly, the two processes are complementary, in which case managers who are aggressive with respect to corporate tax evasion may also engage in large-scale diversion of shareholder resources.  If this is true, then the act of evasion may not actually benefit shareholders (even if there are no competing evaders to reduce before-tax returns), and strengthened corporate tax enforcement need not make shareholders worse off.[32]

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[32] See also Crocker and Slemrod (2005) on this topic.

In summary, the corporate tax may affect managerial behavior in two ways, through the incentive effects of changes in after-tax payoffs, and by giving rise to decisions regarding tax avoidance and evasion. While some of the potential incidence effects have been considered, this is an area in which the literature is still developing.

## CONCLUSIONS

Our journey beyond the Harberger model through the more recent literature takes us both forward and backward: forward in considering issues not previously studied, but backward in reestablishing the relevance of the shareholder incidence approach. For a variety of reasons, shareholders may bear a certain portion of the corporate tax burden. They may be unable to shift taxes attributable to a discount on "old" capital, taxes on rents, or taxes that simply reduce the advantages of corporate ownership. In the short run, they may also be unable to shift taxes on corporate capital. Thus, the distribution of share ownership remains empirically quite relevant to corporate tax incidence analysis, though attributing ownership is itself a challenging exercise.

Another of this paper's lessons is that one-dimensional incidence analysis – distributing the corporate tax burden over a representative cross-section of the population – can be relatively uninformative about who bears the corporate tax burden, because it misses the element timing. For example, for a tax that is shifted over time from shareholders to all owners of capital, as depicted in Figure 2, the part not shifted will fall entirely on initial shareholders, while the part that is shifted will fall on future capital owners. Collapsing the burdens on shareholders and capital owners into a single cross section completely misses this important distinction.

A related point is that it is more meaningful to analyze the incidence of corporate tax changes than of the corporate tax in its entirety, because (1) different components of the tax have different incidence (e.g., a change in the corporate tax rate versus a reduction in corporate tax

payments through a dividends-paid deduction), and (2) incidence relates to the path of the economy over time, not just in a single year; for example, it would make little sense to consider the incidence of one-year's depreciation deductions for a long-lived investment.

A further point is that corporate tax collections don't equate to corporate tax incidence, even in the aggregate. A well-known reason for this distinction is the deadweight loss of taxation, which makes burdens exceed revenue collections. But burdens may also fall short of corporate revenue collections if (1) distortions are reduced (as in the case of improved risk-sharing) or (2) other taxes (e.g. personal taxes) are avoided.

Finally, while exploring many extensions of the Harberger model, I have devoted little attention to one of that model's important omissions, the impact of corporate income taxes on capital accumulation. But the implications are clear. For taxes on capital income, in general, we would expect an increase in the effective tax rate on new saving and investment to reduce capital accumulation. The resulting decline in the capital-labor ratio would increase before-tax returns to capital and lead to a fall in wages, thus partially shifting the tax burden from capital to labor. This analysis would apply to the corporate tax as well, but *only* to the extent that the corporate income tax represents a tax on new saving and investment. The shift in the corporate tax burden from capital to labor can proceed only if it is first shifted from shareholders.

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# Table 1.  U.S. Corporate Equity Ownership, 2004

(end of year, billions of dollars)

| Asset Holder | Amounts | Detail |
|---|---|---|
| Households | 5,979 | |
| Mutual funds | 3,694 | |
| Nonprofit organizations [a] | 597 | |
| Retirement funds | 2,993 | |
|    Private pension funds (DB) [b] | | 720 |
|    Private pension funds (DC) [b] | | 971 |
|    State and local govt. retirement funds | | 1,202 |
|    Federal government retirement funds | | 99 |
| Bank personal trusts and estates | 221 | |
| Life insurance companies | 1,065 | |
| Savings institutions | 28 | |
| State and local governments | 89 | |
| Rest of the world [c] | -467 | |
| Market value of domestic corporations | 14,198 | |

Source:  Board of Governors of the Federal Reserve System (2005), Table L.213.  Amounts net out inter-corporate holdings.

Notes:

[a] Holdings of households and nonprofit organizations are grouped together for 2004; breakdown is based on assumption that proportion held by nonprofits is the same as in 2000, using Table L.100.a.

[b] Detail from Tables L.119.b and L.119.c.

[c] Rest of world equals holdings of U.S. issues by foreign residents less holdings of foreign issues by U.S. residents.
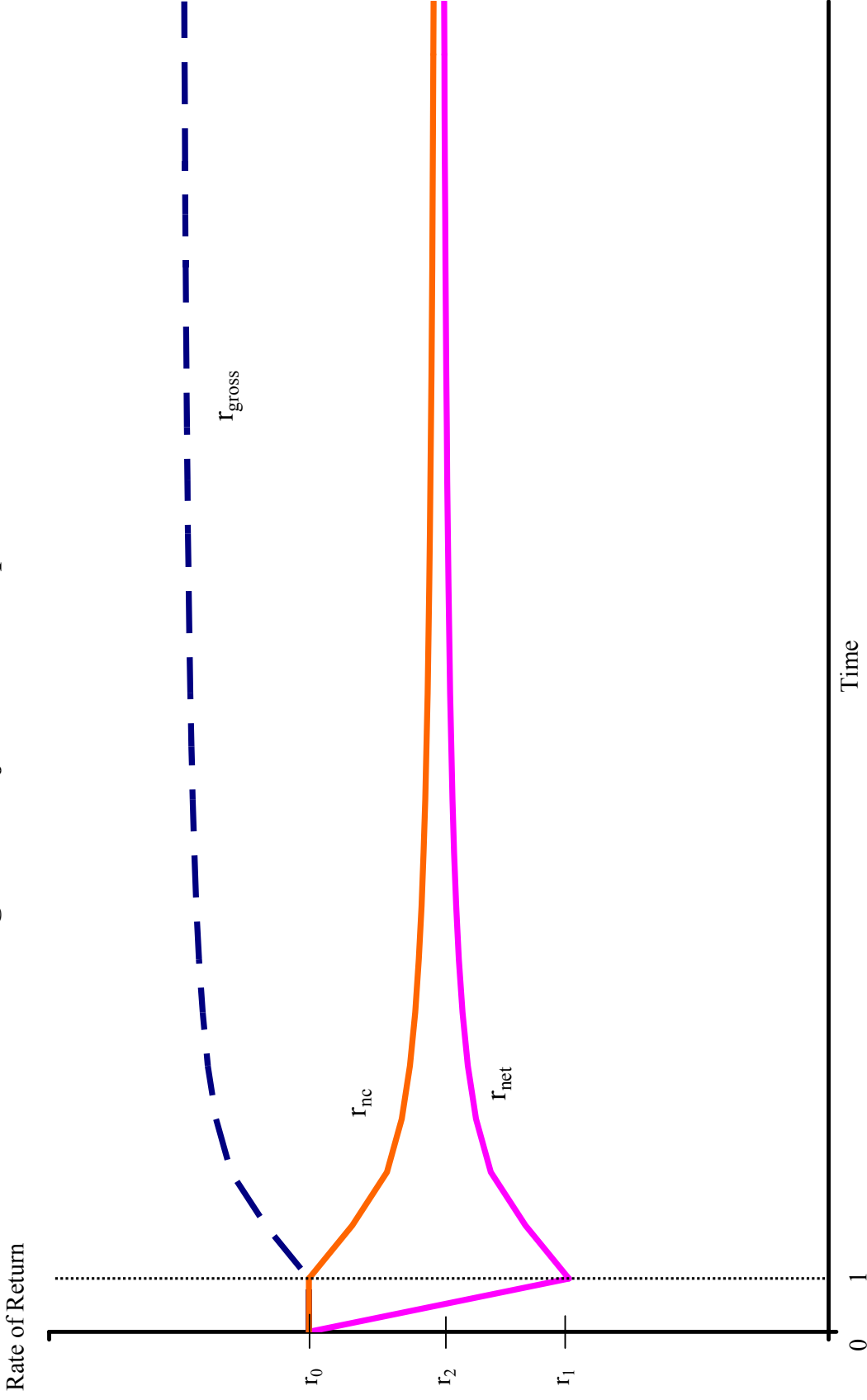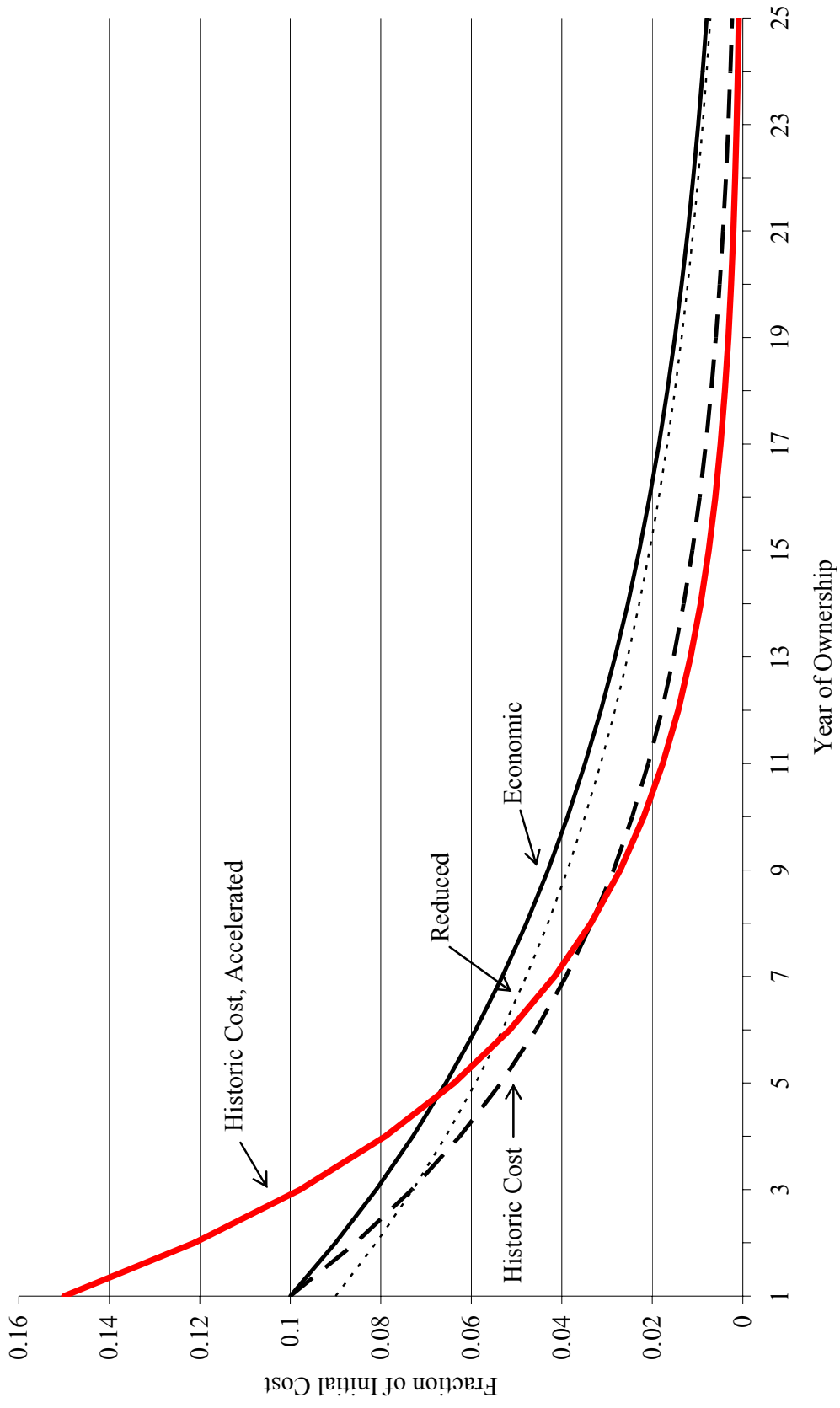
# Figure 1. U.S. Federal Corporate Income Taxes, 1962-2004
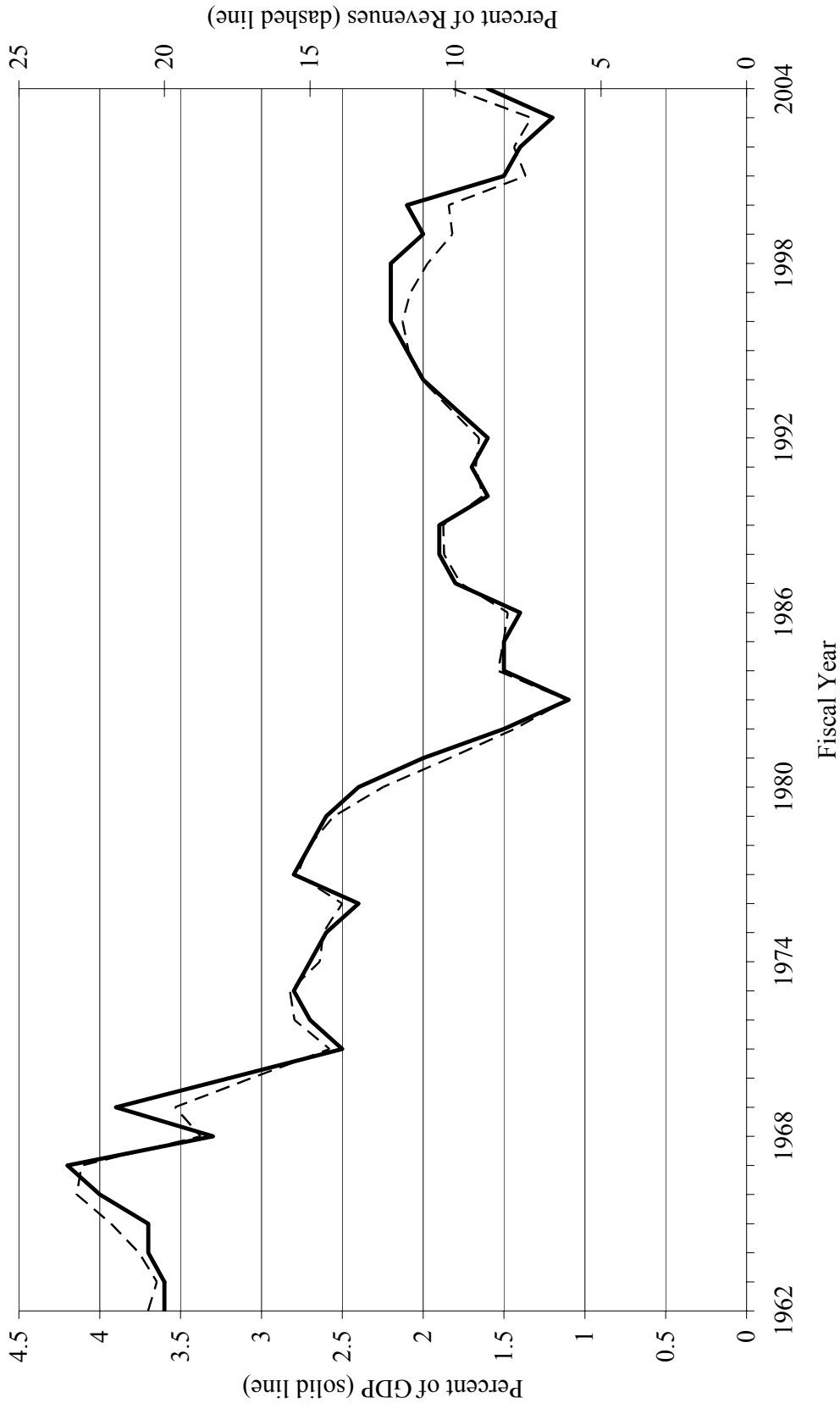


Source: Congressional Budget Office

Figure 2. Adjustment to Equilibrium

**Figure 3. Depreciation Schedules**

# Figure 4. The Miller Equilibrium



return to holding debt $(1 - t_p)$

return to holding equity $(1 - \tau)(1 - t_e)$

$(1 - \tau')(1 - t_e)$

investor tax rate

$1$

$1 - \tau$

$1 - \tau'$

$0$

$t_p^*$

$t_p'^*$