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An Economic Analysis of Contributions under the Income Tax Laws

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AN ECONOMIC ANALYSIS OF CONTRIBUTIONS UNDER THE INCOME-TAX LAWS

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I. INTRODUCTION

IN THIS note classical tools are used to examine the treatment of "gifts in kind" under the federal income-tax laws as they were but a few years ago, as they are today, and as they should be, given the objective that the law appears to be trying to achieve. It will be demonstrated that, under certain conditions, firms today can maximize profit after taxes by producing some output to be given to acceptable charities.

II. THE LAW

Just as cash gifts to approved charities and educational institutions are deductible from gross income in the determination of taxable income, so are gifts made in kind.¹ When such gifts in kind are made, they are deductible at "fair market value," a term which could have a variety of meanings. In this paper it will mean the price at which the firm or individual could sell the gift in its most conservative market. This construction can be and has been put on the meaning of the term,² and, since it is the most favorable to the taxpayer, it is presumably the pertinent one. If the property is a capital good, rather than an inventory item, or if the return is that of an individual rather than a firm, the gift item is still deductible at fair market value regardless of

¹ The basic law discussed in this paper is found in secs. 23(o) and 23(q) of the Internal Revenue Code. We have relied heavily upon the Prentice-Hall Tax Service, 1944 through 1956. Gifts of services are not deductible.

² See the Old Mission Valley Portland Cement Co. case as reported in the Prentice-Hall Tax Service, Sec. 12,827, and Revenue Ruling 55-138. Detailed analysis of all possible meanings of the term is beyond the scope of this paper.

its tax base, and gains or losses are not reportable.³

Recognizing that an item given away rather than sold affects the taxpayer's revenue, the law has always attempted to provide some incentive for donations to approved organizations by allowing the donation to be deducted in an amount equal to the foregone revenue. The law, however, has not always appeared to recognize, or at least to appreciate, the fact that the item is already deductible at cost by virtue of having been produced. Indeed, it is not until 1948 that one finds specific recognition of the fact that gifts affect costs as well as taxable revenues.⁴ Prior to 1948, presumably, the shrewd firm deducted the fair market value from computed net profits in the determination of taxable income and deducted total costs (not excluding the costs of the articles given away) from gross revenues in the determination of net profits. There was no ruling to prohibit the deduction of the gift twice: once as a contribution, once as an ordinary cost of production! There are two possible interpretations of this absence of law. Charitably, one might argue that perhaps no taxpayer had been bold enough to claim the double deduction, and therefore no ruling or case was neces-

³ *Federal Tax Service, 1948* (New York: Prentice-Hall, Inc., 1948), II, 12, 710.

⁴ This ruling (see Prentice-Hall Tax Service, 1948), based on the Supreme Court case, *Helvering v. Paul R. G. Horst* (311 U.S. 112), held that "expenses of production are deductible . . . as ordinary and necessary business expenses." Here the taxpayer was required to include the fair market value of the product in gross revenue and deduct it again in the computation of taxable income. This is a more severe treatment than that of the Old Mission Valley Portland Cement Co. case analyzed below.

sary. Another construction is that, in the routine of auditing returns and verifying whether or not the gift was to a bona fide recipient, no notice was taken of the cost figures at all.

Our first task, then, will be to analyze, in Section III, rational behavior of the firm where a double deduction is allowed for product donations.

Two rules govern the current treatment of such donations. In Revenue Ruling 55-138⁵ one finds the following:

The fair market value of agricultural or manufactured products or property held for sale in the ordinary course of business which is contributed . . . is not includable in the gross income of the donor for Federal Income Tax purposes. . . . The fair market value which may be deducted from gross income . . . will be the replacement cost to the donor in his most favorable market. There must be an adjustment to inventory effecting the removal of the donated article and the costs pertaining thereto . . . in order to avoid a double deduction.⁶

Here the fair market value is defined as "the replacement cost to the donor in his most favorable market." A more specific description of the treatment of deductions for gifts in kind is found in the Old Mission Valley Portland Cement Company case.⁷ In this case the taxpayer included the fair market value of the gift (which seems to have been its regular selling price) as a part of gross revenue, deducted it in the determination of taxable income, and included its costs of production in its ordinary expenses. The courts ruled that the taxpayer could also deduct the gross profit arising from inclusion of the gift in revenues, gross profits being the difference between actual cost and fair market value. The inclusion in revenues is canceled by the deduction from profits, thereby washing out, and the true deduction is cost plus gross profits, or selling price.

Our second task, in Section IV, will be an analysis of rational behavior when the firm

must exclude costs involved in a donation but can deduct it at selling price. Since it can be shown that even the present modified law yields an actual profit on product donations under certain conditions, and in such instances it is far preferable to give away goods than to give away money, certain questions arise about what the law *should* be.

Our final task, then, will be an analysis of what the law should be if its intent is to treat gifts in kind in the same way as cash gifts.

III. OPTIMAL PRODUCT DONATIONS BY FIRMS UNDER DOUBLE DEDUCTIBILITY

The analysis of this section applies to the case in which a firm deducts from its profits before taxes both the market value of units of product donated to qualified charitable institutions and the costs of producing them. The argument, therefore, has had no practical application since the Internal Revenue Department felt obliged in its 1955 ruling to disallow any double-deductibility interpretation of the original Internal Revenue Code of 1939.

a) THE THEORY OF THE FIRM UNDER THE TAX LAW

We direct our attention first to the non-incorporated firm operating under pure competition and taxed under the individual income tax law. Let z be the total production of the firm, x be the quantity of product that the firm sells on the open market, and y be the quantity of product donated to some qualified charitable organization (that is, $z = x + y$). Suppose the firm sells its product for a price p and produces at a short-run total cost given by the function $C(z)$, where the latter is convex from below beyond some level of production. Let the tax function faced by the firm be $t[\theta]$, where θ is the firm's taxable income; that is, gross income minus all deductions and exemptions. Under the provisions of the tax law, if K is the total dollar amount of all the firm's exemptions and deductions that are

⁵ *Internal Revenue Bulletin* 1955-11.

⁶ *Ibid.*

⁷ Prentice-Hall Tax Service, 1954, Sec. 12,827.

constant (independent of production and donations), and if the donation, y , is deductible at both its cost and its market value, then

$$\begin{aligned} \theta &= px - C(z) - py - K \\ &= pz - C(z) - 2py - K. \end{aligned} \tag{1}$$

In equation (1) px is the firm's gross receipts, while $px - C(z)$ is the firm's "profit (or loss) from business" as it is termed on Form 1040 of the Individual Income Tax Return. The latter sum would also be "adjusted gross income" if the proprietor earned no wages or income from other sources such as dividends and interest. The quantity py would be the firm's deductions because of donations in the form of product. Note in equation (1) that, for every unit given away rather than sold, taxable income decreases by $2p$ dollars.

In line with the postulates of pure competition, it will be assumed that the quantity y which is given away has no effect on the market price of the product or on the amount the firm can sell at that price. Profits, net of income taxes, can therefore be written as

$$\begin{aligned} \pi &= px - C(z) - T[\theta] \\ &= pz - py - C(z) \\ &\quad - T[pz - C(z) - 2py - K]. \end{aligned} \tag{2}$$

Under the present progressive income tax $T[\theta]$ is convex from below, and

$$T' = \frac{dT}{d\theta} < 1.$$

The necessary conditions for the maximization of profits in (2) are

$$\begin{aligned} \frac{\partial \pi}{\partial z} &= p - \frac{\partial C(z)}{\partial z} - T' \cdot \left\{ p - \frac{\partial C(z)}{\partial y} \right\} = 0, \\ \frac{\partial \pi}{\partial y} &= -p - T' \cdot \{-2p\} = 0, \end{aligned}$$

where $\partial C(z)/\partial z$ is simply marginal cost, $MC(z)$. Hence the conditions for profit maximization under the income-tax law are,

first, adjust total output to a level $x = z^0$, such that

$$p = MC(z^0), \tag{3}$$

the usual conditions for an optimum; and, second, adjust the quantity of output given away to a level $y = y^0$, such that

$$T' [pz^0 - C(z^0) - 2py^0 - K] = \frac{1}{2}. \tag{4}$$

The latter condition asserts that, given z_0 as determined from (3), units are given away until the marginal tax rate falls to $\frac{1}{2}$, or until the firm is operating in the 50 per cent income-tax bracket. This condition may be derived verbally as follows: For each unit that is given away rather than sold, the loss due to failure to sell is $-p$. On the other hand, the gain is given by the marginal tax rate multiplied by the amount by which taxable income declines. But taxable income declines p due to the loss in sales and another p because the value of the unit is deductible when donated. Hence the total gain from donating a unit rather than selling it is $-p + T' \cdot \{2p\}$, and units will be given away until this marginal gain is zero; that is, $-p + T' \cdot \{2p\} = 0$ or $T' = \frac{1}{2}$.

There are two boundary conditions on the solution in addition to these marginal conditions. The first stems from the fact that, if the firm is operating in an income-tax bracket less than or equal to 50 per cent, the firm cannot improve its position by giving away part of its output. The second boundary condition grows out of a further provision of the income-tax law, namely, that, "in general, the deduction for contributions may not exceed 20 percent of your adjusted gross income. . . . However, you may increase this limitation to 30 percent if the extra 10 percent consists of contributions made to churches, a convention or association of churches, tax-exempt educational institutions, tax-exempt hospitals, or certain medical research organizations."⁸ This provision places an upper bound, \bar{y} , on

⁸ *Federal Tax Regulations, 1957*, U-8, Code (St. Paul: West Publishing Co., 1958), p. 5.

the quantity of output that can be given away. Hence

$$0 \leq y^0 \leq \bar{y},$$

where

$$\bar{y}p = 0.30 [p z^0 - p\bar{y} - C(z^0)] \quad (5)$$

or

$$\bar{y} = \left(\frac{0.3}{1.3} \right) \left[z^0 - \frac{C(z^0)}{p} \right].$$

From this analysis we can conclude that, under the double-deductibility interpretation of the income-tax law, if a firm produced a form of property which it was feasible to donate to charitable institutions, then profit maximization required the proprietor of that firm to adjust sales to a level that would just place him in the 50 per cent income-tax bracket. The one exception to this would arise where the firm's donations in the form of product were as much as 30 per cent of "adjusted gross income."

b) THE CASE OF INDEPENDENCE BETWEEN SALES AND DONATIONS

Dynamic considerations, uncertainty, ignorance of the complete cost function, or the failure to use marginal principles in price-output determination may render the preceding approach impractical for decision-making. For example, the firm may have a fixed-price policy because of fear of retaliation, "spoiling the market," or other considerations and may proceed to sell all that the market will absorb at that price. Under these conditions, can the firm improve its position by producing output purely for donation purposes and deducting the value of such donations from its taxable income? The answer is "Yes."

To simplify the analysis, we shall assume that the donation is to a non-competing market such as a charity which is not itself a customer of the firm in question or one that will distribute the donation exclusively to markets in which the firm cannot compete. An example of this latter case would arise if a shoe manufacturer who could not seriously consider selling shoes in Belgium gave shoes to CARE; this organization could give

away an almost indefinite number of shoes to the Belgians.⁹

Suppose our firm finds that it can sell \bar{x} units at the established price p . Using the same notation as before, the problem is to maximize

$$\begin{aligned} \pi &= p\bar{x} - C(\bar{x} + y) \\ &\quad - T[p\bar{x} - C(\bar{x} + y) - p y - K] \end{aligned} \quad (6)$$

with respect to y . Setting $\partial\pi/\partial y = 0$ gives y^0 , such that

$$\begin{aligned} T' [p\bar{x} - C(\bar{x} + y^0) - p y^0 - K] \\ = \frac{MC(\bar{x} + y^0)}{MC(\bar{x} + y^0) + p}. \end{aligned} \quad (7)$$

This condition states that units should be given away until the marginal tax rate falls to the ratio of marginal cost to marginal cost plus price. The condition can be derived verbally as follows: For each additional unit produced for donation, the cost incurred is MC . The marginal return on a unit given away is the marginal tax rate multiplied by the decrease in taxable income. But taxable income declines MC dollars because of the deductibility of the cost of producing the item, and p dollars because of the deductibility of the item at its market value. Therefore the marginal net return on a unit produced for donation is $T \cdot \{MC + p\} - MC$, and units will be given away until this marginal gain is zero; that is,

$$T' \cdot \{MC + p\} - MC = 0 \quad \text{or} \quad T' = \frac{MC}{MC + p}.$$

Note in equation (7) that, if $p > MC$, then

$$\frac{MC}{MC + p} < \frac{1}{2},$$

and, in equilibrium, the marginal tax rate is less than $\frac{1}{2}$. Consequently, a firm whose price was greater than its marginal cost could benefit from donations *even if it fell in an income-tax bracket of less than $\frac{1}{2}$.*

⁹ One of the advantages offered by CARE as a dumping market is the fact that this organization allows the donor to specify the country to which the gift is to be sent.

If the firm's best estimate of total cost is a linear estimate similar to those used in break-even chart analysis, then marginal cost is constant; and, if we express marginal cost as a proportion of price, say $MC = \beta p$, then the condition (7) becomes

$$T' [p\bar{x} - C(\bar{x}) - p(1 + \beta)y^0 - K] = \frac{\beta}{1 + \beta} \text{ or } T' [\bar{\theta} - (1 + \beta)p y^0] = \frac{\beta}{1 + \beta} \quad (8)$$

The expression $\bar{\theta} = p\bar{x} - C(\bar{x}) - K$ would be the firm's taxable income if it produced no output for donation purposes.

c) EXTENSION TO THE CORPORATION

The analysis of optimal product donation policy for the corporation is especially simple in view of the flat 52 per cent tax on corporation earnings over \$25,000. In this case the tax function is simply $T[\theta] = t\theta = 0.52\theta$. In the general case of a non-linear cost function $C(\bar{x} + y)$, and, where sales and donations are independent, equation (6) for the corporation becomes

$$\pi = p\bar{x} - C(\bar{x} + y) - t \cdot \{ p\bar{x} - C(\bar{x} + y) - p y \}, \quad (9)$$

in which we have set K equal to 0, since the exemption provisions of the individual income-tax law do not apply to the corporation. Maximizing (9) with respect to y gives the condition,

$$MC(\bar{x} + y) = \frac{t p}{1 - t} = \frac{0.52}{0.48} p = 1.083 p \quad (10)$$

Therefore product donations should be adjusted until marginal cost equals $1.083p$.

Just as in the analysis of the non-incorporated firm, there are two boundary conditions on the solution. The lower bound is determined by the condition that the 52 per cent tax rate applies only to corporations earning a net income in excess of \$25,000. The second (upper) boundary condition is

fixed by the requirement that the corporation cannot donate more than 5 per cent of its taxable income.

If marginal cost is constant, as in break-even chart analysis, then we can write $MC = \beta p$, and for this case we have a "corner" solution in which, if it pays to give away at all, it pays to give away the maximum amount allowable under the law. Indeed, if the parameter $\beta < 1.083$, it pays to give away up to the full 5 per cent upper bound, that is, until

$$p\bar{y} = 0.05 \cdot \{ p\bar{x} - C(\bar{x}) - \beta p\bar{y} \} = 0.05 \cdot \{ \bar{\theta} - \beta p\bar{y} \}$$

or

$$p\bar{y} = \frac{0.05 \bar{\theta}}{1 + 0.05 \beta} \quad (11)$$

IV. OPTIMAL PRODUCT DONATIONS BY FIRMS UNDER DEDUCTIBILITY AT MARKET VALUE ONLY

Since the 1955 ruling, in which the Bureau of Internal Revenue clearly recognized that the tax law did not prohibit double deduction of donations in kind, the application of the law has allowed the firm to deduct such donations at market value only. What has not been recognized is that, under this interpretation, both the corporate and the non-corporate enterprise, under conditions likely to prevail in practice, can still increase profits after taxes by making product donations. The new ruling reduces the magnitude of the profits to be so gained but still does not place product donations on a par with cash donations, which clearly do not yield the donor a net gain. The reason for this is simply that, under the present law, a separate give-away market is created for firms with excess capacity, and, under conditions which are still fairly weak, it pays to produce for "sale" in this market.

a) THE THEORY OF THE FIRM UNDER THE 1955 RULING

The first important area in which the new ruling delimits the range of application of

the law is for the firm in pure competition. Under pure competition no gains can accrue to the firm, regardless of its income-tax bracket, from product donations deductible at market price, since, by hypothesis, the firm can sell unlimited quantities at the going market price.

This can be seen mathematically by observing that equation (1) now becomes

$$\theta = px - C(x) - py - K, \quad (1')$$

in which the costs of producing y cannot be deducted from gross income in arriving at taxable income. Equation (2) then becomes

$$\begin{aligned} \pi &= pz - py - C(z) \\ &- T[pz - C(z - y) - 2py - K]. \end{aligned} \quad (2')$$

Maximizing, we get the same conditions in (3); that is, $MC(z^0) = p$, but condition (4) becomes $T' = 1$, and there exists no positive solution for y^0 .

b) INDEPENDENCE BETWEEN SALES AND DONATIONS

Under the new ruling, equation (6) becomes

$$\begin{aligned} \pi &= p\bar{x} - C(\bar{x} + y) \\ &- T[p\bar{x} - C(\bar{x}) - py - K]. \end{aligned} \quad (6')$$

Now setting $\partial\pi/\partial y = 0$ gives y^0 , such that

$$\begin{aligned} T'[p\bar{x} - C(\bar{x}) - py^0 - K] \\ = \frac{MC(\bar{x} + y^0)}{p}. \end{aligned} \quad (7')$$

According to this condition, if $p \geq MC$, then $T' \leq 1$. Therefore, a positive solution for y^0 requires price to be greater than marginal cost. Condition (7') is clearly stronger than (7).

If marginal cost is constant, and we set $MC = \beta p$, then the condition (7') becomes

$$T'[\bar{\theta} - py^0] = \beta \quad (8')$$

where $\bar{\theta} = p\bar{x} - C(\bar{x}) - K$ would be the firm's taxable income exclusive of deductions for product donations. Using equation (8') and the income-tax tables, it is possible to map the relationship between $\bar{\theta}$ and the optimal dollar value of output donations, py^0 , for various values of β .¹⁰ To construct such a map for any given β , we simply set $\bar{\theta} - py^0$ equal to the income level corresponding to a tax bracket of β and solve for py^0 . If $\bar{\theta}^*(\beta)$ is the income level at which the tax bracket is 100β per cent, then

$$py^0 = \bar{\theta} - \theta^*(\beta) \quad (8'a)$$

gives optimal product value donations as a function of taxable income $\bar{\theta}$. Of course, py^0 is zero if $\bar{\theta} \leq \theta^*(\beta)$. The upper bound on y^0 is \bar{y} , such that $p\bar{y} = 0.30\{\bar{\theta} + K - \beta p\bar{y}\}$ or

$$p\bar{y} = \frac{\bar{\theta} + K}{3.33 + \beta}. \quad (8'b)$$

A decision map for optimal donations under the 1955 ruling is shown in Figure 1, the computation for which was carried out by applying equations (8'a) and (8'b) to an unmarried taxpayer with $K = \$600$. As an illustration of the use of this diagram, consider a firm whose marginal cost is constant at 65 per cent of its selling price. We see that for $\beta = 0.65$ such a firm would have to earn a taxable income of \$32,000 before product donations could be made without incurring a net loss in income after taxes. For taxable income in excess of \$32,000, the $\beta = 0.65$ contour allows one to read off the value of product donations that will maximize income after taxes. At a taxable income of about \$43,500 a "kink" occurs in the contour, since for incomes above this value the 30 per cent limit on donations determines the optimal product donation.

Suppose, under these conditions, that a

¹⁰ Computing $\bar{\theta}$ would cause no difficulties beyond those normally encountered in filing income-tax returns. The parameter $\beta = MC/p$ is also completely operational in that it requires nothing more sophisticated than a break-even chart for the firm's operations.

firm has a reportable income of \$40,000 and gives nothing away. From the income tax table for an unmarried taxpayer its tax is as follows:

Tax on the first \$32,000	\$14,460
Tax of 65 per cent on the next \$6,000	3,900
Tax of 69 per cent on the next \$2,000	1,380
Total	<u>\$19,740</u>

Taxable profits	\$40,000
Cost of contribution	\$ 5,200
Tax on \$32,000 reportable income	<u>\$14,460</u>
Total, tax plus contribution	<u>19,660</u>
Profit after taxes	<u>\$20,340</u>

The firm has bettered itself—ignoring good will—by \$80 through a product donation

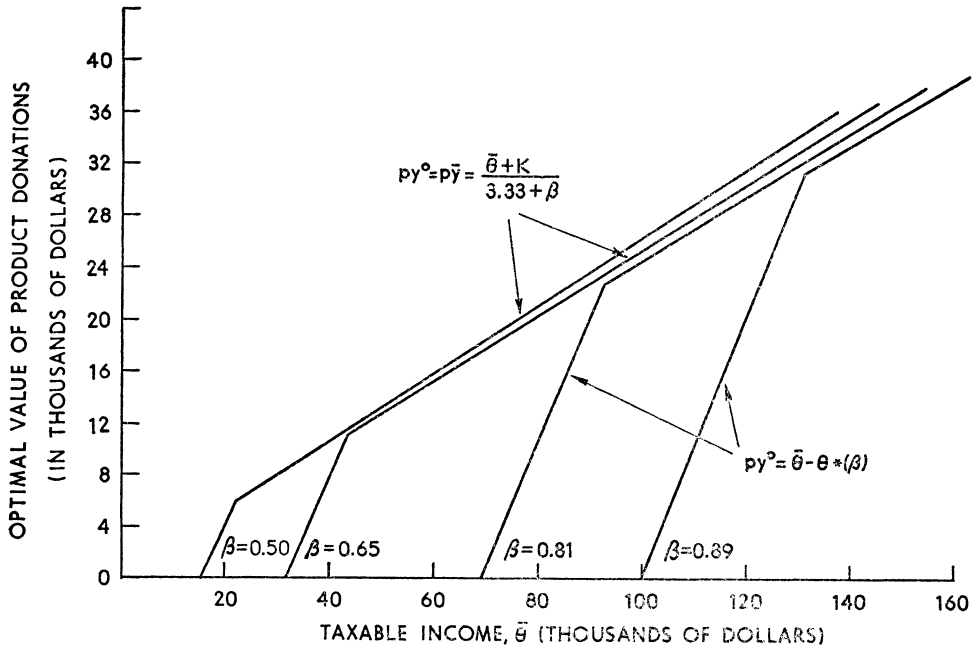


FIG. 1.—A decision map for optimal product donations by firms under the income tax

and profit after taxes is \$20,260. To demonstrate that the firm bettered itself, assume optimal donations with a fair market value of \$8,000 (see Fig. 1) at a cost ($\beta = 0.65$) of \$5,200.¹¹

¹¹ The reader will note that the same net profit is obtained by gifts of \$2,000 or any amount between \$2,000 and \$8,000. This zone of indifference occurs whenever β equals the marginal tax rate, because of the discontinuities in the income-tax function. Figure 1 has been constructed for values of β coinciding with actual tax-bracket percentages and assumes that the firm gives away output until the lower bound of the relevant tax bracket is reached.

valued at \$8,000.

The analysis of Section IV on the corporation applies, with minor alterations, to the corporate case under the 1955 ruling. For example, under deductibility at market value only, equation (10) becomes $MC = 0.52p$.

V. CAN CASH AND PRODUCT DONATIONS BE GIVEN EQUAL TREATMENT?

Clearly, allowing deductions for cash gifts made to acceptable organizations is a direct inducement extended to taxpayers to

encourage such gifts. In effect, the government pays a portion of the cost of such gifts, a percentage equal to the tax rate; one would suspect that the intention in extending such inducements to donations other than cash is to subsidize them to the same extent. There seems to be little reason why Congress would view product donations as either more or less socially desirable than cash gifts. This raises the question: Just how should the tax law be stated if product donations are to be put on a par with cash gifts?

As it turns out, under both the individual and the corporate income tax, there is a simple general ruling that will make all firms indifferent between product donations and cash donations. Such a ruling is simply to allow the firm to compute taxable income by deducting from gross receipts the total cost of producing both the units sold and any units that are donated. Under such a ruling, profit would be given by

$$\pi = p\bar{x} - C(\bar{x} + y) - T[p\bar{x} - C(\bar{x} + y)], \quad (12)$$

and the firm could not make product donations without reducing profit after taxes. Indeed, it would make no difference to the firm whether it donated \$1,000 cash or units of product that cost \$1,000 to produce.

It is difficult to understand why this ruling was not handed down at the very beginning.

VI. CONCLUSIONS

We suggest that the preceding analysis has far-reaching implications. Even in the

absence of a double deduction, there must be many corporations with excess capacity that will not lower prices to increase sales because of the nature of their demand curve or because of some fear of spoiling the market and whose marginal costs are less than 52 per cent of their selling price. Rationally, they should find some acceptable institution (not constituting part of their usual market) and give more in order to make more. The conditions are even more favorable for the unincorporated entrepreneur who is in a higher marginal tax bracket than the corporation. One can imagine a firm changing its fiscal year so that the last month will be the slackest, estimating revenues and taxes in order to decide rationally how much activity yields them the largest net profit, and budgeting product donations along with sales.

Since neither of us pretends to be a student of tax rulings, it is suggested that many more—perhaps more important—provisions of the law might be fruitfully exposed to similar analysis. One is the deductibility of disasters: What is the true cost of insurance for a man in the 80 per cent tax bracket when, if his house burns down, he can deduct 100 per cent of the uninsured loss?¹² His premiums yield a marginal protection of only 20 per cent of the value of the house.

¹² This problem could be analyzed by application of the apparatus discussed in Milton Friedman and L. J. Savage, "The Utility Analysis of Choices Involving Risk," *Journal of Political Economy*, Vol. LVI, No. 4 (August, 1948). It is interesting that the authors of this article called attention to the importance of the deductibility of uninsured losses (see n. 16, p. 285, and n. 32, p. 295) in applying utility theory to insurance choice.