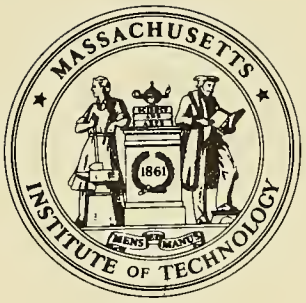

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RECENT STUDIES OF THE INCIDENCE OF THE CORPORATE INCOME TAX

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I. Introduction

Every area of public economics had profited from Richard A. Musgrave's searching thought and analysis. His contributions have ranged widely from macro to micro problems, from public expenditure theory on the one hand to tax incidence on the other. We would have to go back to a Bastable to find someone who has so moulded the field in his own image, both through his own contributions and those of his students.

In a typical pioneering effort, Musgrave with Krzyzaniak published a study [9] attempting quantitatively to determine the incidence of the corporation income tax. These results generated substantial discussion and further studies. The question remains moot, however, with some results indicating tax shifting and others demonstrating that it is zero.

The difficulties of reaching definitive quantitative results have been emphasized by many of the researchers in the field.[1] It is my purpose here not to give a detailed critique; many able and fullsome commentaries have already been put forward [1, 2, 10]. Instead, I give primary emphasis to what I view as crucial issues, asking the question -- what would a reasonable man conclude from the recent flurry of activity in this area? The two studies chosen as types and leading to different conclusions are those of Krzyzaniak and Musgrave (K-M) and of Gordon [3].

II. Two Quantitative Models

A. The Krzyzaniak-Musgrave Approach

1. The Model

The well-known Krzyzaniak-Musgrave standard case explains the gross corporate rate of return on total capital (equity plus debt) in manufacturing (Y_g) by the lagged change in the ratio of consumption to GNP (ΔC_{-1}), the lagged inventory to sales ratio (V_{-1}), the ratio of all tax accruals (other than the corporate income tax) to GNP (J), and the ratio of the corporate tax liability to capital stock (L). In estimating for the period 1935-42 and 1948-59, they used the effective tax rate (Z*) as an instrumental variable with the following results [9, p. 44][2]:

$$(1)\quad Y_{g.t} + .2859 + .4038\ \Delta C_{t-1} - .5272V_{t-1} - .8333J_t + 1.3394L_t \quad R = .98$$
$$(2.6690)\quad (-3.0043)\quad (-4.7168)\quad (12.2165)$$

Literally interpreted, tax shifting was more than 100 percent. This relationship was not particularly stable, however, as between the prewar and postwar period, except for the tax coefficient:

$$\text{Prewar}\ Y_{g.t} = .3693 + .6458\ \Delta C_{t-1} - .7776V_{t-1} - 1.0334J_t + 1.3394L_t \quad R = .98$$
$$(1.7166)\quad (-1.8894)\quad (-1.6006)\quad (8.3068)$$

$$\text{Postwar}\ Y_{g.t} = .2698 + .1593\ \Delta C_{t-1} - .1044V_{t-1} - 1.1223J_t + 1.2050L_t \quad R = .92$$
$$(.5962)\quad (-2.5218)\quad (-3.1541)\quad (4.3398)$$

K-M substituted the statutory tax rate for liabilities in (1) which led to an even higher degree of shifting, the coefficients .27 and .41 on the statutory rate implying a coefficient of shifting of 1.9 and 2.8 [9, p. 50]. Many other experiments were conducted: the rate of return on equity capital was used as the dependent variable, depreciation was included in the rate of

return, an adjustment was made for inflation in profits and capital, and the differential tax rate on incorporated as compared with unincorporated profits was substituted for the corporate tax rate.[3] Two variables, other than taxes, had coefficients that seem highly unstable in these experiments, one -- V_{t-1} -- even changing sign. But the tax coefficients continued to show shifting of more than 100 percent of the tax.[4] When the standard model was applied to a variety of industry groups and larger individual firms, the same results were generally found for the coefficient of the tax variable, with a few exceptions when applied only to the postwar period.

From these results, K-M conclude that the corporate tax is fully shifted in the short run, and draw policy implications from it.

2. Criticisms

Many criticisms have been made of the K-M model and its results, the major ones of which are listed here without elaboration.

a. None of the critics seem to find the K-M model well-conceived theoretically or particularly congenial to other models used to explain corporate profits. (Slitor, [10], pp. 154ff., Goode, [2], pp. 212ff). Perhaps the weakest part of the K-M study is the absence of a detailed discussion of their model and its coefficients as determined by their statistical analysis.

(1) Most critics see some appeal in the use of the ratio of inventory to sales as an explanatory variable (with a negative sign), a rise in the ratio being bearish and a fall being bullish, but see little reason for this variable to have a lagged effect.[5]

(2) The consumption variable -- the change in the fraction of GNP consumes -- is certainly dubious. Indeed, one would not know a priori what sign to expect on its coefficient since, other things equal, it would rise in recessions and fall in booms. (Slitor, [10], p. 156; Goode [2], p. 214).

Slitor describes this variable as a pseudo-accelerator, but this may be over-generous.

(3) The third major variable -- all taxes other than the corporate income tax-- raises somewhat the same puzzle: what explanatory power should it have and what should be the sign of its coefficient? Are higher taxes a depressant on rate of return, or, if spent by government, are they a buoyant factor? K-M models were run that used either total or government expenditure (K-M [9] Table 6-1, Line 1), yet the coefficients of both of these variables were found to be negative- oddly enough. When the federal budget surplus was used as a variable in place of the other two fiscal variables, the coefficient was negative and insignificant (K-M, [9] Table 6-1, Line 9) and the consumption coefficient became insignificant. When this same set of variables was run with just 1942 excluded, the budget surplus coefficient became positive, and almost all other coefficients became insignificant, except the tax variable. This kind of instability does not lead one to place much confidence in the results.

(4) The corporate tax variable as formulated by K-M has also been criticized. While the K-M formulation used tax liabilities, the effective tax rate, the statutory tax rate, and the differential tax rate between corporate and unincorporated income, it is our view that the proper differential rate was not used, although the proper rate is a slippery and ambiguous concept as has been pointed out [2,9,10]. The consequence of this misspecification cannot be determined without a recomputation of the tax series and the various regressions.

(a) Assume a competitive economy in which investment will be pushed to the point where risk-adjusted yields net of tax are equal in all industries and firms, taxed or untaxed.[6] In achieving such equalization

an investor encounters different methods of taxation associated with different investments. If investing in unincorporated equity or corporate debt, he only faces personal taxation; if in corporate equity he faces a corporate tax on total earnings and a personal tax on distributed and retained earnings. The method of taxing dividends at the personal level may reduce or offset the corporate tax on distributed income; special treatment of capital gains may reduce or offset the corporate tax on retained income. Taxing methods have not remained static. Moreover, corporate equity, in contrast with corporate debt, may benefit from the effective rate reduction offered by accelerated depreciation, percentage depletion, and similar devices; effective taxation is also affected by the treatment of inventory gains and losses and the use of historic cost depreciation in periods of price change. When the rules defining taxable income of corporations and unincorporated enterprises differ, they, too, would contribute to the differential tax.

As Slitor has emphasized [10], there is not one differential rate representing the net excess taxation of corporate equity income, independent of the financial policies of the particular corporation and the personal tax position of the stockholder. Any changes in this differential tax, either from the personal or corporate side, should be eligible to create changes in the profitability of alternative investments and to set in motion alterations in investment decisions. Whether or not an average or aggregate net differential tax can adequately represent this diversity is not a matter to be settled a priori; but the difficulty here is sobering and intrinsic.

Given competitive equalization (by assumption), the relevant tax from the theoretical point of view is the differential tax that arises between two types of investment income. It is not the differential tax on equal before-tax returns from two investments, but the larger, differential tax generated in the

process of achieving equal after-tax returns. If investment yields (of equal risk) are equalized after tax, the following relationship must hold for the marginal investment in corporate or unincorporated form:

$$(2) \quad U(1 - t_p) = C\,(1 - t_c)\,[1 - dt_p - (1 - d)\,t_g] \quad ,$$

where U = the marginal rate of return before tax in unincorporated enterprise, t_p = the relevant marginal personal tax rate, C = the marginal rate of return (of equal risk) before tax in corporate enterprise, t_c = the relevant marginal corporate tax rate, d = the percentage of the after-tax return distributed as taxable dividends, and t_g = the relevant marginal personal tax on retained earnings (realized as capital gains or postponed indefinitely).

The full differential tax would then be defined as the increment in yield before tax in the corporate field necessary to make yields after tax equal to those in unincorporated enterprise. Thus:

$$(3) \quad U = C\,(1 - T), \text{ or } T = \frac{C - U}{C} \quad .$$

This is the "wedge" driven between taxed and non-taxed returns, similar to an excise tax. Solving for U in (2) and substituting in (3) gives:

$$(4) \quad T = \frac{[t_c + dt_p\,(1 - t_c) + (1 - d)\,(1 - t_c)\,t_g] - t_p}{1 - t_p}$$

The numerator is the familiar expression for the combined corporate and personal tax on a dollar of corporate income less the personal tax on an equal dollar of income.[7] But this is not the total differential, since it represents the tax on an equal before-tax return rather than the differential before-tax return necessary to produce an equal after-tax return. The denominator, therefore, blows up this amount to its before-tax equivalent.[8] Put in still another way, this is the "tax" that must be fully shifted in order for an investor to be indifferent between incorporated and unincorporated investment.

Obviously, this differential can be positive or negative. It can also change as a result of changes in dividend distribution ratios, the corporate tax rate, the taxation or postponement of gains, and the relevant personal tax rate (which can change both the numerator and denominator).

(b) A comment should also be made about the corporate tax rate that is relevant in the differential tax formula.

(1) It seems unreasonable to include the excess-profits tax in a differential measure of a tax that is to be shifted. The problem of identifying causality -- from profits to tax or tax to profits -- has been alluded to in all of the discussions. The excess-profits tax was an emergency, temporary device to prevent the emergence of large corporate profits. A more reasonable procedure would be to subtract it directly from profits and treat the residue as the profits that arise from some kind of market shifting process. This is by no means wholly satisfactory, but it has one important virtue. There are relatively few corporate tax changes of major size; this procedure keeps one or two abnormal and extreme changes from controlling the whole correlation and, thereby, avoids specious results.

(2) The effective tax rate as used by K-M is not an entirely satisfactory variable. Aside from the fact that it is endogenous, the inclusion of losses in the denominator gives peculiar results.[9] One finds the effective tax rate nearly doubling between 1929 and 1934 primarily because of the large increase in losses, falling in the following years, rising sharply in 1938, and falling in 1939.[10] The erratic character of these shifts, of not inconsiderable size, makes this an unreliable variable to use as the tax that corporations are trying to shift. This problem tends to disappear after World War II, but, by the same token, the statutory rate could have been as reasonable a variable.

(3) Undistributed profits taxes, such as were imposed from 1936-39, require modest modification in the differential tax measure of (3) above to:

$$T = \frac{[dt_{cd} + (1 - d)t_{cr} + dt_p(1 - t_{cd}) + (1 - d)(1 - t_{cv})t_g] - t_p}{1 - t_p}$$

where the corporate tax rate is t_{cd} on distributed profits and t_{cr} on retained earnings.

This discussion of the problem of selecting the proper tax variable points up the serious ambiguities that are present in dealing with overall data. One can only take a pessimistic view of the problems, because they seem intrinsic.

b. Another line of criticism of the K-M model is that it lacked variables that could account for a substantial amount of the cyclical variation in corporate rates of return, thus thrusting more of the burden of carrying the explanation on the tax variable than is justified by the economic fact. Critics have added a variable to account for this phenomenon -- an economic "pressure" variable (Slitor [10] and Goode [2]) or an employment rate variable (Cragg, Harberger and Mieszkowski [1]). These variables are subject to the objection of K-M that they are not true exogenous variables, since they, in turn, are dependent, to some degree, on the corporate tax itself. However, C-H-M have shown that the biases they introduce by this addition are in the direction of overstating the degree of tax shifting, not the other way around. Moreover, it has been argued that the comparison being made is between fiscal change of equal deflationary effect, and thus effective demand would be (approximately) constant (Gordon [4]).

The addition of these variables to the standard K-M models reduces the degree of shifting to around unity, but substantially alters the significance of the coefficients of some of the other variables. The coefficient on tax liabilities is reduced by a third -- to .94 by Slitor [10], and unity by C-H-M [1, p. 817]. Moreover, complete substitution of this new variable for tax liabilities gives a remarkably good fit (Goode [2]), or, indeed, using it alone. However, despite the addition of this variable, the tax shifting coefficient still remains stubbornly around unity (K-M [8]).

c. The addition of a dummy variable for the mobilization and war years -- 1941, 1942, 1950-52 by C-H-M -- makes a dramatic difference in the results. The tax shifting coefficients drop to around one half. This may strengthen the view that much of the shifting that is found is associated with the high rates of return in the war years in combination with the excess-profits tax.

In interpreting these results, C-H-M hold that a shifting of 50 percent of the corporate tax (reducing corporate yields by half the tax) would leave capital bearing the full burden of the tax through reduction in unincorporated before-tax yield to incorporated after-tax yield. Since they posit equality in the yield from unincorporated enterprise (adjusted for risk) with the after corporate tax yield from corporate investment, and approximately an equal division of capital stock between the two business forms, half of the corporate tax would be borne by corporate investors and the other half by investors in unincorporated enterprises. They draw comfort from the fact that their modification of the K-M model shows shifting of around 50 percent, but the finding is statistically insignificant -- the standard error of the shifting coefficient is larger than the coefficient itself. Moreover, the shifted tax should be

the differential tax with all of its difficulties (see above), and not the crude, gross corporate tax.

Another weakness in the C-H-M finding that all capital bears the corporate income tax is the assumption, and not demonstration, that before tax yields of unincorporated enterprise have been reduced by the corporate tax. Unfortunately, the ambiguity of the profit concept for partnerships and proprietorships virtually precludes such a finding. In principle, of course, one could test the C-H-M position by running regressions with unincorporated enterprise return as the dependent variable and the corporate tax (or differential tax) as a separate independent variable. The coefficients in the unincorporated enterprise relationship should agree with those in the corporate case -- both adding up to one. This might be an interesting, though thorny, procedure.

3. Conclusions Regarding the K-M Model

The difficulties connected with time series analysis of the incidence of the corporate income tax are serious and have been well spelled out by K-M and their critics. There seems to be little acceptance of the finding that more than 100 percent of the tax is shifted. It is interesting to see, however, that the addition of a cyclical variable indicating pressure on employment or capacity to those used in the K-M model still leaves the shifting coefficient at around 100 percent. However, most critics are displeased with the variables used to explain corporate yields, and, indeed, one is hard pressed to justify them.

The war years appear to play a major role in determining their shifting coefficients, especially the inclusion of the excess profits tax, which we find unsatisfactory.

Finally, the tax that should be shifted, from a theoretical viewpoint, is the differential tax on corporate earnings, not the one used by K-M in one of

their regressions, but that tax blown up by one minus the relevant marginal personal income tax rate. This adjustment will raise the differential rate in the later years compared with the earlier ones.

Without having undertaken these recomputations, it is our belief that the shifting coefficient will be considerably reduced.[11] What that might mean with respect to the incidence of the tax on all capital actually requires a testing of the effect of the corporate tax on unincorporated enterprise yields.

B. The Gordon Approach

1. The Model

The Gordon model is premised on the assumption that prices are determined by an assumed constant mark-up over capacity average direct cost. To fixed direct costs (wages for fixed labor) are added capacity variable costs (wages for variable labor plus material costs). This gives an average direct cost to which the constant mark-up is assumed to apply to cover other fixed costs -- depreciation and interest paid -- and profits. Actual profits, of course, depend on actual output.

Since wage rates of the two types of labor and material costs are not available directly, Gordon assumes them to be a simple linear function of the general price level, and, in the case of wage rates, of labor productivity in the particular industry. These substitutions make prices and costs and, thus, profits a function of the general level of prices.

Outside this theory are two added variables -- the percentage change in prices and quantities -- to pick up inventory profits and cyclical profit swings. These can be thought of as passive variables in contrast to the active mark-up policy of the firm.

The corporate tax is introduced in the form of an identity -- gross profits

before tax are equal to what profits would have been without tax divided by the tax shifting coefficient times the corporate tax rate. If the tax shifting coefficient is zero, corporate gross profits have been unaffected by the tax and there has been no shifting.

The general equation, before normalizing by assets or revenues, thus becomes:

$$(5)\quad \Pi = a_1 \frac{PQ}{1-a_5 v} + a_2 \frac{PQ^*}{1-a_5 v} + a_3 \frac{\Delta P}{(1-a_5 v)P} + a_4 \frac{\Delta Q}{(1-a_5 v)Q} - \frac{D}{1-a_5 v} + U$$

where all variables have subscripts for period t, Π = profits before tax, P = general price level, Q = output of industry, Q* = capacity output, v = corporate tax rate, D = depreciation and interest paid, and U = an error term. Because this is a nonlinear form, estimate of the tax coefficient is undertaken by a nonlinear iterative technique that Gordon finds more efficient than the instrumental-variable technique of Krzyzaniak-Musgrave. He applies this to manufacturing as a whole and to 10 industries in manufacturing for the period 1925-41 and 1946-62.

For example, normalizing by capital, Gordon obtains the following coefficients (analogous to the a's in equation (5)) for all manufacturing for the whole period using gross profits (Π^g) as the dependent variable (net profits plus depreciation and interest):

a_1 = .176	a_2 = -.062	a_3 = .043	a_4 = .056	a_5 = .110
(8.94)	(-4.48)	(1.54)	(3.57)	(1.22)

In all manufacturing, he finds the tax shifting coefficient (a_5) for the whole period to be 6 or 11 percent and not significantly different from zero, depending on the normalizing variable used (revenues or capital).

For the various subgroups of manufacturing, a rather different story

appears. In 4 of the 10 industries there is statistically significant tax shifting of from one-third to virtually 100 percent. For example, when normalized by assets we find significant shifting coefficients of nearly 50 percent[12] for paper products, 55 percent for stone, clay and glass, and 90 percent for chemicals and petroleum, and for rubber products. Moreover, there is significant negative shifting (of over 2/3 of the tax) in printing and publishing, when normalized by revenues. The differences in industry behavior are explained in part by Gordon by the degree of industrial concentration.

2. Criticisms

a. One advantage to the approach used by Gordon is that he could use data from Statistics of Income from 1925, a period nine years earlier than the SEC data used by K-M. The additional years of observation of prosperity make his prewar and postwar parameters more stable than those of K-M.

b. Several questions have been raised about the use of the general level of prices as an independent variable. It can be argued, for example, that it is related to the tax variable through shifting and that collinearity would be present. Gordon himself indicated his belief that this collinearity may contribute to some mild understatement of tax shifting ([3] p. 751, n. 19), while K-M in their critique have more serious doubts [8]. Gordon in reply seems to take a harder line, arguing that normalization of his results by assets or by revenues yields the same (non shifting) result and that in this latter case "the quantity Q_t and price level p_t^g [P in our notation in equation (5)] variables to which K-M object cancel out and thus do not appear at all!" ([4] pp. 1362-63, italics in original). Yet, surely, such normalization cannot purge the system of the general level of prices. By dividing through by the general price level, the independent variables are freed of it, but the distortion is moved to the

other side of the equation and infects the dependent variable.

It seems clear in principle that the use of the general price level will impart a downward bias to the tax-shifting coefficient; the question is to what extent. This effect can be seen most simply with three variables, one of which is an excise tax instead of an income tax, related in the following way:

(6) $\Pi = \hat{\alpha}_1\hat{p} + \hat{\alpha}_2 t$, where Π = profits per unit, $\hat{p}$ = price net of excise tax, and t = excise tax per unit.

Suppose that the observer uses market price, p, not net price to the producer, $\hat{p}$, in his statistical test of this relationship. Assume, further, that market price and producer's price are related as follows:

(7) $p = \hat{p} + \hat{\alpha}_2 t$, where $\hat{\alpha}_2$ is the true degree of tax shifting.

Substituting in (6), we find:

(8) $\Pi = \hat{\alpha}_1(p - \hat{\alpha}_2 t) + \hat{\alpha}_2 t$, but the statistical formulation is

(9) $\Pi = \alpha_1 p + \alpha_2 t$. Thus, if $\alpha_1 = \hat{\alpha}_1$, which can be shown to be the case, the true shifting parameter will not be α_2, but instead $\hat{\alpha}_2 = \frac{\alpha_2}{1-\hat{\alpha}_1}$. If $\hat{\alpha}_1$ is small, the divergence between $\hat{\alpha}_2$ and α_2 cannot be large. Similarly, if α_2 is zero, $\hat{\alpha}_2$ must also be zero. It is on this basis that Gordon has argued that the downward bias shown by α_2 is only of the order of 10 or 15 percent for manufacturing combined. Presumably, this consideration is directly relevant when the price variable used is that of the industry being studied -- the general manufacturing price level for all manufacturing combined. As will be seen presently, however, it is also relevant for some of the manufacturing subgroups.

c. In dealing with the ten manufacturing subgroups, Gordon clearly establishes statistically significant shifting of the corporation income tax. In four industries, the tax shifting coefficient varies from one-third to nearly unity. In two others, it is significantly negative by one-third to two-thirds. In other words, if corporate income taxes are raised, firms lower their prices and profits, and vice versa! This behavior is even more difficult to understand than the initial finding of K-M of more than 100 percent shifting, and cannot help but cast some doubt on the methodology, unless further explanation can be given. In any event, if these negative industry coefficients are placed at zero, which seems more reasonable, as well as all those that are positive but below the 5 percent level of statistical significance, the weighted average of the tax shifting coefficients for all manufacturing comes out to 24 percent.[13]

It should also be noted that in five industries its own price was used as an independent variable as a substitute for the general level of prices. In four of these the tax-shifting coefficient was treated as zero in the preceding computation. Of the 8 tax-shifting coefficients found in these industries, five were negative -- 2 significant at the 1 percent level and 1 at the 5 percent. In the fifth industry, a significant positive coefficient was found and it was adjusted upward to reduce the downward bias from the use of its own price.

Another question can be raised about the degree of aggregation and its effect on the tax-shifting coefficients. If the tax-shifting coefficient in all manufacturing has been masked by a combination of positive and negative subgroups, might this not also be true at the subgroup level? For example, one industry -- metal products -- accounts for around a third of total manufacturing value added or profits before tax, and represents a combination of five large industries: metals and products, electrical machinery, other machinery, automobiles, and other transportation equipment. One suspects that a further breakdown of this

group would yield more positive tax-shifting coefficients. On the assumption that the negative coefficients make no economic sense whatsoever, it is the positive ones that should be searched for.

Finally, one must record the failure of Gordon's model to specify the way that taxes other than on corporate income would enter into pricing behavior. To move from a mark-up theory on cost to a mark-up theory on price assumes that the firm responds in the same way to both price and cost changes. Yet an excise tax would create a divergence between the two in a way that differs from other costs and can enter on a much larger scale. For example, it would be surprising if the cigarette manufacturers treated the tobacco excise as a cost on which to compute a mark-up. It is undoubtedly their biggest single cost, yet it could hardly be made the excuse for increased profits. Whether these other taxes have moved with the corporate income tax, which might reduce the shifting coefficient, or in some random fashion deserves exploration.

3. Conclusions

While Gordon's model reveals no tax shifting in manufacturing, disaggregation into industries indicates a considerable and significant amount of shifting. Further disaggregation might reveal still more. One cannot agree, there, with his view: "Thus the aggregate and industry equations tell a consistent story -- tax shifting in manufacturing is not significantly different from zero, although it is significantly greater than zero in the Paper, Chemicals and Petroleum, Rubber, and Stone industries, and significantly less than zero in the Printing industry and in one equation of the Food industry." [3, p. 750].

III. Concluding Remarks

In conclusion one can say that neither of these major studies sheds much light on the shifting process -- in its initial phases or in its later stages.

First, consider the question of long-run or short-run shifting. Both K-M and Gordon claim to be investigating the short-run only. Certainly in one sense they are clearly correct: long-run changes that might arise from alterations in saving or factor inputs as a consequence of the corporation tax are not included in their models. Whether or not they can claim to be working with a given capital stock within the (short-run) period is, however, another matter. They both work with annual data and within such a period there can be much capital mobility. Personal saving, retained earnings, and depreciation in one year represent a not inconsiderable fraction of the capital stock. A movement toward a new equilibrium, typically a small step from the old, could be taken substantially in one period.

Furthermore, the tax-shifting coefficients in these studies yield the same result whether the tax rate has been recently enacted or has been in existence for some time. This suggests that lagged, as well as current rates should be used, and the speed of response to the change studied. Unfortunately for a suggestion of this sort, however, is the fact that K-M tried some lagged tax rates without success.

Second, it would be interesting to know more about the way tax shifting exhibits itself in the market. If one accepts Harberger's view [6,7] that yields before tax in all sectors, unincorporated and incorporated, should differ only by the differential tax on yields, the K-M finding of 100 percent shifting would mean that unincorporated enterprise yields would remain unchanged, while corporate before-tax yields would rise by the full tax. The Gordon finding would be that corporate before-tax yields would rise somewhat, and that unincorporated enterprise yields would fall by a fraction of the corporate tax. A test of these hypotheses in the unincorporated sector would be of great interest, although the difficulties are, indeed, impressive.

Furthermore, it may be the sectoral yields after tax do not equilibrate: the differential yields before tax between taxed and untaxed fields may differ by less than the differential tax. One such situation would arise when capital was imperfectly mobile between sectors, and where immobile capital bore the burden of the tax when in a taxed field. Another situation could arise when the tax itself changed the riskiness of the taxed industries. As was pointed out by Musgrave and Domar in their seminal article on taxation and risk taking, partial or full loss offsets can reduce the variance of investment decisions and, thus, the differential before tax yield between taxed and untaxed firms. How far one can go with this familiar argument is uncertain, but it should surely be borne in mind. Equilization of yields must always be net of risk.

Finally, these studies and the discussion they have generated have narrowed considerably the range of disagreement on the incidence of the corporate income tax. While they have been carried forward with great care and impressive technique, the time is not yet at hand when the evidence points clearly to a single conclusion. My own conjecture is that the range will be narrowed still further -- some considerations point to a lowering of the K-M results and others to a further raising of Gordon's. Perhaps they may even meet at the figure determined theoretically by Harberger of 50 percent. There are many puzzles that remain, however, and many lines to pursue before we can complete the work that was pioneered by Musgrave.

Footnotes

[1] For a succinct statement, see [1].

[2] The numbers in brackets under the coefficients represent the coefficient divided by its standard error.

[3] This rate differs from what I believe to be the proper differential by the reciprocal of the relevant marginal personal tax rate on dividend income. This would make it two or three times larger than that used by K-M, and should sharply reduce the degree of shifting. See pp. 5-7, below.

[4] One should, perhaps, note in this connection that the simple correlation between $Y_{g.t}$ and L_t is .95.

[5] This relationship may be a biased one, however, arising from an ad hoc explanation of profit behavior. For, if we are explaining the profit to capital ratio by this means:

$$\frac{\Pi}{K} = \alpha\frac{I}{S} + \ldots.,$$ where Π = profits, K = capital, I = inventories, and S = sales, and if Π = S - costs, and K = I + Depreciable assets, the estimation may produce a negative α, even though the true α may be zero. For then we have,

$$\frac{S - C}{I + D} = \alpha\frac{I}{S} + \ldots.$$

[6] This is Harberger's strong emphasis [7].

[7] See, M-K [9, p. 29, note C]. There is surely a mistake in their printed formulation, however, since they have not reduced the tax on retained earnings by the fraction of after-tax profits retained. Whether they have used this precise formula in computing the differential tax in Table 3-1 cannot be ascertained. One may also note that the marginal corporate rate in 1944 and 1945 should be 85 1/2 percent, rather than 80 percent.

[8] This formulation is implicit in Slitor [10, p. 195 and n. 32], but he does not criticize M-K's use of the numerator in (4) above as a measure of the relevant tax differential for shifting.

[9] See Slitor [10] and Goode [2].

[10] K-M [9], Table 3-1.

[11] Preliminary tests of the substitution of the differential tax as defined in equation (4) above for their differential tax, sharply reduced the shifting coefficient to unity or less.

[12] After making adjustment for the use of prices gross of tax as the independent variable, as discussed below, pp. 13-14.

[13] The weights used were profits before tax in 1939 rather than value added, as used by Gordon. Profits before tax shifting would have been better, but since taxes were low in 1939 the results should not be far different.

Bibliography

[1] Cragg, John G., Arnold C. Harberger, and Peter Mieszkowski, "Empirical Evidence on the Incidence of the Corporation Income Tax," Journal of Political Economy, December 1967.

[2] Goode, Richard, "Rates of Return, Income Shares, and Corporate Tax Incidence," in Marian Krzyzaniak, ed., Effects of the Corporation Income Tax (Detroit: Wayne State University Press, 1966).

[3] Gordon, Robert J., "The Incidence of the Corporation Income Tax in U.S. Manufacturing, 1925-62," American Economic Review, September 1967.

[4] Gordon, Robert J., "Incidence of the Corporation Income Tax: Reply," American Economic Review, December 1968.

[5] Hall, Challis A., Jr., "Direct Shifting and the Taxation of Corporate Profits in Manufacturing 1919-1959," American Economic Review, Papers and Proceedings, May 1964.

[6] Harberger, Arnold C., "The Corporation Income Tax: An Empirical Appraisal," U.S. Ways and Means Committee, Tax Revision Compendium, Vol. I (Washington, Government Printing Office, 1959).

[7] Harberger, Arnold C., "The Incidence of the Corporation Income Tax," Journal of Political Economy, June 1962.

[8] Krzyzaniak, Marian, and Richard A. Musgrave, "Incidence of the Corporation Income Tax: Comment," American Economic Review, December 1968.

[9] Krzyzaniak, Marian, and Richard A. Musgrave, The Shifting of the Corporation Income Tax (Baltimore: Johns Hopkins Press, 1963).

[10] Slitor, Richard E., "Corporate Tax Incidence," in Marian Krzyzaniak, ed., Effects of the Corporation Income Tax (Detroit: Wayne State University Press, 1966).