

VI

The next three chapters, all of which deal with the corporation income tax, do not seem to need the introductory comment made for most of the others. In fact, Chapter 6, which was written well after Chapters 7 and 8 as my contribution to the *International Encyclopedia of the Social Sciences* (New York: Crowell Collier, 1968), serves that purpose, drawing together and highlighting the main conclusions of the following two chapters.

The element that perhaps best characterizes the approach taken in these chapters is the treatment of the corporation income tax as what has come to be called a partial factor tax, i.e., a tax on the earnings of a particular factor (in this case capital) in some but not all its uses. In the United States case at least, agriculture and housing (defined not as construction but as the activity providing the services out of existing housing facilities), plus miscellaneous repair services (plumbers, electricians, painters, etc.), constitute an overwhelmingly noncorporate sector. These activities pay a negligible percentage of their income in corporation tax as compared with the rest of the economy, which is predominantly corporate. The "gray area" between the two extremes is occupied only by wholesale and retail trade, where there is a genuine mixture of corporate and noncorporate businesses, and by oil and gas, where special tax provisions (treated in Chapters 11 and 12) operate to limit the force of the corporation income tax in important ways. These latter activities, however, pay in the form of corporation income tax several times the percentage of their income from capital that is paid by what is called above the noncorporate sector; hence in empirical applications I classify them as part of the corporate sector. Lest readers conclude that with only housing, agriculture, and miscellaneous repair services classified as noncorporate, practically

the whole economy must be corporate, let me note that approximately half the capital of the United States economy is in fact in the noncorporate sector as I have delineated it. This point (which will be repeated later) is made here mainly to underscore the relevance of the treatment of the corporation income tax as a partial tax on the income from capital.

The two-sector model developed in Chapter 7 provides the theoretical structure for analyzing the incidence of a partial factor tax, under conditions in which the basic supplies of labor and capital are unaffected by the existence of the tax. The main "practical" conclusion that I draw from that exercise a decade after having written it is highlighted in Chapter 6: namely, that the idea of a partial factor tax (in this case a tax on the income from corporate-sector capital) being borne fully by the factor in question (in this case not just corporate-sector capital but all capital) does not represent an extreme case, but rather one that is quite "in the middle" of the range of plausible outcomes. Moreover, empirical evidence is presented in Chapter 7 that suggests it is likely, in the United States case, that "all capital" bears something close to (and perhaps even a little more than) the full burden of this partial factor tax.

The question of the efficiency effects of a partial tax on the income from capital is discussed in Chapter 6, and dealt with empirically for the United States case in Chapter 8. This analysis is basically an application of the theoretical structure built up in Chapters 1-3, and the empirical exercise suggests that the efficiency costs involved in differential taxation of the income from capital in different uses are substantial. This is especially so if one accepts the conclusion that the true burden of a partial tax on income from capital will in any case fall largely on capital generally. In this case a tax directly levied on all income from capital would have the same ultimate incidence as the present partial tax set-up, but the costs in terms of resource allocation would be greatly reduced — even absent if the stock of capital (i.e., the supply of savings) were inelastic with respect to the net rate of return.

Chapter 6

Corporation Income Taxes

The taxation of the income of corporations has come to be one of the major sources of fiscal revenue in most countries. According to the 1965 *Yearbook of National Accounts Statistics* of the United Nations, corporation tax receipts in 1962 equaled or exceeded 2 percent of the national income in 32 countries, and represented 10 percent or more of current government receipts in 19 countries. Of the major countries, Japan places the heaviest reliance upon the corporation income tax, receipts from this tax accounting for 22 percent of current revenues and amounting to 6 percent of the national income. Australia, Canada, New Zealand, the Republic of South Africa, and the United States all collect more than 15 percent of their current revenues from this source, the amounts in each case representing more than 5 percent of national income. In western Europe corporation income taxes typically represent 3-4 percent of national income and 6-10 percent of current government revenues. The corporation income tax tends to be less important, relative to national income and government revenues, in the developing countries than in the more advanced economies; but this is due mainly to the fact that the corporate sector itself is less important, rather than to a failure of the developing countries to levy the tax at all or to a tendency on their part to impose the tax at significantly lower rates than those applied by the more advanced countries.

This widespread and heavy reliance on the corporation income tax testifies to its administrative feasibility and political popularity. It is highly feasible administratively because the laws under which corporations are established generally require the maintenance of accounts on a standardized basis; thus the enforcement of the tax reduces to the problem of requiring honest and accurate accounts and of resolving a series of technical issues, such as the determination of which expenditures may be expensed and which must be capitalized, and the setting of allowable rates of depreciation for specific classes of assets. These problems have been handled in most countries by administrative

Reprinted from Arnold C. Harberger, "Corporation Income Taxes," from *International Encyclopedia of the Social Sciences* (New York: Crowell Collier, 1968), "Capital Taxation: Corporation Income Taxes." Vol. 15, Part III, pp. 538-545, with the permission of Macmillan Publishing Co., Inc. Copyright © 1968 by Macmillan Publishing Co., Inc.

decrees or regulations issued by the tax-collecting authority itself, operating under broad guidelines set out in the tax legislation.

The political appeal of the corporation income tax has two roots. First, the tax obviously conforms to popular conceptions of ability to pay, since the man in the street tends to view corporations as wealthy entities themselves and as being owned predominantly by wealthy stockholders. But second, and in many ways equally important as a source of political appeal, is the fact that the corporation income tax, by definition, cannot be a source of loss to a corporation. Those corporations which have no net income pay no corporation income tax; only "profitable" companies are required to bear this levy. By contrast, other forms of business taxation can themselves be responsible for converting what would otherwise be a net profit situation into one of net loss. Hence, even within the world of business, companies in a marginal or precarious financial situation are likely to prefer the taxation of corporate net income to other forms of business taxation, and the strong opponents of corporate income taxation are likely to be the more profitable companies with the most "ability to pay."

The administrative and political advantages of the corporation income tax do not, however, imply that it is a good tax from the economic point of view. Quite to the contrary, it is readily demonstrable that, of the major revenue sources, this tax is one of the least justifiable on economic grounds. It entails an essentially arbitrary discrimination among industries or activities, it tends to inhibit the growth of the more dynamic sectors of the economy, and it probably causes a reduction in the overall rate of capital formation.

EFFICIENCY EFFECTS

All the discriminatory features of the corporation income tax stem from the fact that corporate net income is the tax base. By the definition of the tax, all unincorporated activities are exempt; and even within the corporate sector of the economy, the tax falls more heavily on activities with low ratios of debt to equity (because interest on debt is a deductible expense). The consequence of these discriminations is a distortion of the economic structure, favoring noncorporate over corporate activities and, within the corporate sector, a distortion favoring those activities which can readily be financed in large measure by debt capital over those which cannot. The tax may also discriminate within the corporate sector against capital-intensive activities and favor labor-intensive activities, but the existence of this effect depends on the incidence of the tax; it may be present but need not be.

The basis for these assertions is the fact that in all economies in the modern world there is a tendency toward the equalization of the rates of return that investors receive on capital in different industries or activities. This tendency can be frustrated by restrictions on the entry of capital into given areas, can be blunted by imperfect information, can be modified by considerations of differential risk or convenience among different investment outlets, and can be obscured by random year-to-year variations in earnings — but it is always present. Stigler [1963, p. 23] found, for example, that whereas the mean rate of return (after taxes) on invested capital in U.S. manufacturing industries

averaged 7.6 percent in 1947-1954, the standard deviation of the rates of return by two-digit industries (about this mean) was only 1.6 percent. Moreover, he found no significant evidence of a risk premium (either positive or negative) when he related observed average rates of return in individual industries to the standard deviation of each industry's rate of return. Stigler's results accord well with that what one would expect a priori from a reasonably well-functioning capital market. If higher-than-average rates of return to capital exist and persist in a given activity, then one would expect investment in that activity to increase and so drive down the rate of return; if lower-than-average rates of return prevail, one would expect investment to fall off, inducing an increase in the rate of return.

The following analysis will, accordingly, be based on a tendency toward equalization of after-tax rates of return to capital in different investment uses. Given this tendency, it is clear that the corporation income tax will produce an equilibrium pattern of net rates of return among industries only through its differential impact's being reflected in differential gross rates of return. Thus, assuming that the net-of-tax rate of return on equity would, in a given capital-market situation, tend to stabilize at 6 percent, and assuming that the rate of return to capital in the noncorporate sector and the rate of interest on debt would also tend to stabilize at 6 percent, we have the following possible pattern of rates of return on capital, gross of a corporation income tax at a rate of 50 percent:

Noncorporate Industry	6%
Corporate Industry A: 2/3 debt	8%
Corporate Industry B: 1/3 debt	10%
Corporate Industry C: 100% equity	12%

The differentials in gross rates of return on capital induced by the corporation income tax have two kinds of effects: first, they are reflected in product prices and, consequently, in the levels of output of particular activities; second, they confront the different activities with different relative costs of labor and capital and, hence, induce decisions concerning the relative intensity of use of these resources which are uneconomic from the standpoint of the economy as a whole. For example, the net annual cost of \$100,000 of capital, for a year, to Noncorporate Industry (see above), would be \$6000, while that to Corporate Industry C would be \$12,000. If labor of a given class is paid \$6000 per year, Noncorporate Industry is induced to operate at a point where the marginal \$100,000 of capital produces a yield equivalent to the marginal product of one man-year of labor, while Corporate Industry C will tend to operate at a point where \$100,000 of capital will have a yield equivalent to the marginal product of two man-years of labor. Clearly, economic efficiency could be improved by a tax system which took an equal fraction of the income generated by capital in all lines of activity, regardless of whether they were corporate in structure or not, and regardless of their degree of access to debt financing.

Effect of Other Taxation. The foregoing sketch of the efficiency-effects of the corporation income tax implicitly viewed the tax as the only levy in the tax

system that affected gross-of-tax rates of return differently in different activities. Actually, there are a variety of taxes and tax provisions in most countries which have such effects, and it is important in any analysis of real-world tax systems to consider the combined effect of all such provisions rather than attempt artificially to isolate one tax, such as the corporation income tax, from the overall structure of which it is a part.

Property taxes, for example, are often levied at different effective rates on real property of different types. More important, property taxes often are levied only on land and buildings. Thus machines, inventories, and such may escape the property tax; and corporate capital, in which machines and inventories play a larger role than in noncorporate capital, will then pay relatively less through property taxation than noncorporate capital. In this way the property tax may tend to offset somewhat the discrimination against the corporate sector that is implicit in the corporation income tax.

Similarly, in countries like the United States, where capital gains are taxed at rates lower than normal personal income tax rates, or in countries with no capital gains taxation at all, the effects of corporate income taxation as such are likely to be offset to some extent by the favored treatment of capital gains. This is so because the earnings of capital in unincorporated enterprises are taxed under the personal income tax as they are earned, at full personal income tax rates, while the personal income tax strikes only that portion of corporate earnings paid out in dividends at the full rate. Let D be the proportion of earnings paid out in dividends, t_c be the corporate tax rate, t_p , the personal tax rate, and t_g be the effective rate of tax on capital gains. Then \$1 of corporate earnings will pay a total personal-plus-corporate tax bill equal to

$$t_c + (1 - t_c)Dt_p + (1 - t_c)(1 - D)t_g.$$

This can turn out to be lower than t_p , the total income tax paid on \$1 of income of an unincorporated enterprise, provided that the rate of tax applicable to a marginal dollar of personal income is sufficiently higher than the corporate tax rate.

For example, assume that an individual is in the 70 percent bracket of the personal income tax and is contemplating investing some savings in either a specific corporation, C , or a specific unincorporated enterprise, U . Suppose that both investments are expected to have a gross-of-tax yield of 20 percent. The net-of-tax return from the investment in U will be 6 percent, while that from the investment in C will depend on t_c , D , and t_g . Suppose t_c is 40 percent, D is 33 1/3 percent, and t_g is 15 percent. Then, of \$20 of earnings in C , \$8 will be paid in corporation tax, and \$2.80 in personal tax on dividends of \$4. If the corporation's savings of \$8 out of earnings of \$20 ultimately are fully reflected in capital gains, and if these are taxed at an effective rate of 15 percent, then \$1.20 will be paid in capital gains taxes. The total tax on \$20 of income will be \$12, and the net-of-tax rate of return from the investment in C will be 8 percent — higher by 2 points than that on the investment in U .

Obviously, the effective rate of corporate-cum-personal tax on an investment will vary from individual to individual (depending on their marginal tax rates) and from corporation to corporation (depending on their dividend policies and

on the degree to which their corporate savings are reflected in capital gains). Moreover, the effective rate of tax on capital gains will itself vary from situation to situation, since individuals can postpone realization of capital gains, thus postponing payment of capital gains tax and shrinking the present value of the tax paid on capital gains account. For example, if a share bought for \$100 today rises in value at 8 percent per year, capital gains tax payable upon sale r years in the future will be $t_g^*[(1.08)^r - 1]$, where t_g^* is the nominal rate of tax on capital gains, but the present value of this tax (evaluated at 8 percent) will be $t_g^*[1 - (1/1.08)^r]$. This is what was meant above by the effective rate of tax on capital gains. It is clearly, from this example, a decreasing function of the length of time that the stock is held. In the United States, the effective rate of capital gains tax can in fact be zero, since assets held until the death of the owner pass to his heirs, who in turn are taxed only on increases in value that take place after they have inherited the property.

While the property tax and capital gains provisions tend somewhat to offset the distorting effects of the corporation income tax, the traditional treatment of income from owner-occupied housing works to reinforce the distortions implicit in the corporation income tax. Obviously, owner-occupied housing generates income in real terms, but traditionally this income has not been a part of the personal income tax base. As a consequence, this important part of the income generated by capital in the unincorporated sector of the economy pays neither corporate nor personal income tax, while the income generated in the corporate sector is subject to both.

Empirical Estimation. Harberger [see Krzyzaniak 1966] has attempted to derive rough estimates of the cost to the U.S. economy of the pattern of distortions created by the differential taxation of capital in different uses. He incorporates into a single model, which distinguishes between the corporate sector and the noncorporate sector, the effects of corporate income taxation, property taxation, capital gains taxation, and the exemption from personal income taxation of the imputed income from owner-occupied housing. Making conservative assumptions about the elasticities of response of the economy to the various distortions involved, Harberger estimates the "efficiency cost" of the U.S. pattern of taxation of income from capital at approximately \$2 billion per year. This estimate concerns *only* the costs associated with the misallocation of a given capital stock, costs which would be zero if all income from capital were to be taxed at a given constant rate. It does not take into account the possible effects of the taxation of income from capital upon the size of the capital stock itself (through the influence of taxation on the rate of saving), nor does it fully incorporate the effects of various special provisions (e.g., percentage depletion) affecting specific industries. Hence, it is a conservative estimate in this respect as well.

INCIDENCE

The incidence of the corporation income tax has long been the subject of debate among economists, a state of affairs which is likely to continue for some time. Underlying this debate are some genuine differences, both analytical

(reflecting different assumptions about the behavior of firms) and empirical (reflecting differing views about, for example, the quantitative response of saving to the disturbances engendered by the imposition of the tax). However, expositions of the effects of the corporation income tax at times contain serious conceptual and analytical errors which should long since have been laid to rest.

Perhaps the main source of confusion has been the conception of the incidence of the tax as falling either (a) on stockholders, or (b) on consumers, or (c) on workers, or on some combination of these three. There are three errors involved in this traditional trichotomy. The first has to do with the use of the term "stockholders" rather than "owners of capital"; the second relates to the distinction between consumers and workers; and the third concerns the assumption, which is usually implicit when the trichotomy is stated, that none of the three groups will gain as a consequence of the tax.

The Distinction between Stockholders and Owners of Capital. The idea that the burden of the corporation income tax will fall on the stockholders of the affected corporations is a valid one within the confines of standard short-run equilibrium analysis. This is because in the short run, with the capital of each corporation considered as a fixed factor of production, the earnings of equity capital represent the residual share. This residual share is assumed, in traditional short-run models of competitive and of monopolistic behavior, to be maximized by the firm. So long as the demand and cost conditions facing the firm are unchanged — the conventional assumption — the output which generated maximum profit before the tax was imposed will also yield maximum profit in the presence of the tax.

Although the above analysis is correct for the short run, a major change occurs when longer-run adjustments are allowed for. Here the appropriate assumption is that the after-tax rate of return is equalized between the corporate and the noncorporate sectors. Any fall in the rate of return perceived by the owners of shares will therefore also be perceived by the holders of other kinds of titles to capital, and the isolation of *stockholders* as the relevant group when assessing the incidence of the tax is no longer correct. The relevant group becomes *owners of capital*, once attention is focused on the longer-run incidence of the tax.

The Distinction between Consumers and Workers. Once the above is recognized, the error implicit in the distinction between consumers and workers becomes apparent. Since all income-earners in the community are owners of either labor or capital resources or both, the reduction in real income implicit in the tax must reflect the sum of the reductions in the real incomes of these two groups. That is to say, a distribution of the burden of the tax between people in their role as owners of capital, on the one hand, and people in their role as sellers of labor services, on the other, is exhaustive, leaving no room for an additional burden to be borne by consumers.

This is not to say that, within each group, different individuals will not bear different burdens because of differences in their consumption patterns. In general, those, whether capitalists or workers, who consume a greater-than-average proportion of "corporate" products as against "noncorporate" products

will be relatively harder hit as a consequence of the tax than those who have the opposite bias in their consumption pattern. But the extra benefits accruing to those consumers with relatively "noncorporate" consumption patterns must, because of the deviations of these patterns from the average, exactly offset the extra burden borne by those with relatively "corporate" consumption patterns. (This statement is precisely correct if only the first-order effects of the change in tax regime are taken into account. When second-order effects are considered, there emerges an "excess burden" of the tax, deriving from the distortion of consumption patterns and resource allocation which results from the tax. Excess burden, however, is conventionally left out of account in discussions of incidence, for otherwise the sum of all burdens allocated would exceed the yield of the tax; that is, incidence is conventionally defined as dealing only with first-order effects.)

There is, nevertheless, a way in which sense can be made out of a statement like "The tax is wholly passed on to consumers." For if analysis reveals that the real incomes accruing to labor and capital fall by equal percentages as a result of the tax, then it is equally convenient to describe the tax as being borne fully by people in their role as consumers. And if labor's real income falls by 10 percent as a consequence of the tax, while capital's falls by 20 percent, it is just as convenient to regard the tax burden as being a 10 percent reduction of the real income of consumers as such (the percentage point fall common to the two groups), plus an additional 10 percent reduction falling upon the owners of capital. But if this approach is taken, there is no burden to be allocated to labor in the example just cited, just as there would be none to allocate to capital if its real income fell by 10 percent and labor's by 20 percent. Thus the idea of a three-way division of the burden remains illogical even when a plausible device is found for ascribing some of it to consumers.

The "No-Gain" Fallacy. The third error involved in typical presentations of the trichotomy — the implicit assumption that no group will gain as a consequence of the imposition of a corporation income tax — is perhaps the most serious of all, since it leads to a gross misapprehension of the nature of its incidence. It is not at all true that the share of the total burden of the tax which falls on capital must lie between zero and 100 percent; a much more plausible range for capital's share runs from a_k to $1/b_c$ (where a_k is the proportion of the national income accruing to capital and b_c is the fraction of the capital stock which is occupied in the corporate sector), though even this range can easily be exceeded.

To demonstrate the plausibility of the suggested range, assume that, with fixed and fully employed stocks of labor and of capital and holding the wage rate constant as the *numéraire*, the net-of-tax return to capital remains unchanged as a consequence of the tax. The nominal income of both labor and capital is therefore unchanged, but the real income of both groups falls because the prices of products of the corporate sector must rise to accommodate the tax. Labor and capital must therefore suffer equiproportionally as a consequence of the tax, capital's fraction of the total burden being a_k , its share in the national income.

The other end of the range is generated when the gross-of-tax rate of return to capital remains unchanged as a consequence of the tax. The net-of-tax rate of return must therefore fall by the percentage rate of the tax imposed. But the equilibrium condition for the capital market assures that if the net-of-tax rate of return falls by this percentage in the corporate sector, it must fall by the same percentage in the noncorporate sector. Since the fall in the return to capital in the corporate sector just reflects the tax paid, the parallel fall in the noncorporate sector reflects that capital is bearing more than the full burden of the tax, the ratio of capital's loss to the full burden of the tax being the ratio of total capital to corporate capital, or $1/b_c$. In this case, therefore, labor gains an amount equal to the reduction in real income per unit of capital times the amount of capital in the noncorporate sector.

The "plausible limits" just outlined can be derived from a two-sector model with homogeneous (of first degree) production functions, on the assumption that the elasticity of substitution between labor and capital is infinite in one sector or the other. If this elasticity is infinite in the untaxed (noncorporate) sector, then so long as some production takes place in that sector in the post-tax equilibrium, the relationship between the return to a unit of capital and the wage received by a unit of labor must be the same as in the pretax equilibrium. Capital and labor therefore must bear the same percentage losses of real income as a result of the tax. When, on the other hand, the elasticity of substitution between labor and capital is infinite in the corporate sector, the post-tax gross-of-tax return per unit of capital must bear the same relationship to the wage of labor as prevailed before the tax was imposed. Hence the net-of-tax return per unit of capital must fall, in both sectors, relative to the wage of labor, by the percentage of the tax, and capital must accordingly bear $(1/b_c)$ times the full burden of the tax.

Strikingly, these same "plausible limits" come into play when the elasticity of substitution is zero in one of the two sectors and nonzero in the other. When the corporate sector has a zero elasticity of substitution between labor and capital, the reduction in its output resulting from the tax leads to the ejection of labor and capital from that sector in the fixed proportions given by its technical coefficients of production. Suppose that the corporate sector uses labor and capital in the ratio of 1:2; as it contracts, it must therefore eject the factors in these proportions. If, now, the noncorporate sector was, in the pretax equilibrium, using the two factors in just these proportions, it will be able to absorb the "rejects" from the corporate sector without any change in relative factor prices. And since factor prices in the noncorporate sector are already net-of-tax, this means that both factors must suffer in the same proportion as a consequence of the tax, just as in the case of an infinite elasticity of substitution in the noncorporate sector.

The above result occurs when labor and capital were initially used in the same proportions in the two sectors, and it must be modified when the initial proportions differ. If the corporate sector ejects labor and capital in the ratio of 1:2, while the noncorporate sector was initially using them in the ratio 1:1, the noncorporate sector (which is assumed to have a nonzero elasticity of substitution) must alter its factor proportions so as to absorb relatively more

capital. Capital's return must therefore fall relative to labor's, in order for equilibrium to be restored; and capital will bear more than the fraction a_k of the total burden of the tax. Conversely, if the noncorporate sector were initially more capital-intensive than the corporate sector, using the factors, say, in the proportions 1:3, the relative price of labor would have to fall so as to enable this sector to absorb the "rejects" from the corporate sector; and capital would end up bearing less than a_k of the total burden of the tax.

Thus, when the elasticity of substitution between labor and capital is zero in the corporate sector, capital will bear the fraction a_k of the total burden if the two sectors have equal factor intensities; will bear more than a_k when the corporate sector is the more capital-intensive of the two; and will bear less than a_k when the corporate sector is the more labor-intensive of the two. Exactly how much more or less than a_k capital will bear depends upon the extent of the difference in factor proportions between the two industries, on the elasticity of substitution between labor and capital in the noncorporate sector (which determines the ease with which it can absorb new factors in proportions different from those initially used), and on the elasticity of substitution on the demand side between corporate products and noncorporate products (the greater this elasticity, the sharper the decline in demand for corporate products as a consequence of the tax, the larger the ejection of resources by this industry, and therefore the greater the shift in relative factor prices required to restore equilibrium).

When, on the other hand, the elasticity of substitution between labor and capital is zero in the untaxed industry and nonzero in the taxed industry, capital tends to bear more than the full burden of the tax. In this case, when the initial factor proportions are the same in both industries, the fixity of proportions in the untaxed industry assures that they will remain the same even after the tax has worked out its full effects. The relative returns to labor and capital, being governed in this case by the proportions in which the factors are used in the taxed industry, will remain the same, gross-of-tax, as they were in the pretax equilibrium. Capital's return net-of-tax will fall by the amount of the tax, but, as in the case of infinite elasticity of substitution in the taxed industry, the reduction will occur for capital used in either industry. The total reduction in capital's earnings will be $(1/b_0)$ times the yield of the tax, reflecting a very substantial "overbearing" of the tax by owners of capital and a corresponding net gain to those whose income accrues principally from the sale of labor services.

The above result (for a zero elasticity of substitution in the untaxed industry) is modified when the initial factor proportions are different in the two sectors. If the corporate sector is initially more labor-intensive than the noncorporate sector, the ejection of capital and labor resources in the proportions in which the latter sector will absorb them will make the corporate sector still more labor-intensive. A readjustment of factor prices against labor and in favor of capital will have to occur, and capital will end up bearing less than $(1/b_0)$ times the observed yield of the tax. Conversely, if the corporate sector is initially more capital-intensive than the noncorporate sector (which is still being assumed to have a zero elasticity of substitution) factor proportions will have to alter to make the corporate sector still more capital-intensive, requiring a

shift of the gross-of-tax ratio of factor prices against capital. Capital will then bear more than $(1/b_0)$ times the observed yield of the tax.

When Capital Bears 100 Percent of the Burden. Falling well within the "plausible limits" of incidence defined by a_k and $1/b_0$ is the case in which capital bears 100 percent of the burden of the tax. This result therefore cannot be regarded as being an extreme outcome, as the conventional use of the capital-labor-consumer trichotomy implies. Added insight into the plausibility of capital's bearing the full burden of the tax can be gained from an analysis of the case in which each industry is characterized by a Cobb-Douglas production function and in which the elasticity of substitution in demand between the products of the two sectors is unity. Letting X represent the quantity of the product of the corporate sector, Y the quantity of the product of the noncorporate sector, P_x and P_y their respective prices, and Z the national income, the unit elasticity of substitution between X and Y implies

$$(6.1) \quad XP_x = \alpha Z; \quad YP_y = (1 - \alpha)Z,$$

where α is the fraction of Z which is spent on X . Competitive behavior of producers of X and of Y , together with the Cobb-Douglas functions $X = K_x^\beta L_x^{(1-\beta)}$, $Y = K_y^\gamma L_y^{(1-\gamma)}$, where β and γ are constants, lead to the relations

$$(6.2) \quad \begin{aligned} K_x P_{kx} &= \beta X P_x; & L_x P_L &= (1 - \beta) X P_x, \\ K_y P_k &= \gamma Y P_y; & L_y P_L &= (1 - \gamma) Y P_y. \end{aligned}$$

Here K_x and K_y represent the amounts of capital used in the X and Y industries, respectively, and L_x and L_y refer to the corresponding amounts of labor. The price of labor is denoted by P_L , this being the same in the two industries. The cost of the services of a unit of capital is denoted by P_{kx} for the corporate sector and by P_k for the noncorporate sector, the former including the corporation income tax and the latter, of course, not including it. If τ is the rate of corporation income tax applied to the earnings of capital in sector X , then $P_k = P_{kx}(1 - \tau)$, since the after-tax earnings (as distinct from the before-tax cost) of a unit of capital are assumed to be brought to equality in both industries through the workings of the capital market.

It can be seen from relations (6.1) and (6.2) that labor will always earn a constant fraction of the national income, regardless of whether a corporation income tax exists or not. This already guarantees that exactly the full burden of the corporation tax must in this case be borne by capital. The precise way in which the burden reaches all units of capital can be seen by analyzing the relations derived from (6.1) and (6.2):

$$(6.3) \quad K_x P_{kx} = \beta \alpha Z; \quad K_y P_k = \gamma (1 - \alpha) Z.$$

From these it results that $[(K_x P_{kx}) / (K_y P_k)]$ is a constant equal to $\beta \alpha / [\gamma (1 - \alpha)]$. But since $P_k = P_{kx}(1 - \tau)$, this means that $K_x / [K_y (1 - \tau)]$ will also be a constant — that is, the ratio (K_x / K_y) will vary directly with $(1 - \tau)$. If, with no tax at all, there were 150 units of capital in each sector, a tax of 50 percent will eventually result in there being 100 units of capital in X and 200 in Y . The

200 units of capital in *Y* will earn the same fraction of national income as was previously earned by the 150 units of capital in *Y*; hence the net-of-tax return to capital will have been reduced by a quarter, say, from \$1.00 to \$.75 per unit. The 100 units of capital in *X* will cost entrepreneurs \$1.50 per unit and will therefore have the same total cost as the 150 units employed in *X* at a unit cost of \$1.00 before the tax was imposed. But the after-tax earnings of capital in *X* will, like those of capital in *Y*, have fallen from \$1.00 to \$.75 per unit. Overall, capital will have lost \$75, represented by the reduction of \$.25 per unit spread over all 300 units, and this amount will be precisely equal to the yield of the tax to the government.

The result obtained in the above example applies not only to all cases fulfilling relations (6.1) and (6.2), which are derived on the basis of unit elasticities of substitution in demand between the two products, and in production between the two factors in each industry. It has been shown elsewhere [see Harberger 1962] that the same result obtains so long as the three critical elasticities of substitution are equal, regardless of their magnitude.

The General-Equilibrium, Two-Sector Model. All the cases presented above are special cases of a general-equilibrium, two-sector model of the incidence of taxation, in which the incidence of the corporation income tax is shown to depend in a specific way on the three critical elasticities of substitution and on the relative factor intensities of the two sectors. This model, based on the assumptions that the supplies of capital and labor are not influenced by the presence or absence of the tax, that competition prevails in both the corporate and noncorporate sectors, and that per-unit net-of-tax earnings of each productive factor are equalized between sectors, was first presented by Harberger [1962] and further elaborated by Mieszkowski [1967]. They have adapted the model to explore the implications of various possible types of monopolistic and oligopolistic behavior in the corporate sector; the results of the original model have proved quite insensitive to plausible allowances for noncompetitive behavior.

The chief weakness of the model appears, at this writing, to be the assumption that the path of the capital stock through time is independent of the rate of corporate taxation. If, through a tax-induced reduction in the net rate of return on capital and/or through a tax-induced shift in the distribution of disposable income, the rate of saving is affected, the relative supplies of capital and labor will gradually diverge from the path they would have followed in the absence of a corporation income tax, with consequent effects on the distribution of income. The difficulties confronting attempts to resolve this issue are twofold. First, a dynamic rather than a comparative-static approach is required, which, while not a serious obstacle as such, involves additional parameters whose magnitudes are difficult to estimate and requires the specification of the precise nature of the dynamic structure of the economy. A great deal of further work is needed before our understanding of the economy's workings can advance to the point where these dynamic aspects can be treated with a degree of precision comparable to that with which problems of comparative statics are handled today.

The second difficulty is conceptual rather than practical. In a comparative-static approach to incidence, excess-burden being neglected, the sum of the changes in real income of the separate groups of the economy is a global reduction in real income equal to the proceeds of the tax; this is no longer true when a dynamic framework is employed. If the rate of saving is reduced by the corporation income tax, the future incomes accruing to individuals are reduced not only because the tax has to be paid each year, but also because less has been saved in the years since the tax was introduced. But it would be wrong, in estimating the incidence of the tax, to count both (a) the full reduction of real income in the year the tax is paid and (b) the future reduction in real income stemming from the reduction in savings induced by the tax. If one counts (a), one has already accounted for the present value of the future reduction in real income. To take explicit account of the future effects of changes in the savings pattern, one would properly have to convert the entire calculation of incidence to a consumption rather than an income basis and count (c) the current reduction in consumption resulting from the tax paid today plus (d) the future reduction in consumption occasioned by the reduction in future incomes stemming from the current tax-induced reduction in the rate of saving.

When the above difficulties are considered, it appears that the current-income approach (i.e., counting only (a) as the measure of incidence) is preferable, on grounds of both clarity and convenience, to approaches attempting to introduce dynamic responses into the measurement of incidence. Nevertheless, the dynamic responses in question here are of substantial interest in their own right, even if they are not linked to the analysis of incidence. The study of this aspect of the effects of corporation income taxation has only recently begun, the most important early efforts being those of Krzyzaniak [1966] and Sato [1967].

REFERENCES

- Goode, Richard B. 1951. *The Corporation Income Tax*. New York: Wiley.
- Harberger, Arnold C. 1959. "The Corporation Income Tax: An Empirical Appraisal." Vol. 1, pp. 231-250 in U.S. Congress, House, Committee on Ways and Means, *Tax Revision Compendium*. Washington, D.C.: Government Printing Office.
- Harberger, Arnold C. 1962. The Incidence of the Corporation Income Tax. *Journal of Political Economy* 70:215-240. [This volume, Chapter 7.]
- Harberger, Arnold C., and Martin J. Bailey (editors). 1968. *The Taxation of Income From Capital*. Washington: Brookings Institution.
- Krzyzaniak, Marian (editor). 1966. *Effects of the Corporation Income Tax: Papers Presented at the Symposium on Business Taxation*. Detroit, Mich.: Wayne State Univ. Press. See pp. 107-117, "Efficiency Effects of Taxes on Income from Capital," by Arnold C. Harberger.
- Mieszkowski, Peter. 1967. "On the Theory of Tax Incidence." *Journal of Political Economy* 75:250-262.
- Musgrave, Richard A. 1959. *The Theory of Public Finance: A Study in Public Economy*. New York: McGraw-Hill.

- Musgrave, Richard A., and Marian Krzyzaniak. 1963. *The Shifting of the Corporation Income Tax: An Empirical Study of Its Short-run Effect Upon the Rate of Return*. Baltimore: Johns Hopkins Press.
- Sato, Kazuo. 1967. "Long-run Shifting of the Corporation Income Tax." Unpublished manuscript.
- Stigler, George J. 1963. *Capital and Rates of Return in Manufacturing Industries*. National Bureau of Economic Research, General Series, No. 78. Princeton Univ. Press.
- Yearbook of National Accounts Statistics*. Published by the United Nations since 1958. Contains detailed estimates of national income and related economic measures for some 76 countries.