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Income Distribution:
Differential Incidence of
the VAT-CIT Substitution

Because consumption expenditure as a proportion of income declines as income increases, a VAT applied at a uniform rate to all consumer purchases is obviously regressive in its apparent distribution of tax liabilities over income classes. However, the important question of VAT incidence does not relate to this nominal distribution of VAT liabilities but to the change in the distribution of disposable income which results from the introduction of the VAT and the simultaneous, compensating changes in other tax or governmental expenditure and transfer programs. Specifically, the issue here is the *differential* incidence of the VAT-CIT substitution. A very different differential incidence could result from other programs of substitution incorporating the VAT, e.g., revenue-sharing grants (financed by the VAT) replacing local property tax support of education.

The incidence of a VAT-CIT substitution is determined by other elements besides nominal VAT incidence. Real incomes will be altered by changes in factor earnings and by changes in the prices of goods and services, resulting both from the reduction in the CIT and from the compensating imposition of the VAT.

Apart from exceptional cases, the prices of consumption goods do not change equiproportionally, as discussed previously. Hence, the effects of the price adjustments on *real* household income will depend on the composition of consumer expenditures. Families whose consumption is dominated by commodities experiencing relatively large price increases will be most adversely affected. It is certainly not unreasonable to expect that the composition as well as the level

of family consumption expenditure will be a function of income, and that this relationship will significantly affect the incidence of the tax substitution. Thus, it is necessary to utilize information concerning the composition of consumer expenditures by income class in order to assess the distributional effects of the tax substitution.

Furthermore, unless the CIT savings are fully shifted forward, the CIT reduction will imply increases in some or all nominal factor incomes. In the short run it is not unreasonable to assume that these changes in income will accrue to owners of capital, as has been assumed implicitly in the treatment of CIT shifting and revenue yield. The full distributional effects of the tax change will then incorporate increases in the after-tax incomes of capital owners, who can reasonably be expected to be concentrated at the upper end of the income distribution. To quantify this effect, it is necessary to determine the level of wealth and the portfolio composition of each income class.[1]

Finally, in addition to increases in prices of consumption goods and in the nominal incomes of owners of securities, any degree of forward CIT shifting will bring about reductions in the price of investment goods. These price reductions will not be offset by imposition of the VAT since investment purchases are not themselves subjected to a consumption-type VAT. Initially at least, this reduction in capital goods prices implies that the original, pre-tax-substitution level of capital earnings can be maintained with a smaller rate of nominal investment; the cost of the fixed bill of real investment purchases (as defined by the original investment final demand vector) will have been reduced. The benefit to investors in physical capital is simply this reduction in the nominal cost of the given net investment bundle.

For example, assume that corporate enterprises were investing $1,000,000 per year in capital goods prior to the tax substitution and earning $200,000 in profits before paying the CIT at a 50 percent rate, leaving $100,000 in after-tax profits. If the CIT is repealed and if the CIT reduction is shifted forward through lower VAT-exclusive prices, there is in the short run no consequent change in net profit income. However, if investment goods prices decline

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1. Part of the increase in after-tax corporate profits will, of course, benefit foreign holders of stock in U.S. corporations. This has, however, been ignored in the distribution of after-tax profits by income class. Although this introduces a bias into the analysis because it increases the apparent regressivity of the tax substitution by overstating the nominal income gains of domestic owners of stocks, the magnitude of this bias is expected to be small enough to be disregarded.

by 10 percent, the enterprises need spend only $900,000 to acquire the same physical volume of capital goods. The savings of $100,000 represents unused funds, not obtainned at the sacrifice of capital earnings. At least in the short run, under present assumptions, this reduction in the cost of the fixed bill of capital goods purchases must be treated as an increase in the real incomes of owners of capital, since they will not suffer any offsetting reductions in their income from capital. On the other hand, in the longer run, if the CIT reduction is allowed to stimulate investment demand without being offset by stringent monetary policy and increased interest rates, the medium-short-run effect may be a rise in the price of investment goods in response to increased demand and limited supply.

In the classical case of zero forward shifting of the CIT, implying that capital earnings are indeed quasi-rents, capital goods prices are unaffected and no benefit accrues in the form of a reduction in the nominal cost of the prespecified gross investment vector (net investment plus depreciation). Instead, the owners of capital goods benefit from an increase in earnings on a given real investment. In the nonclassical cases, i.e., some degree of forward CIT shifting, capital consumption (depreciation) has been considered as an intermediate good, with the benefits of price reductions (more than offset, however, by imposition of the VAT) flowing to consumers. But in these cases, it has been argued (section 2.4.4), that capital earnings can no longer be viewed as quasi-rents, and net earnings of capital enter into price formation. In this event, capital owners can anticipate receiving an unchanged flow of *net* earnings on the basis of a smaller level of nominal investment (unchanged physical investment). Thus, the benefit to investors of a decline in capital goods prices is the reduction in the nominal cost of the original bill of *net* investment purchases. This benefit must be distributed over households according to their participation in the purchase of capital goods. Thus, owners of unincorporated enterprises benefit directly from reduced nominal investment costs, while owners of corporate stock benefit indirectly via either higher current dividends, or higher future earnings (capital gains). This contrasts with the classical case of zero CIT shifting in which the entire (short-run) benefit accrues to owners of *corporate* wealth in the form of increased after-tax corporate profits.

In this chapter, changes in the cost of living for each income class are computed by combining the previously estimated price changes of consumption goods and services with information on the level and composition of consumer expenditure by income class, on the assumption that real consumption expenditure (level and composi-

tion) is unaffected by the tax substitution. Actually, of course, the shifting of consumption to the new basket that is optimal at the new relative prices will provide some opportunity for gain, indicating that the burden of the shift will have been slightly overestimated. Similarly, unshifted CIT savings are allocated to income classes on the basis of the share of wealth and portfolio composition (common stock versus other assets) unique to each income class. Finally, the benefits derived from the reductions in capital goods prices and hence in the nominal cost of net investment purchases are distributed on the same basis as the benefits of unshifted CIT savings; that is, ownership of corporate wealth is taken as a proxy for participation in current capital expenditure.[2] The sum of these effects, i.e., the increase in nominal consumption expenditure less (a) the increase in income, and (b) the reduction in investment cost, relative to income then represents the differential incidence of the tax substitution by income class. This information is further summarized by computing a Gini-coefficient, or index of concentration, which permits an (albeit somewhat arbitrary) assessment of the change in the overall degree of inequality in income distribution which results from the VAT-CIT substitution.

In almost all actual cases of VAT imposition, a system of multiple rates has been set up to mitigate the obvious regressivity of the tax by partially or wholly exempting some consumer goods deemed to be "necessities." We shall assess the implications of these dual rate systems, and we suggest and evaluate alternative means of reducing the regressivity of tax systems that incorporate the VAT.

To simplify matters the analysis is restricted to the extreme cases of complete repeal of the CIT under the polar assumptions of full or zero forward CIT shifting. These extremes most clearly delimit and exemplify the range of redistributive consequences of a VAT-CIT substitution.

Since the tax substitution analysis is based on data relating to input-output relationships, final demands, and corporate income tax liabilities observed in 1969, it is necessary for consistency to use the 1969 level and distribution of consumption expenditure by income class. These 1969 income-consumption relationships have been estimated from 1960-61 data, which are the most recent that

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2. In principle, ownership of corporate wealth, weighted by the corporate share of net investment, plus ownership of noncorporate physical capital, weighted by the noncorporate share of net investment, would be employed to distribute these benefits, However, the required information is not readily available by income class, and it is likely that the distribution of corporate wealth would be highly correlated with the weighted distribution of total physical wealth particularly because of the predominance of net corporate capital formation (in excess of 75 percent of the total).

are sufficiently disaggregated [U.S. Bureau of Labor Statistics].
Two alternative assumptions concerning the responses of consumption patterns to the relative price changes which occurred between 1960 and 1969 have been used to convert 1960 consumption patterns to 1969 prices:

a. The *percentage distribution of nominal expenditures* over consumption commodities for a given 1969 income class is assumed to be identical to that of the 1960-61 income class having the same real income. This is implied by *unitary relative-price elasticity of demand*. The adjustment of real levels of consumption of each good and service to relative price changes is just sufficient to maintain the budgetary shares, for a given income class, for each commodity.

b. Alternatively, it can be assumed that the *level of real consumption* of each good and service for a 1969 income class will be identical to that of the 1960-61 income class having the same real income. This would be implied by *zero relative price elasticity of demand*. In this case, the *share of expenditure* accounted for by the goods and services with above-average price increases would be greater in 1969 than in 1960, while the share of expenditure accounted for by those with below-average price increases (relative price reductions) would decline.

The computations of the redistributive results are made under both price-elasticity assumptions. However, since the estimated incidence of the tax substitution is relatively insensitive to the elasticity assumptions, the discussion is confined to the less extreme case of unitary elasticity. But, it should be understood that the alternative elasticity assumptions have been employed only in converting 1960-61 consumer budget composition to 1969 consumer prices. Zero elasticity is assumed in both cases in the assessment of the redistributive effects of the tax-substitution-induced price changes, i.e., the composition of real 1969 consumption is assumed to be unaltered by the price changes resulting from the tax substitution. Real consumption patterns have not been permitted to respond to these price changes for the sake of simplicity and of consistency with the input-output assumption of a fixed vector of final consumption demands. The data underlying the incidence analysis are presented in Table 4-1.

4.1 INCOME REDISTRIBUTION WITH FULL CIT SHIFTING

Consider first the impact of the VAT-CIT substitution on income redistribution under the assumption of full CIT shifting. Since the

Table 4-1. Underlying Data for Personal Income Distribution, 1960–1961 and 1968

| Income Class | 1960-1961 | | Average Propensity to Consume [(2) ÷ (1)] | No. of Families & Individuals | 1968 | | Aggregate Common Stock Distrib. |
| | Mean Income | Mean Expenditure | | | Mean Income | Percentage of Aggregate Income | |
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Less than $3,000	$ 1,810	$ 2,140	1,182	12,394	$ 1,780	4.0%	2.1%
$3,000-$4,999	4,240	4,140	0.976	8,720	4,000	6.4	4.4
$5000-7,499	6,150	5,860	0.953	11,502	6,240	13.1	2.3
$7,500-$9,999	8,550	7,680	0.898	10,706	8,660	17.0	12.3
$10,000-14,999	11,720	9,900	0.845	13,318	12,110	29.5	31.4
$15,000 and more	21,930	15,090	0.688	7,660	21,300	29.9	47.3
						100.00	100.0

Source:

Columns (1) and (2): Based on U.S. Bureau of Labor Statistics (Report 237-93 and Supplements, Table 1A).
Columns (4) and (5): Based on U.S. Bureau of the Census (1969, Tables 2 and 4).
Column (6): From columns (4) and (6).
Column (7): From Katona (1970, Table 6-15).

benefits of CIT repeal are fully shifted forward in the form of lower prices, there will be no changes in nominal income, i.e., net-of-tax profits and other factor incomes are unaffected. As indicated in the preceding chapter, the CIT-compensating VAT rate in this case is 7.22 percent. VAT-inclusive consumer prices rise on average by about 1.70 percent. However, because of differing initial corporate tax liabilities, consumer prices will not move uniformly. The tax substitution implies VAT-inclusive price increases in excess of 3 percent in such important, but relatively unincorporated, sectors as foods and services. The most important price decreases occur in the capital-intensive and highly incorporated utilities and communications sectors (decreases of 3 percent or more). The effect on consumption expenditure will then clearly be sensitive to the composition of the consumption budget.

The percentage increases in overall consumption costs by income class, as indicated in Table 4-2, are 2.3 percent and 2.5 percent for the lowest income classes, 2.5 percent for the highest, and 2.1 percent for the middle. The above-average increase for the lowest income class is accounted for by the substantial price increases for food, housing, and medical care, which collectively account for about 57 percent of household expenditure at this income level. The importance of these three items declines continuously with increases in income. The below-average increases in the middle income range are primarily accounted for by the decline in the price of private transportation, which takes a greater share of the budget at these income levels than at any others.

These changes in consumption expenditures effectively represent net changes in tax burden on consumption account, i.e., reductions in real disposable income resulting from the tax substitution. In addition, households will benefit, directly or indirectly, from the reduction in capital goods prices resulting from forward CIT shifting, a benefit *not* offset by the imposition of a VAT liability. The *aggregate* benefit of capital goods price changes is simply the reduction in the nominal cost of the fixed level of real net investment. To distribute these benefits over income classes the distribution of corporate common stockholdings is used as a proxy for direct participation in net capital formation. For a given income class, its benefit per dollar of income (benefit as a percentage of income) due to the reduction in capital prices is obtained as follows: the total share of common stock held by individuals in the income class (the ratio of the total value of common stock held by individuals in the income class to the total value of common stock held by individuals of all income classes) is multiplied by aggregate savings on net in-

Table 4-2. Incidence of Income Redistribution, Assuming CIT Repeal and Full CIT Shifting

1960–61 Income Class	Reduction in Investment Cost ($\Delta I/Y$)	Increase in Consumption Cost				Net Incidence ($\Delta C/Y - \Delta I/Y$)	
		$A1^a$		$A2^b$		$A1^a$	$A2^b$
		$\Delta C/C$	$\Delta C/Y$	$\Delta C/C$	$\Delta C/Y$		
Less than $3,000	.007	0.023	0.027	0.024	0.028	0.019	0.020
$3,000–$4,999	.009	0.021	0.021	0.022	0.022	0.011	0.012
$5,000–$7,499	.002	0.021	0.020	0.022	0.021	0.017	0.018
$7,500–$9,999	.009	0.021	0.019	0.022	0.020	0.009	0.010
$10,000–$14,999	.016	0.022	0.019	0.023	0.020	0.003	0.004
$15,000 and more	.024	0.025	0.017	0.026	0.018	-0.007	-0.006

Note: Gini coefficient $(g) = 0.374$ before tax substitution and 0.380 after substitution. The investment price index $(P_I) = 0.9455$; the export price index (P_E), 0.9465; original exports (E), $47.49 billion; gain to rest of world from lowered export prices (ΔE), $2.54 billion.

[a]Unitary price elasticity assumed for adjusting consumption in 1960–61 to 1969 prices.

[b]Zero price elasticity assumed for adjusting consumption in 1960–61 to 1969 prices.

vestment purchases and divided by aggregate income of the class. The distribution of stock ownership is shown in Table 4-1, column 6, and the resultant investment cost savings as a proportion of income are in Table 4-2, column 1.

Presumably because of the concentration of retired rentiers in the lowest income class, net investment savings *as a percentage of income* are as high or higher in the two lowest income classes as in the next higher classes. Not surprisingly, the gain is greatest for the highest income group (income in excess of $15,000), although average family stockholdings in this class were probably understated. The percentage gain ranges from a low of 0.2 percent for the $5,000–$7,499 income class to 2.4 percent at incomes about $15,000 (with incomes expressed in 1960-61 dollars).

The resultant total net incidence of the tax substitution, with CIT repeal and full shifting, is simply the algebraic sum of the increases in consumption expenditures plus reductions in investment expenditures, expressed as a percentage of income. For this purpose, the change in consumption expenditure must be expressed as a percentage of income, rather than of expenditure itself. This is done simply by multiplying by the pre-tax-substitution ratio of expenditure to income (the average propensity to consume) by the percentage increase in consumption expenditure, i.e.,

$$\frac{\Delta C}{Y} = \left(\frac{\Delta C}{C}\right)\left(\frac{C}{Y}\right),$$

where ΔC is the change in consumption expenditure and C and Y are the original (presubstitution) levels of expenditure and income, respectively. The incidence of net investment savings (investment cost reduction) is already expressed as a percentage of income. Thus, the full net incidence is given by the sum of the two components:

$$- \frac{\Delta Y}{Y} = \frac{\Delta C}{Y} - \frac{\Delta I}{Y} = \frac{\Delta C - \Delta I}{Y},$$

where ΔI is the *reduction* in net investment expenditure; and it is displayed in the last two columns of Table 4-2.

Not surprisingly, since the average propensity to consume declines with income, while stock ownership rises with income class, the tax substitution with full CIT shifting is generally regressive: The net incidence declines from 1.9 percent at the lowest income class to approximately zero at incomes of $10,000-$14,999, and is negative about $15,000. Thus, even under the most favorable assumption of

full forward shifting of the CIT savings, the effect of the VAT-CIT substitution is to redistribute income from lower to higher income classes.

To quantify this effect, Gini coefficients, or indices of concentration, were computed for the original income distribution and for the income distribution resulting from the tax substitution. This coefficient effectively measures the degree to which the full distribution diverges from income equality. A Gini coefficient of zero would imply absolute family-income equality; the most extreme inequality would result in a coefficient of unity. The pre-tax-substitution Gini coefficient for the disposable income distribution had a value of 0.374; the tax substitution increases the coefficient to only 0.380, suggesting that the tax substitution results in only marginal changes in relative incomes.[3]

It should be pointed out that the first-round aggregate effect of the tax substitution, in an open economy, is to increase taxes paid by citizens of the government imposing the tax. The aggregate burden on U.S. taxpayers would increase simply because part of the advantage of the CIT reduction would redound to the benefit of foreign purchasers of U.S. exports. The aggregate benefit of the substitution to the rest of the world (or aggregate burden on domestic taxpayers), under the present assumption of full CIT removal and full forward shifting, would be in fact approximately $2.54 billion, on the basis of original export sales of $47.49 billion and a reduction in export prices of 5.35 percent.

4.2 INCOME REDISTRIBUTION WITH ZERO CIT SHIFTING

Under the classical assumption of zero CIT shifting, it is somewhat simpler to assess the effects of the VAT-CIT substitution on income redistribution. First, because export prices are unaffected, no benefit

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3. The arbitrary nature of the Gini coefficient should be recognized in interpreting it as a measure of change in the degree of distributional inequality resulting from a public policy measure, e.g., the VAT-CIT substitution. As Vickrey has pointed out, very different patterns of income distribution are consistent with a particular value of the Gini coefficient: a concept of distributive justice may distinguish very clearly between two income-distributional policies which generate virtually identical measures of inequality. Specifically, in the present case, peculiarities in the relationship between tax burden and income at very low levels of income (less than $5,000 or $7,500) may disguise the significant regressivity of the tax substitution over the bulk of the income range, i.e., above $5,000. For a further discussion, see Shoup [1970, pp. 580-581].

accrues to the rest of the world: the weighted average domestic incidence of the tax change is zero. Secondly, capital goods prices do not change, implying no benefit on net investment account. Thus, it is necessary to consider only changes in consumption expenditure and the distribution of the increase in net-of-tax profits.

The increase in net corporate profits is simply the original CIT revenue ($42.68 billion). This increase can be distributed over income classes the same way as were net investment cost savings: the aggregate change in profit is multiplied by the share of aggregate common stock held by a particular income class, and the result is divided by the aggregate income of that class, giving the relative benefit of the profit increase as a proportion of income of the average family in that income class, as reflected in increased stock dividends or capital gains or both.

Not surprisingly, the profit effect with zero CIT shifting is significantly greater than investment savings with full CIT shifting. The aggregate benefit from investment savings (the change in investment goods prices times original net investment) was only $6.82 billion, compared to the $42.68 billion increase in net profit. Thus, regressivity with zero shifting should be much greater than with full shifting.

The ratio of increase in net profits to income $(\Delta P/Y)$, by income class, is shown in Table 4-3. Again, because of the distribution of stock ownership, the benefit is greater below an income of $5,000 (3.4 percent for the lowest income class and 4.4 percent for the next higher one) than for the $5,000 to $7,499 class (1.1 percent). The

Table 4-3. Incidence of Income Redistribution, Assuming CIT Repeal and Zero CIT Shifting

1960-61 Income Class	*Profit Increase* $(\Delta P/Y)$	*Consumption Expenditure Increase* $\Delta C/C$	$\Delta C/Y$	*Net Incidence* $(\Delta C/Y - \Delta P/Y)$
Less than $3,000	.034	.0768	.091	.057
$3,000-$4,999	.044	.0768	.075	.031
$5,000-$7,499	.011	.0768	.074	.063
$7,500-$9,999	.043	.0768	.069	.026
$10,000-$14,999	.072	.0768	.065	-.007
$15,000 and more	.102	.0768	.053	-.049

ΔP = profit increase (= Original CIT Revenue) = $42.68 billion. The VAT rate (Z) = 7.68 percent and the consumption price index (P_C) = 1.0768. Note: Gini coefficient (g) = 0.374 before tax substitution and 0.397 after substitution.

greatest increase in nominal income (10.2 percent) was in the highest income group.

To the gain on profit account must be added the effect of the price changes on consumption expenditure. With zero CIT shifting this effect is also somewhat simpler: all consumption prices rise by exactly the rate of the VAT, 7.68 percent. Obviously, then, the expenditure required to purchase any prespecified bill of consumption goods will rise by an equivalent amount. To specify the change in expenditure, by income class, as a proportion of income, it is only necessary to multiply the VAT rate (rate of expenditure increase) by the average propensity to consume. Because the average propensity to consume declines continuously with income, the increase in consumption expenditure relative to income also declines throughout, from 9.1 percent at the lowest levels of income to only 5.3 percent at the highest (15,000 and above).[4]

The net incidence (burden) of the VAT-CIT substitution is then simply the increase in relative expenditure less the gain in relative profit:

$$- \frac{\Delta Y}{Y} = \frac{\Delta C}{Y} - \frac{\Delta P}{Y} \, .$$

Computed in this manner, the net incidence (burden) with zero CIT shifting (Table 4-3) ranges from 6.3 percent at incomes from $5,000 to $7,499 to a -4.9 percent for families with incomes in excess of $15,000. The incidence for the lowest income group is 5.7 percent.

The pre-tax-substitution Gini-coefficient is 0.374; the post-tax value is 0.397. Thus, the increase in inequality is much greater with zero shifting of the CIT than with unitary CIT shifting, for which the post-tax-substitution coefficient increased to only 0.380. This substantive increase in the coefficient for zero shifting reflects a significant divergence from proportionality. Zero shifting implies a marked redistribution from low income families, who lose as much as 5.7 percent, and from middle income families, who lose 6.3 percent, to high income families, whose incomes actually increase by about 5 percent.

To summarize, the degree of regressiveness of a VAT-CIT substitution depends on assumptions concerning CIT shifting. As ex-

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4. The increase in consumption expenditure relative to income for the lowest income class exceeds the VAT rate because, on average, households in this income class dissave.

pected, the most severe regressivity is observed if, in accordance with classical theory, the CIT is not shifted and the CIT savings accrue entirely to owners of capital (at least in the short run).

4.3 DUAL RATES

In response to this observed regressivity of the VAT-CIT substitution, or to more superficial conceptions of the "absolute" regressivity of the VAT, governments have in practice usually exempted some selected commodities from taxation at the full rates, paralleling the policy applied in imposing sales taxes.

Because the main objective of such "dual rate" systems is the reduction of regressivity, that bill of goods which would necessarily result in the greatest such reduction was selected for analysis. Specifically, in order to minimize the burden of the VAT on the lower income groups, all commodity classes exhibiting an income elasticity of less than 1 were given VAT preference. The resultant commodity classes are: food (elasticity of 0.59), tobacco (0.34), housing (0.60), utilities (0.45), supplies for household operation and personal care (0.42), and medical care and education (0.76), where the elasticities are weighted average elasticities computed from income class data [U.S. Bureau of Labor Statistics]. This is obviously *not* the bill of goods conventionally exempted from state retail sales taxes.[5] In the aggregate, these commodity classes account for approximately 54 percent of consumer expenditures.

The aggregate VAT-inclusive consumer price index is not affected by the imposition of dual rates; what is saved on a preferred commodity is made up in the aggregate via increased VAT liabilities on nonexempted commodities. Thus, the differential incidence effects depend entirely on differences in the composition of consumption budgets between income classes. Hence, the exemption

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5. Four reasons for this divergence of conventional exemption practice from that which most effectively mitigates regressivity can be suggested. First, the choice of commodities selected for exemption may be guided by other objectives besides mitigation. For example, externality considerations or moral judgments concerning the social desirability of some types of consumption may enter, as in the decision not to exempt tobacco or alcoholic beverages.

Secondly, as will become very clear, the use of dual rate schemes may create severe distortions in the price structure, resulting in significant inefficiencies of allocation as households attempt to minimize their tax burdens (legal tax avoidance achieved by shifting consumption patterns toward exempted commodities) and potentially leading to tax evasion: the development of black markets and other methods of illegal tax avoidance.

Thirdly, and related to the second, many items in income inelastic demand are also *price inelastic*, and as is well known, the allocative inefficiency (excess

of income-inelastic items minimizes the regressivity of a dual-rate VAT as a replacement for the CIT.

It should be noted that the exemption of, e.g., tobacco sales to consumers from the VAT does not mean that retail tobacconists are exempted from the VAT network. To exempt value added completely at all stages of production ultimately embodied in consumer purchases of tobacco it would be necessary not only to exempt the tobacconist but also to provide the retailer with a refund of all VAT invoiced on his purchases. Similarly, if it were desired to tax a preferred commodity at one-half the regular VAT rate, the net VAT liability of the retailer would be one-half the VAT rate times all preferred sales, less *all* VAT invoiced (at full rates) on his intermediate purchases. In general, a dual-rate system under the invoice method requires only that the final sale be identified as subject to a preferred rate, with the usual full credit of the VAT invoiced on intermediate purchases.

To examaine the sensitivity of incidence to the degree of exemption, two cases are considered: (a) the application of one-half the "normal" (non-exempt-commodity) rate to items in income-inelastic demand, and (b) the complete exemption of (application of a zero rate to) income-inelastic items. The results are again assessed for the extreme cases of complete CIT removal with full and zero forward CIT shifting. The differential incidence of the VAT-CIT substitution for the three cases of full-rate, half-rate, and zero-rate VAT preferences is presented in Tables 4-4 (full CIT shifting) and 4-5 (zero CIT shifting).

In the case of CIT repeal and full forward CIT shifting, the introduction of preferential treatment for income-inelastic commodities increases the normal VAT rate from 7.22 percent to 9.89 percent with half-exemption and to 15.69 percent, more than double the single rate, with full exemption. The benefit received on purchases of exempted commodities is the reduction in the effective VAT rate

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burden) imposed by an excise tax is less the more price inelastic the demand. Thus, on allocative grounds it is desirable to subject these commodities to special *higher* rather than lower rates. The fundamental point, ultimately, is that the rate structure of ad valorem taxes should be determined on the basis of criteria other than income distributional effects, with undesirable consequences in the latter dimension compensated by other simultaneous changes in the tax system, e.g., rebatable credits against income taxes or an appropriately structured system of transfers (negative taxes).

Finally, as a means of enhancing progressivity, exemptions under existing ad valorem taxes may be "nonoptimal" because they are attempts to make the taxes *appear* progressive without significantly altering the incidence of a basically regressive tax system.

Table 4-4. Incidence[a] of Dual VAT Rates, Assuming CIT Repeal and Full CIT Shifting

1960-61 Income Class	Investment Cost Reduction (ΔI/Y)	Consumption Expenditure Increase						Net Incidence (ΔC/Y - ΔI/Y)		
		Single Rate		Half Rate		Zero Rate		Single Rate	Half Rate	Zero Rate
		ΔC/C	ΔC/Y	ΔC/C	ΔC/Y	ΔC/C	ΔC/Y			
Less than $3,000	.007	.023	0.027	.018	.021	0.004	.004	.019	.014	.003
$3,000-$4,999	.009	.021	0.021	.020	.020	0.015	.015	.011	.011	.006
$5,000-7,499	.002	.021	0.020	.021	.020	0.019	.018	.017	.018	.016
$7,500-$9,999	.009	.021	0.019	.022	.020	0.023	.021	.009	.011	.012
$10,000-$14,999	.016	.022	0.019	.024	.021	0.028	.023	.003	.005	.007
$15,000 and more	.024	.025	0.017	.028	.019	0.034	.023	-.007	-.005	-.001

VAT Rates

	Nonexempt	Exempt
Single rate	7.22%	7.22%
Half rate	9.89	4.95
Zero rate	15.69	0

Gini Coefficients

Single rate	.380
Half rate	.377
Zero rate	.377
Pre-VAT	.374

Note: Consumption price index independent of exemption $(P_C) = 1.0168$.

[a] Unitary relative price elasticity assumed for adjusting consumption in 1960-61 to 1969 prices.

Table 4-5. Incidence[a] of Dual VAT Rates, Assuming CIT Repeal and Zero CIT Shifting

1960-61 Income Class	Profit Increase ($\Delta P/Y$)	Consumption Expenditure Increase						Net Incidence ($\Delta C/Y - \Delta P/Y$)		
		Single Rate		Half Rate		Zero Rate		Single Rate	Half Rate	Zero Rate
		$\Delta C/C$	$\Delta C/Y$	$\Delta C/C$	$\Delta C/Y$	$\Delta C/C$	$\Delta C/Y$			
Less than $3,000	.034	.0768	.091	.0697	.082	.0543	.064	.057	.048	.030
$3,000-$4,999	.044	.0768	.075	.0742	.072	.0687	.067	.031	.028	.023
$5,000-7,499	.011	.0768	.074	.0755	.072	.0727	.069	.063	.061	.058
$7,500-$9,999	.043	.0768	.069	.0768	.069	.0768	.069	.026	.026	.026
$10,000-$14,999	.072	.0768	.065	.0782	.066	.0813	.069	-.007	-.006	-.003
$15,000 and more	.102	.0768	.053	.0798	.055	.0861	.059	-.049	-.047	-.043

VAT Rates	Nonexempt	Exempt
Single rate	7.68%	7.68%
Half rate	10.48	5.24
Zero rate	16.48	0.00

	Gini Coefficients
Single rate	.397
Half rate	.395
Zero rate	.394
Pre-VAT	.374

Note: Consumption price index independent of exemption (P_C) = 1.0768.

[a] Unitary relative price elasticity assumed for adjusting consumption in 1960-61 to 1969 prices.

applied to these purchases: from 7.22 percent to 4.95 percent (half-rate) or to 0 percent (zero rate, or full exemption).[6]

As can be seen from the estimates of net incidence, the half-rate benefits families with income below about $3,000 at the expense of those with incomes above $15,000. With full exemption, those below $7,500 benefit at the expense of those above $10,000. However, the effect for the overall redistribution is marginal. The post-substitution Gini-coefficient is reduced from 0.380 (no exemption), to 0.377 (half *and* total exemption). Thus, either dual-rate system moves back only halfway to the presubstitution coefficient of 0.374. Under either dual-rate system the VAT-CIT substitution is still markedly regressive above an income of $5,000. However, families at the lowest income levels (below $5,000) do derive significant benefits from exemption, in the extreme (below $3,000) an increase of 2.3 percent in disposable income (the difference between $\Delta C/Y$ for the single rate and the zero rate).

In the case of zero CIT shifting, the absolute magnitudes of the redistributive effects of dual rates are similar. Again, the benefits of both full and partial exemptions are concentrated among those with an income below $7,500. Full exemption, for example, would increase the disposable income of the lowest income group by 2.7 percent, compared to a single-rate VAT (although the net tax burden

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6. Note that the "half-rate," 4.95 percent, is more than one-half the "single rate," 7.22 percent, simply because the full rate applied to nonexempt commodities, 9.89 percent, must be above the single rate to compensate for the lower rate applied to preferentially treated commodities, and the half rate is one-half this full rate. In general the relationship between the degree of exemption, the full rate, and the "exemption rate" is given by

$$Z_f = \frac{R}{C(1 + \rho e - \rho)}$$

$$Z_e = eZ_f$$

where Z_f is the full rate,

   Z_e is the rate applied to preferential commodities,

   e is the ratio of the preferential to the full rate,

   C is total personal consumption expenditure (the *VAT base*),

   ρ is the proportion of expenditure accounted for by preferential commodities, and

   R is the required VAT revenue yield.

In the present case with $\rho = 0.54$ and $R/C = 0.0722$ (the single VAT rate, i.e., in the absence of exemptions; assuming full CIT repeal and shifting), the relationship between e and the VAT rate is

of this group would still rise by 3.0 percent in comparison to the presubstitution level of disposable income). However, because the substitution with zero CIT shifting is so much more steeply regressive (through the effect of increased profits), the dual-rate systems are also significantly more regressive compared to the pre-tax-substitution condition. Without exception, the Gini coefficient is increased by the tax substitution from 0.374 to 0.397; half-exemption reduces it only to 0.395, and full exemption has the almost unnoticeable marginal effect of an 0.001 reduction (to 0.394). But to achieve these relatively minor improvements in incidence it is necessary to increase the normal VAT rate from 7.68 percent (no exemption) to 10.48 percent (half exemption) and 16.48 percent (full exemption), respectively.

If dual rates only mitigated regressivity, even marginally, they might be justified. However, apart from their marginal redistributive effectiveness, they can be expected to have a significant adverse impact on other dimensions of the economic structure. Note particularly the radical rate differences which are implied by dual-rate systems: full rates of about 10 percent versus half rates of 5 percent or full rates in excess of 15 percent with total exemption of preferred commodities. The allocative effects of such substantial rate differentials can certainly be expected to be noticeable and are

$$Z_f = \frac{0.0722}{(0.46 + 0.54e)}$$

and

$$Z_e = \frac{0.0722e}{(0.46 + 0.54e)}.$$

or graphically
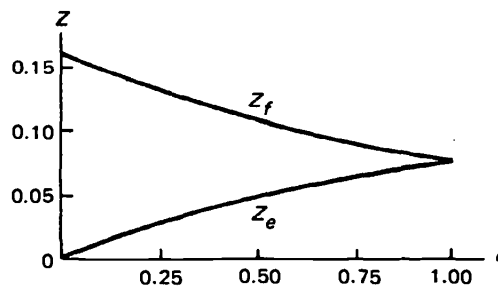
The general characteristics of these relationships are independent of the specific values of the variables C, R, and p.

necessarily adverse. With such staggering rate differentials it is hard to believe that consumer budget composition would not be altered in an attempt to minimize the burden of the tax. Thus, a dual rate VAT could entail substantial excess burdens, i.e., losses in welfare due solely to the peculiarities of the tax system.

In brief, dual rates minimally reduce the regressivity of the VAT-CIT substitution, but only by sacrificing the major claim which can be made for the VAT: its allocative neutrality. Even if other benefits can validly be claimed for the substitution, e.g., growth and trade advantages (the validity of which will be discussed in succeeding sections), or elimination of biases against equity financing, these could be achieved much more efficiently by other means, e.g., investment credits and devaluation or various forms of integration of personal and corporate income taxes, without incurring either the adverse allocative or redistributive effects of dual- or single-rate VAT systems.

However, alternatives to dual rate systems can be suggested to offset the regressivity of the substitution, and render it redistributively neutral or desirable. These can only be discussed here briefly. The least radical means would be to permit *VAT liabilities to be credited against federal personal income tax liabilities.* For this method to work it would be necessary, first, that net credits, i.e., the excess of gross credits for the VAT over gross personal income tax liabilities, be refunded to the taxpayer, and second, that the *degree* of credit depend upon income, declining as income rises.[7] Under this method either the VAT rate would have to be increased, so that reduced income tax revenues would be compensated by increased VAT revenues, implying VAT rates significantly higher than those discussed here, *or* changes in the *level and structure* of income tax rates would have to be introduced to compensate for the aggregate *net* income tax revenue loss resulting from the VAT credit. In either case, the net incidence of the change in tax structure would result from compensating changes in *three* tax instruments: the VAT, the CIT, and the personal income tax. Changes in the structure and yield of the latter would have to be explicitly incorporated into the analysis if the consequences of the tax substitution were to be assessed.

A more substantial change in tax structure which could also

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7. Note that the use of rebatable credits would require that all households file income tax returns, even those whose income is so low that they are not otherwise subject to the income tax. This would involve a quantum leap in the administrative burden of the income tax, particularly since the tax reform act of 1969.

serve to offset the regressivity of the VAT-CIT substitution would be the simultaneous introduction of a *progressive expenditures tax* (PET) [Kaldor].[8] At one extreme, the PET could be designed so that, by applying appropriate negative and positive PET rates, the net incidence of the PET-augmented VAT-CIT substitution would be reduced to zero on average for any income class (or to a positive constant, i.e., a tax liability proportionate to income, if the CIT were shifted forward, since that would imply a net increase in domestic tax liabilities due to the benefit accruing to the rest of the world in the form of lower export prices).

At the other extreme, it would be possible to dispense with the VAT completely, relying only on the PET to compensate for CIT removal. In that case, any desired degree of progressivity could be built into the substitution simply by manipulating the PET rate structure. Of course, much the same effects could be obtained by using the personal income tax to compensate for corporate tax removal, e.g., by integrating corporate and personal income taxation and by introducing appropriate simultaneous changes in the rate structure of the latter. However, the two alternatives are *not* indentical. In terms of consumption and savings effects major differences could be expected. Thus, the personal income tax and the PET offer basically different alternatives for replacement of the CIT or mitigation of VAT regressivity. In terms of incentive effects, it might be noted, the PET would more closely approximate the VAT than would the personal income tax, particularly with reference to the trade and investment effects discussed in the following chapters.

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8. Administration of the progressive expenditures tax entails certain difficulties, although these are not insurmountable. In a regime already employing an income tax, introduction of PET would require in addition only the computation of annual flows into or out of investment, or to or from gifts and bequests.