Volume Title: Substituting a Value Added Tax for the Corporate Income Tax: First-Round Analysis

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Volume Publisher: NBER

Volume ISBN: 0-884-10474-5

Volume URL: http://www.nber.org/books/dres77-1

Publication Date: 1977

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Chapter URL: http://www.nber.org/chapters/c3830

Chapter pages in book: (p. 63 - 102)

Chapter 3

CIT-Compensating VAT Rates, Revenues, and Price Adjustments

3.1 CIT-COMPENSATING VAT RATES AND REVENUES

To identify VAT rates and revenues which would just compensate for the reduction or removal of the corporate income tax, the model described in the preceding chapter was applied empirically to data for the United State economy in 1969. The remainder of the study contains the results of this application. In this section we discuss VAT rates and revenues required to compensate for various degrees of CIT reduction under alternative assumptions concerning forward CIT shifting. The effects of these specified tax substitutions on prices (by industry and by component of final demand) are examined in the following section of this chapter. In the remaining chapters we then consider the implications of these tax and price changes for income distribution, investment, and international trade.

Six degrees of CIT reduction (S) are examined: S = 25 percent, 50 percent, 75 percent, 85 percent, 90 percent, and 100 percent. As we discussed earlier, it is assumed throughout that producers fully shift the newly imposed VAT forward by raising their prices. Prices exclusive of VAT are determined by the reduction and shifting of the CIT, and are then simply marked up by the amount of the VAT in determining VAT-inclusive prices. To assess the effects of possible shifting of the CIT, six alternative degrees of CIT shifting are considered: α = 0, 0.2, 0.4, 0.6, 0.8, 1.0.

Superficially, the examination of such a large number of alterna-

tive cases (6 degrees of CIT removal by 6 degrees of CIT shifting = 36 separate cases) might seem unnecessary; however, since the degree of CIT shifting is an "unknown," examining the *sensitivity* of the VAT rate to the CIT shifting parameter seemed necessary. In fact, we will discover that for a specifiable degree of CIT reduction (about 90 percent) the appropriate compensating VAT rate is independent of the CIT shifting parameter. Because the interrelationships between the compensating VAT rate, CIT shifting, and the degree of CIT reduction can only be assessed numerically, it is necessary to approximate the general relationships by the empirical solution of a number of permutations.[1]

The importance of the interrelationships between the VAT rate and the degrees of CIT reduction and shifting should not be underestimated. The substitution of one broad-based tax for another (VAT for the CIT) involves a number of uncertainties and potentially serious unanticipated effects. At least one significant criterion for the actual selection of a particular tax substitution is the *minimization* of the most serious of these unexpected consequences. In the present case, while a budget-balancing approach to fiscal policy might cause concern to be felt over the possibility of unanticipated revenue surpluses or shortfalls, the more significant and fundamental problem would lie in the possibility of unanticipated enhancement or represssion of aggregate demand. In the analysis being presented

1. Equations (2-6-6) and (2-6-13) indicate why, e.g., the derivative of the VAT rate, Z, with respect to the CIT shifting parameter, α, cannot be determined analytically:

$$a_j = \frac{\alpha}{1 - \alpha(1-s)t_j} \tag{2-6-6}$$

$$Z = \frac{s\pi' tx + s(1-s)\pi' tbtx - s\pi' tb(I-A)^{-1}g}{v'(I-A)^{-1}c - s\pi' tb(I-A)^{-1}c} \tag{2-6-13}$$

where

$$b = \begin{bmatrix} a_1 & \cdots & 0 & \cdots & 0 \\ \vdots & & \vdots & & \vdots \\ 0 & & a_j & & 0 \\ \vdots & & \vdots & & \vdots \\ 0 & \cdots & 0 & \cdots & a_n \end{bmatrix}$$

By inspection it can be seen that the derivative cannot be reduced to a scalar magnitude because α only enters the VAT rate equation through the vector b, which also incorporates initial industry-specific CIT rates and the degree of CIT reduction. Furthermore the sign of the derivative is ambiguous.

here, however, both the CIT and VAT revenues as well as net impacts on aggregate demand are in general sensitive to the unknown CIT shifting parameter. Moreover, within our model the government's only way of minimizing the consequences of variations in shifting is by manipulating the size of the CIT reduction. Thus, it is important at least to investigate the degree to which unanticipated consequences can be avoided by selecting an appropriate value for this policy-controlled variable.

CIT-compensating VAT rates and revenues are presented in Table 3-1 for all 36 combinations of CIT reduction and shifting. Each column contains VAT rates and revenues required to compensate for a given CIT reduction under varying shifting assumptions. Conversely, the shifting parameter is held constant and the degree of CIT reduction is varied across each row. The final row and column provide the relative ranges of VAT rates and revenues for each of the CIT shifting and reduction assumptions.

To interpret the variations in VAT rates and revenues it is necessary to recall that the criterion for the VAT yield being used in this model is that the nominal government surplus or deficit be unaffected by the tax substitution: the VAT rate is determined such that the net change in government revenue (difference between VAT revenue gain and CIT revenue loss) equals the change in government expenditure.

Stated another way, VAT revenue must equal the CIT revenue foregone plus the (algebraic) change in government expenditure. The change in CIT revenue can be further decomposed into two components: the "primary" loss due to the rate reduction and the "secondary" loss due to CIT shifting. Adopting the convention that government prices are VAT-exclusive, the change in government expenditure is due solely to the shifting of the CIT reduction.

The VAT *rate* is simply given by the ratio of required VAT revenue to the VAT base, i.e., to private domestic consumption expenditure at VAT-exclusive prices. With zero CIT shifting, consumption prices are not changed by the CIT reduction and the VAT base is simply private domestic consumption expenditure prior to the tax change. However, with forward shifting of the CIT reduction, the consumption base declines by the amount of the shifted reduction in CIT liabilities.

Thus, the change in the VAT rate as the degree of shifting (α) and of CIT reduction (S) are varied depends upon the consequent changes in the components of required VAT revenue and in the VAT base. These changes in the components are given in Table 3-2.

In the following analysis we concentrate first on the sensitivity

Table 3-1. VAT Rates and Revenues[a] for Varying Degrees of CIT Reduction and Shifting (rates in percentages; revenues in billions of dollars)

CIT	*Degree of CIT Reduction (S)*												*Range*	
Shifting	*25 Percent*		*50 Percent*		*75 Percent*		*85 Percent*		*90 Percent*		*100 Percent*		*(percent)*	
Parameter	*Rate*	*Revenue*	*Rate*	*Revenue*	*Rate*	*Revenue*	*Rate*	*Revenue*	*Rate*	*Revenue*	*Rate*	*Revenue*	*Rate*	*Revenue*
0.0	1.92	10.67	3.84	21.34	5.76	32.01	6.53	36.28	6.91	38.41	7.68	42.68	300	300
0.2	2.04	11.33	3.99	22.02	5.83	32.14	6.55	36.04	6.90	37.95	7.59	41.72	271	268
0.4	2.19	12.11	4.15	22.79	5.91	32.28	6.57	35.79	6.89	37.48	7.50	40.77	242	237
0.6	2.38	13.07	4.34	23.66	6.00	32.43	6.59	35.53	6.87	37.00	7.41	39.81	212	205
0.8	2.61	14.27	4.56	24.65	6.09	32.59	6.61	35.26	6.86	36.52	7.32	38.86	175	172
1.0	2.91	15.83	4.82	25.80	6.19	32.76	6.63	34.99	6.84	36.02	7.22	37.91	148	139
Range (percent)	51.6	48.4	25.5	20.9	7.5	2.3	1.5	-3.6	-1.0	-6.2	-5.9	-11.2		

Source: For derivation, see accompanying text.

[a]VAT revenue = net loss in government revenue before the VAT introduction, but after reduction of the CIT.

Table 3-2. Components of Change in VAT Revenues and Base (dollars in billions)

CIT Shifting Parameter (α)	CIT Revenue Loss		Government Expenditure Savings (3)	Reduction in Consumption (VAT) Base (4)	Net CIT Loss as Percent of Primary Loss (5)	Col. 4 as Percent of Preshifted VAT Base (6)	Ratio: VAT Rate with Shifting to Rate Without Shifting (7)
	Primary (1)	Secondary (2)					
			CIT Reduction of 25 Percent				
0.0	$10.67	0	0	0	0	0	1.0
0.2	10.67	$0.91	$0.25	$1.56	6.16%	-0.28%	1.065
0.4	10.67	1.99	0.55	3.40	13.53	-0.61	1.142
0.6	10.67	3.31	0.90	5.63	22.53	-1.01	1.238
0.8	10.67	4.95	1.34	8.40	33.80	-1.51	1.359
1.0	10.67	7.07	1.90	11.95	48.48	-2.15	1.517
			CIT Reduction of 50 Percent				
0.0	21.34	0	0	0	0	0	1.0
0.2	21.34	1.18	0.49	3.03	3.23	-0.54	1.038
0.4	21.34	2.49	1.03	6.41	6.86	-1.15	1.081
0.6	21.34	3.98	1.64	10.21	10.97	-1.84	1.131
0.8	21.34	5.67	2.33	14.52	15.68	-2.61	1.188
1.0	21.34	7.62	3.11	19.45	21.14	-3.50	1.255
			CIT Reduction of 75 Percent				
0.0	32.01	0	0	0	0	0	1.0
0.2	32.01	0.86	0.71	4.42	.46	-0.80	1.013
0.4	32.01	1.76	1.46	9.08	.95	-1.63	1.026
0.6	32.01	2.72	2.25	14.01	1.47	-2.52	1.041
0.8	32.01	3.74	3.09	19.22	2.03	-3.46	1.057
1.0	32.01	4.82	3.97	24.25	2.64	-4.45	1.074
			CIT Reduction of 85 Percent				
0.0	$36.28	0	0	0	0	0	1.0
0.2	36.28	$0.58	$0.80	$4.57	-0.61%	-0.82%	1.002
0.4	36.28	1.17	1.62	10.07	-1.23	-1.81	1.006
0.6	36.28	1.79	2.47	15.35	-1.88	-2.76	1.009
0.8	36.28	2.43	3.35	20.81	-2.54	-3.75	1.013
1.0	36.28	3.09	4.25	26.46	-3.22	-4.76	1.016

Table 3-2 continued

CIT Shifting Parameter (α)	*CIT Revenue Loss*		*Government Expenditure Savings* (3)	*Reduction in Consumption (VAT) Base* (4)	*Net CIT Loss as Percent of Primary Loss* (5)	*Col 4 as Percent of Preshifted VAT Base* (6)	*Ratio: VAT Rate with Shifting to Rate Without Shifting* (7)
	Primary (1)	*Secondary* (2)					
			CIT Reduction of 90 Percent				
0.0	38.41	0	0	0	0	0	1.0
0.2	38.41	0.40	0.84	5.22	-1.13	-0.94	.998
0.4	38.41	0.82	1.70	10.55	-2.29	-1.90	.996
0.6	38.41	1.24	2.57	16.00	-3.47	-2.88	.994
0.8	38.41	1.67	3.47	21.56	-4.67	-3.88	.992
1.0	38.41	2.12	4.38	27.25	-5.90	-4.90	.990
			CIT Reduction of 100 Percent				
0.0	42.68	0	0	0	0	0	1.0
0.2	42.68	0	.92	5.74	-2.16	-1.03	.989
0.4	42.68	0	1.85	11.48	-4.33	-2.07	.977
0.6	42.68	0	2.77	17.22	-6.49	-3.10	.965
0.8	42.68	0	3.70	22.96	-8.66	-4.13	.953
1.0	42.68	0	4.62	28.70	-10.82	-5.17	.940

Column (1) = the first term in the numerator of equation (2-6-13).
Column (2) = the second term in the numerator of the same equation.
Column (3) = the third term in the numerator of the same equation.
Column (4) = the second term in the denominator of the same equation.

$$\text{Column (5)} = \left[\frac{\text{column 1} + \text{column 2} - \text{column 3}}{\text{column 1}} - 1\right] \times 100.$$

$$\text{Column (6)} = \left[\frac{C - \text{column 4}}{C} - 1\right] \times 100,$$

where C = private domestic consumption expenditures before the tax change.

$$\text{Column (7)} = \frac{100 + \text{column 5}}{100 + \text{column 6}},$$

noting that the VAT rate (Z) = $\frac{\text{column 1}}{C} \times$ column 7 and only column 7 is a function of the CIT shifting.

of the VAT rate to the degree of CIT reduction, given a specified degree of CIT shifting. Then, we examine the dependence of the VAT rate on the degree of CIT shifting, holding constant the degree of CIT reduction. This decomposition of the analysis permits a somewhat simpler exposition than would a direct focus on simultaneous variation in the CIT reduction and shifting parameters.

3.1.1 Sensitivity of VAT Rate to CIT Reduction

Given zero CIT shifting VAT-exclusive prices are unaffected by the CIT reduction, i.e., there is no change in either government or consumption expenditure at VAT-exclusive prices for a given bill of goods and services.

Similarly, there is no secondary CIT revenue loss since pretax profits are unaltered by the change in CIT rates. As a result, required VAT revenue is simply equal to the primary CIT revenue loss, which is proportionate to the degree of CIT reduction. Equivalently, the VAT rate is proportionate to the degree of CIT reduction. Thus, a CIT reduction of 100 percent necessitates a VAT rate of 7.68 percent and VAT revenue of $42.68 billion, equal to original CIT revenue, which is *twice* the 3.84 percent rate and $21.34 billion revenue required of the VAT if the CIT reduction were only 50 percent, or *four times* the 1.92 percent rate and $10.67 billion revenue required with a 25 percent CIT reduction. That is, the VAT rate and revenue required to compensate for CIT repeal are 100 percent and 300 percent greater than the rate and revenue required to compensate for a 50 percent CIT reduction and for a 25 percent reduction. Symbolically, $\partial^2 Z/\partial S^2 = 0$ if the CIT is not shifted, i.e., the relationship between the VAT rate and the degree of CIT removal is linear.

For any given degree of positive CIT shifting, the change in the VAT rate required to compensate for an increased degree of CIT reduction is less than proportionate to the change in CIT rates. For example, even if the CIT reduction is doubled, from 50 percent to 100 percent, the VAT rate is not fully doubled if the CIT is shifted: If the CIT is fully shifted, the VAT rate rises from 4.82 percent to 7.22 percent (the VAT rate required for CIT elimination is only 150 percent of the rate required for a 50 percent reduction in CIT rates), while a shifting parameter of 0.5 results in an increase in the VAT rate from 4.34 percent to 7.41 percent if the CIT reduction changes from 50 percent to 100 percent (in this case the latter rate is 171 percent of the former). Thus, $\partial^2 Z/\partial S^2 < 0$, if positive shifting of the CIT occurs. This reduced responsiveness of

the VAT rate to changes in the degree of CIT reduction for higher values of the CIT shifting parameter is due to two reinforcing phenomena. First, as can be seen from Table 3-2, *for any given degree of shifting*, the reduction in government expenditures becomes monotonically greater in absolute value (although at a diminishing rate) as the CIT is progressively reduced. This increased expenditure savings resulting from increased CIT shifting reduces the adjustment in VAT revenue required to compensate for any increase in the degree of CIT reduction.

In addition, as the CIT is progressively reduced, the secondary CIT revenue loss, given any positive degree of CIT shifting, at first *increases at a diminishing rate.* At a CIT reduction of slightly less than 50 percent it then decreases, although it remains positive. The reason for this behavior is that the decline in taxable profit due to shifting entails less of a revenue loss the lower the *post-reduction* CIT rate (the greater the degree of CIT removal). Complete removal of the CIT obviously precludes any secondary CIT revenue loss regardless of the degree of CIT shifting, since the post-reduction CIT rate is zero.

Of course, in addition to its effect on the secondary loss and savings in government expenditure, positive CIT shifting also reduces the VAT base (consumption expenditure at VAT-exclusive prices). However, these reductions in base also proceed at a diminishing rate as CIT reduction proceeds. The base reduction is simply equal to the sum of the primary and secondary CIT revenue loss multiplied by the CIT shifting parameter, less the reduction in nominal government, investment, and export expenditure: primary loss is proportionate to the degree of CIT reduction, while secondary loss at first increases and then declines, as noted above. Thus, the decline in the VAT base proceeds at a decreasing rate with progressive CIT reduction, given any positive degree of CIT shifting. Furthermore, the change in base has very little effect on the VAT rate because the change is very small *relative to original consumption expenditure*: in all cases less than 6 percent. In absolute amount the change in VAT-exclusive consumption expenditure is second in magnitude only to the primary CIT revenue loss, but the former is a change only in tax *base*, not tax revenue.

To summarize, the required VAT rate is proportionate to the degree of CIT removal if the CIT is not shifted but is less than proportionate if the CIT is shifted. Furthermore, as demonstrated in Tables 3-1 and 3-3, the relative increase in the VAT rate required to compensate for any increase in CIT removal declines with increased CIT shifting. This phenomenon is visually portrayed in

Table 3-3. Percentage Changes in VAT Rates and Revenues for Given Changes in CIT Reduction and Differing Degrees of CIT Shifting (percent)

CIT Shifting Parameter	*Change in Degree of CIT Reduction (S)*					
	From 25% to 50%		*From 50% to 75%*		*From 75% to 100%*	
	Rate	*Revenue*	*Rate*	*Revenue*	*Rate*	*Revenue*
0.0	100.0	100.0	50.0	50.0	33.3	33.3
0.2	95.0	94.5	46.3	45.9	30.2	29.8
0.4	89.3	88.2	42.4	41.6	26.9	26.3
0.6	82.6	81.0	38.1	37.1	23.6	22.8
0.8	74.9	72.8	33.5	32.2	20.2	19.3
1.0	65.4	63.0	28.4	27.0	16.7	15.7

Note: Percentage changes are calculated as $\frac{\Delta Z}{Z}$ and $\frac{\Delta T_v}{T_v}$ for a given α, where Z is the VAT rate and T_v is the VAT revenue.

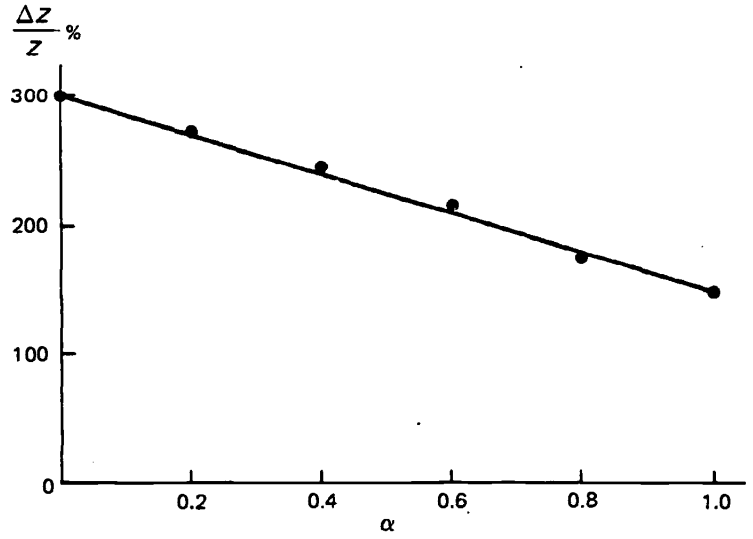

Figure 3-1. Relative Change in VAT Rate (Z) for CIT Reductions Moving from 25 Percent to 100 Percent, as Function of CIT Shifting Parameter (α)

Figure 3-1, which contains plots of the relative change in the VAT rate, Z, when the degree of CIT reduction is increased from 25 percent to 100 percent, as a function of the shifting parameter, α. The relative change in the VAT rate required to compensate for an increase in the degree of CIT removal from 25 percent to 100 per-

cent declines continuously with increase in the CIT shifting parameter: With zero CIT shifting the 300 percent increase in the degree of CIT rate reduction implies an equivalent 300 percent increase in the VAT rate, while with the extreme of full forward shifting of the CIT the relative change in VAT rates is only 148 percent.

The same dependence of the CIT reduction-VAT rate association on the degree of CIT shifting is portrayed in Figure 3-2, which relates the compensating VAT rate to the degree of CIT reduction, holding the CIT shifting parameter constant. It is readily observed that the curves become progressively flatter as the CIT shifting

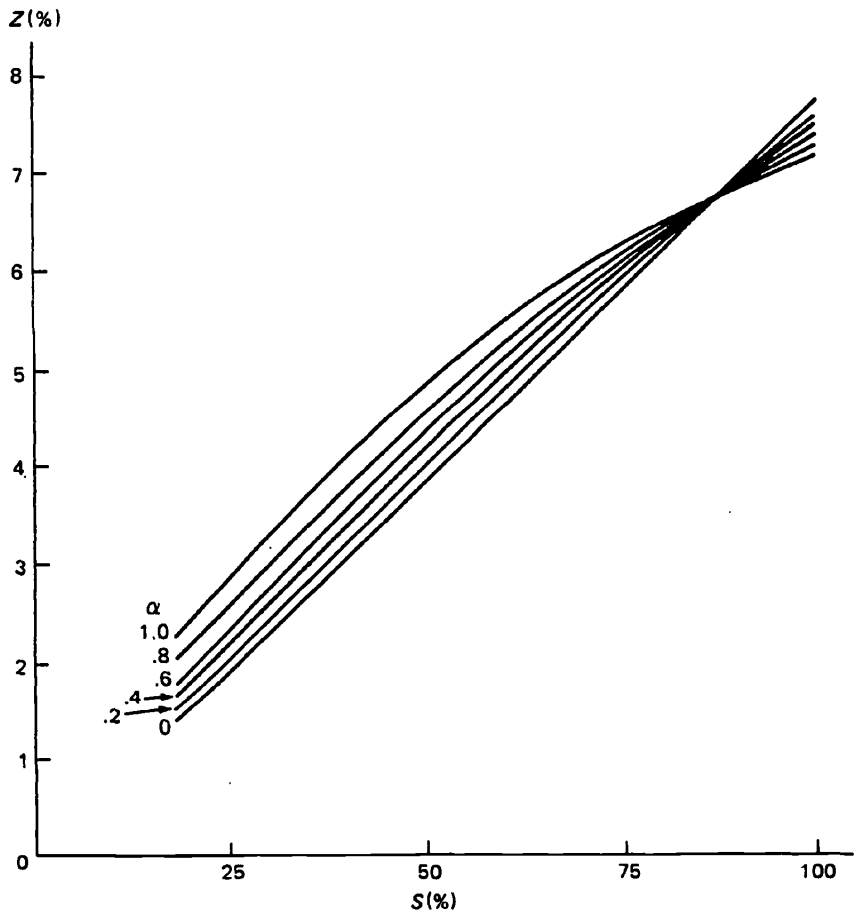

Figure 3-2. VAT Rate (Z) as Function of Degree of CIT Reduction (S), Given CIT Shifting Parameter (α)

parameter is increased, i.e., the rate of change of Z (the VAT rate) with respect to change in S (CIT reduction) is less the greater the degree of forward CIT shifting, or alternatively, $\partial^2 Z/\partial\alpha\partial S < 0$. This is more precisely indicated in Table 3-3, which contains figures for the change in the VAT rate resulting from three representative changes in the degree of CIT reduction (25 percent to 50 percent, 50 percent to 75 percent, and 75 percent to 100 percent). In each of the three cases, the percentage change in the VAT rate declines throughout with increases in CIT shifting.

It should be noted that if the CIT is shifted in any degree, the relative increase in VAT *revenue* is less than the relative increase in the VAT *rate* required to compensate for an increase in S (degree of CIT removal). The change in revenue must be less than the change in rate simply because the VAT base is simultaneously reduced as the degree of CIT reduction proceeds. Thus, in the extreme case of full CIT shifting, the increase in the VAT rate (moving from S = 25 percent to S = 100 percent) is 148 percent but the increase in VAT revenue is only 139 percent. With zero CIT shifting, of course, the 300 percent increase in the VAT rate implies a corresponding 300 percent increase in VAT revenue.

3.1.2 Sensitivity of VAT Rate to CIT Shifting

Superficially, it might appear that an increase in shifting would necessarily require an increase in the VAT rate (and in VAT revenue), regardless of the degree of CIT reduction, simply because of the increased secondary CIT revenue loss implied by an increase in shifting. This is indeed true for low degrees of CIT removal: With a 25 percent reduction in CIT rates, zero CIT shifting requires a VAT rate of 1.92 percent while full shifting requires a rate 52 percent greater (Z = 2.91 percent). Thus, for sufficiently small values of S, $\partial Z/\partial\alpha > 0$. However, in the extreme case of full CIT removal there can be no secondary CIT revenue loss, simply because the post-tax-change CIT rate is zero. *Primary* CIT revenue loss is, of course, the same for any degree of shifting. But, any degree of positive CIT shifting will entail a *reduction* in government expenditure due to reductions in the VAT-exclusive prices of government purchases. The greater the degree of forward CIT shifting, the greater the resultant reduction in government expenditure. Thus, with complete CIT removal, *required VAT revenue* (equal to primary CIT revenue loss minus the reduction in government expenditure) *declines as the CIT shifting parameter increases.* The decline is from $42.68 billion (original CIT revenue) with zero CIT shifting to $37.91 billion (a

government expenditure decline of $4.77 billion) with full shifting of the CIT. Whether the VAT rate is increased or reduced depends upon the effect of CIT shifting on the VAT base, i.e., on consumption expenditures at VAT-exclusive prices. As might be expected, the increase in CIT shifting from zero to 100 percent implies a reduction in required VAT revenue (11.2 percent) which is proportionately greater than the implied reduction in the total VAT base (less than 6 percent). As a result the VAT *rate* declines from 7.68 percent with zero shifting to 7.22 percent with full shifting, a relative reduction of 5.9 percent. Therefore, if the degree of CIT reduction is sufficiently large, an increase in CIT shifting will imply a reduction in the VAT rate, i.e. $\partial Z/\partial \alpha < 0$.

Thus, for some intermediate degree of CIT reduction, required *VAT* revenue must remain unchanged whatever the degree of CIT shifting, i.e., increases in secondary CIT revenue loss due to increased shifting must be just offset by increases in government expenditure savings resulting from the increase in shifting. For smaller CIT reductions increases in CIT shifting will require increased VAT revenues (secondary CIT revenue loss will exceed government expenditure savings) while revenue requirements will decline with increased shifting for greater CIT reductions (government expenditure savings will exceed secondary CIT revenue loss). In fact, as indicated in Table 3-1, the degree of CIT reduction for which VAT revenue is independent of shifting is in excess of 75 percent, but less than 85 percent. For $S = 75$ percent, a CIT shifting increase from zero to unity implies a 2.3 percent increase in required VAT revenue, while at $S = 85$ percent, required VAT revenue declines by 3.6 percent due to the change in shifting.

Note, however, the requirement that VAT revenue remain unchanged does *not* imply that the VAT rate remains unchanged as the CIT shifts. In fact, for the same reason that revenue is constant (the reduction in government expenditure due to shifted CIT savings equals the increase in secondary CIT revenue loss), the VAT rate must *increase*: the VAT base is reduced by increased CIT shifting due to the reduction in VAT-exclusive consumption prices.

The VAT *rate* will be invariant to CIT shifting only for the critical degree of CIT reduction at which the rate of decline of required VAT revenue due to CIT shifting is equal to the rate of CIT-shifting-induced decline in the VAT base. That is, there is a critical value for the degree of CIT reduction below which increases in CIT shifting imply increases in the VAT rate; either required VAT revenue rises (secondary CIT loss exceeds government expenditure savings) while the VAT base declines (due to reductions in VAT-exclusive consumption prices), or required VAT revenue declines (government ex-

Table 3-4. Percentage Changes in VAT Rates and Revenues for Given Changes in CIT Shifting and Differing Degrees of CIT Reduction (percent)

Change in CIT Shifting Parameter (α)	*Degree of CIT Reduction (S)*											
	25 Percent		*50 Percent*		*75 Percent*		*85 Percent*		*90 Percent*		*100 Percent*	
	Rate	*Revenue*	*Rate*	*Revenue*	*Rate*	*Revenue*	*Rate*	*Revenue*	*Rate*	*Revenue*	*Rate*	*Revenue*
From 0 to .2	6.5	6.1	3.8	3.2	1.3	.4	.3	-.7	-.2	-1.2	-1.1	-2.2
From .2 to .4	7.3	7.0	4.1	3.5	1.3	.4	.3	-.7	-.2	-1.2	-1.2	-2.3
From .4 to .6	8.4	7.9	4.6	3.8	1.4	.5	.3	-.7	-.2	-1.3	-1.2	-2.3
From .6 to .8	9.8	9.2	5.1	4.2	1.5	.5	.3	-.8	-.2	-1.3	-1.3	-2.4
From .8 to 1.0	11.7	10.9	5.7	4.7	1.6	.5	.4	-.8	-.2	-1.4	-1.3	-2.5

Note: Percentage changes are calculated as $\Delta Z/Z$ and $\Delta T_v/T_v$ for a given S, where Z is the VAT rate and T_v is VAT revenues.

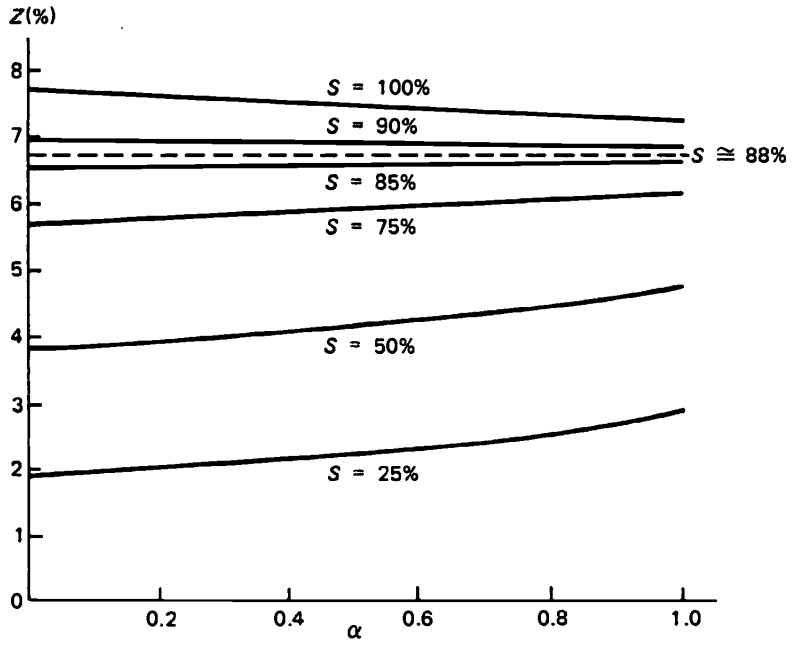

Figure 3-3. VAT Rate (Z) as Function of CIT Shifting Parameter (α), Given Degree of CIT Reduction (S)

penditure savings exceed secondary CIT loss) but less rapidly than the decline in the VAT base. Above that critical degree of CIT reduction, required VAT revenue declines *more rapidly* than the VAT base, implying a *reduction* in the VAT rate with increases in shifting.

By inspection, it is clear that the critical degree of CIT reduction at which the VAT rate is independent of CIT shifting ($\partial Z/\partial \alpha = 0$) is slightly less than 90 percent (between $S = 85$ percent and $S = 90$ percent). This can be seen clearly in Tables 3-1 and 3-4 and is graphically portrayed in Figures 3-3 and 3-4. In Figure 3-3 the VAT rate (Z) is related to the CIT shifting parameter (α), with the CIT reduction (S) held constant. For CIT reductions of less than 90 percent the slopes of these curves are positive (VAT rate rises with α), while above this level the slope is negative (the VAT rate declines with increases in α). In Figure 3-4 the relative change in the VAT rate due to an increase in CIT shifting from zero to unity is plotted as a function of the degree of CIT reduction. Again, it is clear that the change is *positive* (moving from $\alpha = 0$ to $\alpha = 1$) for CIT reductions of less than 90 percent but *negative* for reductions in excess of 90 percent.

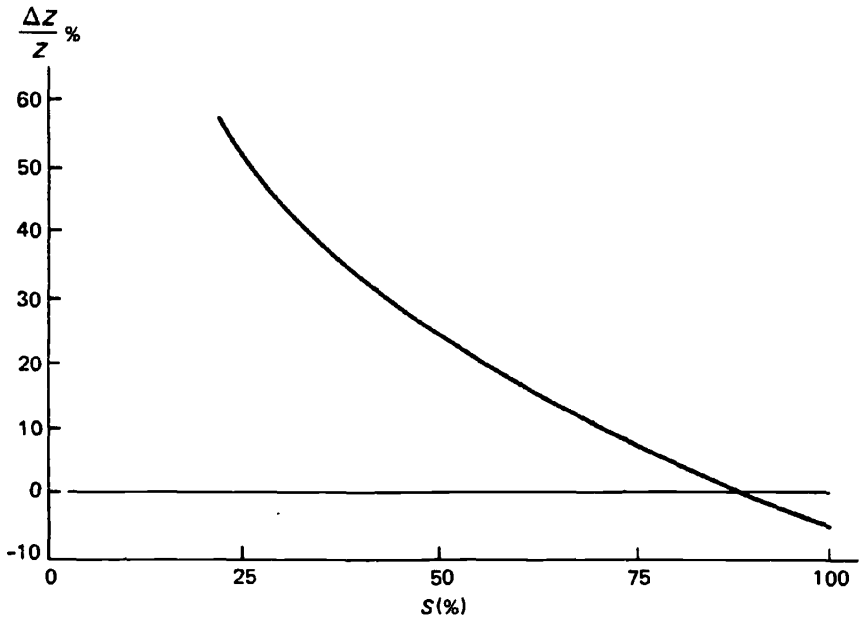

Figure 3-4. Relative Change in VAT Rate (Z) for Degrees of CIT Shifting (α), Moving from Zero to 100 Percent, as Function of Degree of CIT Reductions (S)

For a CIT reduction of between 85 and 90 percent the change due to increased CIT shifting is zero. This is also precisely the point of intersection of the curves in Figure 3-2, relating the VAT rate to the degree of CIT reduction, given specified values of α.

Determination of this VAT rate-CIT shifting invariance is significant because the degree of CIT shifting is an unknown and disputed parameter: since the sensitivity of the required VAT rate to CIT shifting is lower for larger than for smaller CIT reductions, and since the VAT rate is unchanged by CIT shifting at a CIT reduction of about 90 percent, therefore, the greater the weight placed on avoidance of unanticipated surpluses or deficits, the closer the degree of CIT reduction should be to 85-90 percent. In this range, the VAT rate would be approximately invariant to the unknown CIT shifting parameter. This conclusion is contrary to the usual predisposition toward marginal changes when uncertainty is great. Here, the almost unqualified rule is that, in order to obtain a high degree of certainty concerning the appropriate compensatory VAT rate, the degree of tax substitution must be very great.

Of course, factors other than unanticipated budgetary effects

must enter a decision to substitute a VAT for the CIT, e.g., redistributive, allocative, growth, and trade effects, but certainly significant weight must be given to aggregate demand effects.[2]

3.2 PRICE EFFECTS OF THE VAT-CIT SUBSTITUTION

The discussion in the preceding section of CIT-compensating VAT rates and revenues was in some sense premature. In fact, it has been impossible to discuss VAT rate determination without simultaneously considering the effects of the tax substitution, in particular of the CIT reduction, on prices. Specifically the effects of the tax substitution on the prices of government-purchased goods and services, which enter the VAT yield criterion through changes in government expenditure, and on consumption prices, which determine the magnitude of the VAT base, have entered into the determination of a compensatory VAT rate. However, in this section the price effects of the VAT-CIT substitution are examined in greater detail and more comprehensively. First, price indices by component of final demand are examined under alternative assumptions concerning the degree of CIT replacement and the extent of forward CIT shifting. Price effects are then disaggregated by modified Standard Industrial Classification two-digit industry groups. Finally, prices by commodity under the full 100-industry disaggregation are discussed.

3.2.1 Price Effects by Component of Final Demand

Post-tax-substitution indices by component of final demand are presented in Table 3-5 for four representative degrees of CIT reduction (S = 25, 50, 75, and 100 percent) under the full range of alternative CIT shifting assumptions. As has been discussed, final consumption prices are VAT-inclusive, while investment and export prices are VAT-exclusive (full credit against final VAT liabilities is permitted for VAT invoiced on these purchases). By convention government prices are treated as VAT-exclusive, since the VAT on government purchases is both government revenue and ex-

2. In this conclusion, it is assumed that the imposed VAT yield criterion, an unchanged nominal government surplus or deficit, would in fact be independent of the behavior of aggregate demand. However, increases in VAT-inclusive consumption prices might serve to depress consumption demand. Offsetting this, increases in after-tax profits or reductions in investment and export prices, or both, would stimulate investment, exports, and even possibly consumption (via higher dividends and capital gains).

Table 3–5. Aggregate Price Indices, by Category of Final Demands, for Alternative Degrees of CIT Reduction and Shifting (percent)

CIT Shifting Parameter (α)	*VAT Rate* (Z)	*Price Indices*						
		P_c						
		VAT-Inc.	*VAT-Exc.*	P_I	P_R	P_E	P_F	P_{SL}
		CIT Reduction of 25 Percent						
0.0	1.92	101.92	100.00	100.00	100,00	100.00	100.00	100.00
0.2	2.04	101.76	99.73	99.71	99.76	99.71	99.71	99.74
0.4	2.19	101.57	99.39	99.36	99.48	99.36	99.37	99.43
0.6	2.38	101.34	98.98	98.93	99.15	98.94	98.96	99.06
0.8	2.61	101.05	98.48	98.42	98.75	98.42	98.44	98.61
1.0	2.91	100.69	97.84	97.76	98.24	97.74	97.79	98.04
		CIT Reduction of 50 Percent						
0.0	3.84	103.84	100.00	100.00	100.00	100.00	100.00	100.00
0.2	3.99	103.42	99.45	99.43	99.54	99.44	99.44	99.49
0.4	4.15	102.95	98.85	98.79	99.02	98.80	98.81	98.92
0.6	4.34	102.42	98.16	98.07	98.45	98.09	98.11	98.28
0.8	4.56	101.82	97.38	97.25	97.81	97.28	97.31	97.57
1.0	4.82	101.14	96.49	96.32	97.08	96.34	96.39	96.75
		CIT Reduction of 75 Percent						
0.0	5.76	105.76	100.00	100.00	100.00	100.00	100.00	100.00
0.2	5.83	104.99	99.21	99.16	99.32	99.18	99.18	99.25
0.4	5.91	104.18	98.37	98.28	98.61	98.30	98.32	98.46
0.6	6.00	103.32	97.47	97.34	97.86	97.38	97.41	97.63
0.8	6.09	102.41	96.53	96.36	97.07	96.41	96.44	96.75
1.0	6.19	101.45	95.54	95.31	96.23	95.37	95.42	95.83

Table 3-5 continued

CIT Shifting Parameter (α)	*VAT Rate* (Z)	*Price Indices*						
		P_c						
		VAT-Inc.	*VAT-Exc.*	P_I	P_R	P_E	P_F	P_{SL}
		CIT Reduction of 100 Percent						
0.0	7.68	107.68	100.00	100.00	100.00	100.00	100.00	100.00
0.2	7.59	106.48	98.97	98.91	99.11	98.93	98.94	99.03
0.4	7.50	105.28	97.93	97.82	98.24	97.86	97.88	98.05
0.6	7.41	104.08	96.90	96.73	97.36	96.79	96.82	97.08
0.8	7.32	102.88	95.86	95.64	96.47	95.72	95.75	96.10
1.0	7.22	101.68	94.83	94.55	95.59	94.65	94.69	95.13

Note: P = aggregate price index; C = personal consumption expenditures; I = private nonresidential fixed investment; R = private residential structures; E = exports; F = federal government expenditures; SL = expenditures by state and local governments.

penditure, and thus cancels out. Investment is decomposed into (a) business plant and equipment and (b) private residential structures. Government is disaggregated into federal and state-local components. Finally, in a departure from conventional input-output practice, the indices represent *purchaser* prices (inclusive of trade and transportation margins) rather than *producer* prices (exclusive of trade and transportation margins).[3]

The interrelationship between degree of CIT reduction, CIT shifting, and prices is somewhat simpler than that between CIT reduction and shifting and VAT rates and revenues. Because all purchasers are assumed to face identical VAT-exclusive prices, and because the VAT is assumed to be fully shifted forward, price changes for components of final demand not ultimately subject to the VAT, i.e., all components *other than consumption*, reflect *only* the effects of the CIT reduction.[4]

The estimated price effects of tax substitution by component of final demand can be rather briefly summarized. First, regardless of the degree of CIT reduction, in the absence of CIT shifting, VAT-exclusive nonconsumption prices remain unchanged (index = 100.0), and VAT-inclusive consumption prices rise by the rate of the VAT. For example, with complete CIT removal and no CIT shifting the required VAT rate is 7.68 percent and the resultant VAT-inclusive consumption price index is 107.68.

Secondly, for any given (positive) degree of CIT reduction, VAT-exclusive prices decline continuously (VAT-inclusive prices rise by less) as forward CIT shifting increases. Again, the extreme of complete CIT elimination provides a case in point: With zero CIT shifting nonconsumption deflators are, by definition, unity; with unitary shifting, deflators for the VAT-exempt components of final demand decline to between 94.5 and 95.6. With zero shifting and CIT repeal the VAT-inclusive consumption index is 107.68, which falls with complete CIT shifting to 101.68. Note that this price decline is only marginally due to the decline in the VAT rate, which falls only from 7.68 percent (zero CIT shifting) to 7.22 percent (full CIT shifting).

3. Thus, trade and transportation services associated with purchases from other industries are treated as intermediate goods rather than as components of final demand.

4. As discussed previously, if the VAT were *not* assumed to be fully shifted, then introduction of the VAT would reduce *VAT-exclusive* prices of consumption goods. Since firms would find it impossible to segregate sales ultimately entering consumption from sales ultimately entering components of final demand effectively exempt from the VAT, maintenance of the assumption of identical VAT-exclusive prices for all purchasers would continue to be justified, implying a decline in the effective prices of VAT-exempt purchases, solely as a result of imposition of the (unshifted) VAT.

Even with lower degrees of CIT reduction (less than 85 to 90 percent), for which the VAT rate *rises* with increases in forward CIT shifting, the benefit of forward CIT shifting outweighs the increase in the VAT rate, resulting in a *net* decline in VAT-inclusive consumption prices as CIT shifting increases. For example, with a CIT reduction of 25 percent the VAT rate *rises* from 1.92 to 2.91 percent as CIT shifting rises from zero to 1.0, but consumption prices nonetheless *decline* from 101.9 to 100.7. Thus, the 1 percent increment in the VAT rate is more than offset by the 1.2 percent reduction in VAT-exclusive consumption prices resulting from the full forward shifting of the CIT. This differential decline occurs because consumers benefit from the shifting of both the primary and secondary CIT revenue loss, while the VAT rate rises to compensate only for the *excess* of the secondary CIT loss over the reduction in government expenditure. This increase in required VAT revenue due to CIT shifting is less than the benefit to consumers of the shifted CIT reduction but large enough relative to the now-reduced VAT base to require a significant increment in the VAT rate.

Thirdly, given any positive CIT shifting, of the exempt components of final demand, business investment in plant and equipment benefits most from the substitution of an economy-wide consumption-type VAT for the corporation-focused CIT, while net residential capital formation benefits least. In between, ranked from highest to lowest degree of price reduction, are federal government expenditures, exports, and state-local government expenditures. The relative price changes of these five exempt components are rather easily explained:

The small price reduction for residential investment reflects the combination of high labor intensity of the housing construction industry and its largely unincorporated structure. Even when contractors are incorporated, much of the work is subcontracted to unincorporated enterprises. Most of the price reduction in this sector is due to reductions in the prices of fabricated inputs, but the high degree of direct labor intensity minimizes the effect of these reductions on final output prices. Similar factors probably explain the somewhat smaller-than-average reduction in state-local government prices.

The tax substitution has a greater effect on investment than on government and export prices primarily because unincorporated enterprise is not important in either capital goods or intermediate supplier industries, and these industries have high capital-output ratios and hence high ratios of profit to value added. In general the corporate profit tax liability of the "own industry" (as opposed to

intermediate supplier industries) is the most significant element in the explanation of the effect of the tax substitution on prices, and this importance appears very clearly in the case of investment in plant and equipment.

It is interesting that the greatest *VAT-exclusive* price reductions are observed in the case of private consumption. (VAT-exclusive consumption prices are obtained by dividing P_c by $1 + Z$, and are approximated by subtracting the VAT rate from P_c.) As will be observed below, this is primarily explained by the significant CIT shifting benefits in the consumer-durable and communications industries. Of course, the imposition of the VAT liability on consumption purchases invariably (and necessarily) results in increases in VAT-inclusive prices over the level of pre-tax-substitution consumption prices. Only if the entire benefit of the CIT reduction were shifted to consumption *alone* would the aggregate consumption price index be unaffected by the tax substitution.

3.2.2 General Relationships Between Price Change; CIT Reduction, Shifting and Initial Rates; and Profit Shares

Before examining the actual industry and commodity price changes which can be anticipated under alternative assumptions concerning CIT reduction and shifting, the general nature of the output-price consequences of the tax substitution must be considered. Specifically, we are concerned with the general interrelationships among (a) CIT reduction, (b) CIT shifting, (c) the profit share of price, and (d) the effective CIT rate. We first consider a very simple situation, one in which there are no intermediate goods and price is determined only by value added in the given industry. Although rarefied, this simple model is formally compatible with the more general interindustry model developed in the preceding chapter (section 2.6), but it is mathematically simpler. Further, while the effects of the tax substitution on the price in one industry will in fact depend on changes in CIT rates and on CIT shifting in other industries, it will be discovered that the price effects of the tax substitution will primarily reflect changes in "own industry" CIT liabilities and shifting. Because value added contributed by the "own industry" is so predominant in virtually all cases, the simplification considered here introduces only minor violations of the true relationships. Of course, the empirical analysis employs the fully articulated interindustry model.

In contrast to the preceding discussion of aggregate indices of purchaser prices, the initial focus here is on changes in VAT-ex-

clusive producer prices. Because it is invariably assumed that the VAT is fully shifted forward and that VAT-exclusive producer prices are identical for all purchasers, changes in these prices are due entirely to the reduction and shifting of the corporate income tax. The response of the producer prices to CIT reduction and shifting is somewhat complex, necessitating a return to the simplified model developed in section 2.4, above. In the interest of clarity, the important features of that discussion can be quickly repeated. It is assumed in the following discussion that the CIT shifting parameter, the pre-tax-substitution CIT rate, and the degree of CIT reduction are mutually independent.

It will be recalled that the CIT shifting parameter (α) was defined as the ratio of the change in gross profit to the change in tax liability, i.e.,

$$\alpha = \frac{\pi - \pi'}{t\pi - t'\pi'} \tag{3-1}$$

where π is gross profit, t is the CIT rate, and the primes ($'$) represent post-tax-change values. The change in profit ($\Delta\pi$) is then,

$$\Delta\pi = \pi - \pi' = \frac{\alpha}{(1 - \alpha t')}(t - t')\pi \tag{3-2}$$

Denoting the relative reduction in the CIT rate by $s(= S/100)$, i.e., $t' = (1 - s)t$, equation (3-2) can be rewritten,

$$\Delta\pi = \frac{\alpha s t}{1 - \alpha(1 - s)t}\pi. \tag{3-2a}$$

If profit is expressed per unit of output, e.g., 10 cents per dollar's worth of widget; if output is measured by value at pre-tax-change prices so that the initial pre-tax-substitution price is unity by definition; and if components other than profit (e.g., the wage component) of value added (i.e., price in the absence of intermediate goods) are unaffected by the tax substitution, then the absolute change in gross profit is equal to the proportionate change in price, i.e., $\Delta\pi = \Delta P$ and $\Delta P/P = \Delta P$, since $P = 1$.[5] Thus, the basic equation, relating

5. The percentage change in *profit* of course depends on the initial level of profit.

the price change (absolute and relative) to CIT shifting, initial rates, and degree of reduction, becomes

$$\Delta P = \frac{\alpha st}{1 - \alpha(1 - s)t}\pi. \tag{3-3}$$

Our interest here is in the effects of α, s, and t on the change in price. To do so, we shall develop ten rules for evaluating the change in ΔP relative to unit changes in each of these parameters. Note that since the change in profit has been defined as $\pi - \pi'$ (gross profit before the tax substitution minus gross profit afterward), ΔP indicates a relative *decline* in price.

Effect of Increased CIT Shifting. An increase in the CIT shifting parameters (α) results in an increase in the price-reduction benefits of the CIT reduction, i.e., in ΔP, experessed by the partial derivative of ΔP with respect to α:

$$\frac{\partial \Delta P}{\partial \alpha} = \frac{st\pi}{[1 - \alpha(1 - s)t]^2} \tag{3-4}$$

This expression is necessarily positive.

To determine whether the rate of increase in the price reductions is increasing or decreasing as α(CIT shifting) increases, consider the following equation, from which two rules can be derived:

$$\frac{\partial^2 \Delta P}{\partial \alpha^2} = \frac{2St^2\pi(1 - s)}{[1 - \alpha(1 - s)t]^3}. \tag{3-5}$$

Rule 1. If the CIT is fully removed ($s = 1$) then the reduction in price is *proportionate* to the CIT shifting parameter α. The change in ΔP with respect to α is independent of the value of α, i.e., from equations (3-4) and (3-5):

$$\frac{\partial \Delta P}{\partial \alpha} = t\pi \text{ and } \frac{\partial^2 \Delta P}{\partial \alpha^2} = 0 \text{ if } s = 1. \tag{3-6}$$

Rule 2. If the CIT is only partially removed ($s < 1$), then the increase in price reduction is *more than proportionate* to the increase in α, since equation (3-5) is positive for values of s less than unity, i.e., $(\partial^2 \Delta P/\partial \alpha^2) > 0$ if $s < 1$. Thus, ΔP increases at an increasing rate with increases in α if the CIT is not completely removed.

Now, consider the effect of the pre-tax-substitution effective CIT rate (t), which is observed to differ by industry, on the relationship between ΔP (price reduction) and CIT shifting (α). Rule 3 is obtained by differentiating equation (3-4) with respect to t:

$$\frac{\partial^2 \Delta P}{\partial t \, \partial \alpha} = \frac{s\pi(1 + \alpha t - \alpha s t)}{[1 - \alpha(1 - s)t]^3} > 0. \tag{3-7}$$

Rule 3. The rate of change in price with respect to CIT shifting is an *increasing function* of the initial CIT rate, i.e., the greater the initial CIT rate, the greater the price-reduction benefits of an increase in CIT shifting, regardless of the degree of CIT reduction.

Alternatively, consider the effect on the relationship between price and CIT shifting exerted by an increase in s (degree of CIT removal). Rule 4 is obtained by first differentiating equation (3-4) with respect to s:

$$\frac{\partial^2 \Delta P}{\partial s \, \partial \alpha} = \frac{t\pi(1 - \alpha t - \alpha s t)}{[1 - \alpha(1 - s)t]^3}. \tag{3-8}$$

By inspection, (3-8) is seen to be necessarily positive for s less than or equal to one. Thus;

Rule 4. The change in price with respect to CIT shifting is an increasing function of the degree of CIT reduction.

Effect of Increased CIT Reduction. From equation (3-3), the effect on prices of an increase in CIT reduction (s) is simply:

$$\frac{\partial \Delta P}{\partial s} = \frac{\alpha t \pi(1 - \alpha t)}{[1 - \alpha(1 - s)t]^2}, \tag{3-9}$$

which has the following property:

$$\frac{\partial \Delta P}{\partial s} \gtreqless 0 \text{ as } \alpha \gtreqless 0.$$

Thus,

Rule 5. Reductions in the CIT, from whatever CIT level, will not affect prices if the CIT is not shifted ($\alpha = 0$).

Rule 6. With positive CIT shifting, price reduction will accompany any increase in CIT reduction.

Whether rate of reduction of price increases or decreases with increases in the degree of CIT reduction is less obviously determined. Specifically, from equation (3-9),

$$\frac{\partial^2 \Delta P}{\partial S^2} = -\frac{2\alpha^2 t^2 \pi(1 - \alpha t)}{[1 - \alpha(1 - s)t]^3} < 0; \tag{3-10}$$

Rule 7. Prices decline at a decreasing rate as the CIT is reduced.

Finally, consider the response of prices to a CIT reduction if, first, the degree of CIT shifting is increased, and second, initial CIT rates are increased. From equation (3-9),

$$\frac{\partial^2 \Delta P}{\partial \alpha \, \partial s} = \frac{t\pi(1 - \alpha t - \alpha st)}{[1 - \alpha(1 - s)t]^3} > 0; \tag{3-11}$$

and

$$\frac{\partial^2 \Delta P}{\partial t \, \partial s} = \frac{\alpha\pi(1 - \alpha t - \alpha st)}{[1 - \alpha(1 - s)t]^3} > 0. \tag{3-12}$$

Thus,

Rule 8. The effect of a given CIT reduction on prices is greater the greater the degree of forward CIT shifting [equation (3-11)]; and

Rule 9. The effect of a given CIT reduction on prices is greater the greater the initial CIT rate [equation 3-12)].

Effects of Initial Profit Share of Price. Finally, Rule 10 is obtained by differentiating equations (3-4) and (3-9) with respect to gross profit per unit of output (or equivalently, the profit share of price):

$$\frac{\partial^2 \Delta P}{\partial \pi \, \partial \alpha} = \frac{st}{[1 - \alpha(1 - s)t]^2} > 0, \tag{3-13}$$

and

$$\frac{\partial^2 \Delta P}{\partial \pi \, \partial s} = \frac{\alpha t(1 - \alpha t)}{[1 - \alpha(1 - s)t]^2} > 0. \tag{3-14}$$

Rule 10. The price reduction resulting from *either* an increase in CIT shifting or an increase in the degree of CIT removal is *greater* the greater the profit share of final output price.

While much of the foregoing is obvious, it is nonetheless useful to make explicit the necessary relationships between these variables. Also, although the relationships were developed under the artificial assumption that only the own-industry CIT effect mattered (on the assumption that there are no interindustry transactions), in fact the dominance of own-industry CIT liability embodied in final output price is so great that in most cases only slight violence to reality results from ignoring interindustry CIT shifting. This point is demonstrated in Table 3-6, in which own-industry CIT liability (prior to the tax change) is compared to the total direct and indirect CIT liability embodied in final output price (also prior to the tax change), for two-digit industries: in over half of the cases, the own-industry CIT accounts for over 40 percent of the total CIT liability. Thus, virtually all of the relationships developed above can be applied to individual industries on the basis merely of own-industry characteristics. Differential *relative* price effects (across industries) are almost entirely explained by differential intraindustry phenomena, and the deviations caused by interindustry effects are small enough to be disregarded.

3.2.3 Price Effects by Industry

To obtain a clearer understanding of the sources of these projected price effects of a VAT-CIT substitution, we developed a modified two-digit industry classification. This provides a useful intermediate level of industry and commodity disaggregation and smooths the transition to the full 100-industry disaggregation used in our input-output model.

Table 3-7 contains percentage reductions in producer prices (exclusive of VAT) for two-digit industries for different degrees of CIT reduction and shifting.[6] Because producer prices change only if the CIT is partially or fully shifted (Rule 5), the case of zero shifting is trivial and can be ignored. Attention is restricted to three representative degrees of shifting (α = 0.2, 0.6, and 1.0). Producer prices of imports are also disregarded, since importes are not subject to the CIT (i.e., t = 0).

As indicated by Rules 3, 9, 10, the magnitude of the price reduction resulting from any degree of CIT reduction and shifting is greater the greater the initial effective CIT rate (direct and indirect, i.e., of own and intermediate supplier industries) and the greater the

6. The 100 industries were grouped into 34 using final demand (sales) as weights. The resultant classification is virtually the same as Aaron's.

Table 3-6. Own- and Other-Industry CIT Liabilities as Proportions of Final-Output Price (modified two-digit industry classification)

Industry	CIT Liabilities as Percentage of Price			Ratio: Col. (2) to Col. (1) (per cent)
	Total CIT (1)	Own Industry (2)	Other Industry (3)	(4)
1 AGRICULTURE	2.20	0.20	2.00	9.65
2 METAL MINING	3.75	0.97	2.78	25.93
3 COAL,STONE,AND CLAY	5.96	3.62	2.34	59.31
4 OIL AND GAS	4.51	-0.17 [a]	4.70	-4.11
5 CONSTRUCTION	4.31	1.10	3.21	25.44
6 ORDNANCE	5.14	1.75	3.39	34.06
7 FOOD	4.14	1.26	2.88	28.87
8 TOBACCO	9.24	7.40	1.84	80.13
9 TEXTILES + APPAREL	5.80	1.87	3.93	32.32
10 LUMBER + WOOD PRODUCTS	5.05	3.22	1.83	64.08
11 FURNITURE + FIXTURES	5.74	2.36	3.38	41.34
12 PAPER + PRODUCTS	7.16	4.01	3.15	56.05
13 PRINTING + PUBLISHING	7.61	4.38	3.23	57.56
14 CHEM,PLAS,DRUGS, + PAINTS	10.54	7.21	3.33	68.06
15 RUBBER + LEATHER	6.42	3.60	2.82	56.06
16 FOOTWEAR	4.86	1.73	3.13	35.55
17 PRIMARY METAL	4.84	2.16	2.68	44.11
18 FABRICATED METAL	6.45	3.67	2.78	56.88
19 NONELECTRICAL MACHINERY	6.22	4.40	1.82	70.80
20 ELECTRICAL EQUIPMENT	6.87	5.43	1.45	79.07
21 TRANS.EQUIPMENT	6.10	3.55	2.55	56.58
22 INSTRUMENTS	8.74	6.77	1.97	77.39
23 MISC MANUFACTURING	5.27	2.02	3.25	38.37
24 TRANS + WAREHOUSING	3.30	1.51	1.79	45.65
25 COMMUNICATIONS	11.86	10.63	1.23	89.63
26 UTILITIES	9.56	7.21	2.35	75.52
27 FINANCE + INSURANCE	16.30	14.13	2.17	86.66
28 REAL ESTATE + RENTAL	2.19	0.67	1.52	30.47
29 HOTELS + SERVICES	4.34	0.93	3.41	21.40
30 AUTO REPAIR + SERVICES	3.72	1.12	2.60	30.06
31 AMUSEMENTS	2.82	0.45	2.37	15.96
32 MEDICAL,EDUCATION, + NONPROFIT ORG	2.23	-0.07 [a]	2.31	-3.58
33 MISCELLANEOUS	1.08	0.06	1.01	5.56
34 IMPORTS	0.00	0.00	0.00	0.00

[a] See Section A.5 for explanation.

Table 3-7. Percentage Reductions in VAT-Exclusive Producer Prices, for Alternative Degrees of CIT Reduction (S) and Shifting (α), by Two-Digit Aggregated Industry Classification[a]

Industry	S = 25%			S = 50%			S = 75%			S = 100%		
	α=.2	α=.4	α=1.0	α=.2	α=.6	α=1.0	α=.2	α=.6	α=1.0	α=.2	α=.6	α=1.0
1 AGRICULTURE	0.12	0.44	0.94	0.23	0.79	1.51	0.34	1.08	1.91	0.44	1.32	2.20
2 METAL MINING	0.20	0.73	1.52	0.40	1.32	2.51	0.58	1.83	3.22	0.75	2.25	3.75
3 COAL,STN,CLAY MNG+PROD	0.32	1.14	2.36	0.62	2.09	3.94	0.92	2.89	5.08	1.19	3.57	5.96
4 OIL + GAS	0.24	0.83	1.68	0.47	1.55	2.86	0.69	2.16	3.77	0.90	2.71	4.51
5 CONSTRUCTION	0.23	0.83	1.71	0.45	1.51	2.85	0.66	2.09	3.58	0.86	2.59	4.31
6 ORDNANCE	0.28	1.01	2.13	0.54	1.83	3.49	0.79	2.51	4.44	1.03	3.08	5.14
7 FOOD	0.22	0.82	1.75	0.44	1.48	2.83	0.64	2.02	3.58	0.83	2.48	4.14
8 TOBACCO	0.51	1.86	4.11	0.96	3.36	6.52	1.43	4.56	8.11	1.85	5.55	9.24
9 TEXTILES + APPAREL	0.32	1.14	2.40	0.61	2.07	3.94	0.90	2.84	5.01	1.16	3.48	5.80
10 LUMBER,WOOD PRODUCTS	0.27	0.93	1.86	0.53	1.73	3.20	0.77	2.42	4.23	1.01	3.03	5.05
11 FURNITURE + FIXTURES	0.31	1.12	2.34	0.61	2.03	3.87	0.88	2.80	4.94	1.15	3.45	5.74
12 PAPER + PRODUCTS	0.37	1.39	2.88	0.76	2.53	4.78	1.10	3.49	6.14	1.43	4.29	7.16
13 PRINTING + PUBLISHING	0.31	1.50	3.18	0.80	2.72	5.19	1.17	3.72	6.59	1.52	4.57	7.61
14 CHEM.,PLAST.,DRUGS,PNT	0.52	2.10	4.49	1.12	3.78	7.27	1.62	5.17	9.17	2.11	6.33	10.54
15 RUBBER + LEATHER	0.35	1.27	2.69	0.68	2.30	4.39	0.99	3.14	5.56	1.29	3.85	6.42
16 FOOTWEAR	0.26	0.95	2.00	0.51	1.73	3.29	0.75	2.37	4.19	0.97	2.92	4.86
17 PRIMARY METAL	0.26	0.93	1.92	0.51	1.70	3.20	0.74	2.34	4.13	0.97	2.90	4.34
18 FABRICATED METAL	0.35	1.27	2.67	0.68	2.29	4.37	1.00	3.15	5.57	1.29	3.87	6.49
19 NONELECT. MACHINERY	0.34	1.23	2.60	0.66	2.22	4.24	0.96	3.04	5.37	1.24	3.73	6.23
20 ELECTRICAL EQUIPMENT	0.38	1.36	2.90	0.73	2.46	4.71	1.06	3.35	5.96	1.37	4.12	6.87
21 TRANSP. EQUIPMENT	0.33	1.20	2.54	0.65	2.18	4.15	0.94	2.99	5.27	1.22	3.66	6.10
22 INSTRUMENTS	0.47	1.73	3.68	0.93	3.13	5.99	1.35	4.25	7.58	1.75	5.24	8.74
23 MISC. MANUFACTURING	0.29	1.03	2.16	0.56	1.87	3.55	0.81	2.57	4.54	1.05	3.16	5.27
24 TRANSP. + WAREHOUSING	0.18	0.71	1.74	0.35	1.24	2.49	0.51	1.65	2.96	0.66	1.98	3.30
25 COMMUNICATIONS	0.64	2.34	4.96	1.25	4.24	8.10	1.83	5.80	10.27	2.37	7.12	11.86
26 UTILITIES	0.51	1.83	3.73	1.00	3.35	6.26	1.47	4.63	8.14	1.91	5.74	9.56
27 FINANCE + INSURANCE	0.89	3.32	7.26	1.73	5.93	11.52	2.52	8.04	14.32	3.26	9.78	16.30
28 REAL ESTATE + RENTAL	0.12	0.43	0.91	0.23	0.78	1.49	0.34	1.07	1.89	0.44	1.31	2.19
29 HOTELS + SERVICES	0.24	0.85	1.78	0.46	1.54	2.93	0.67	2.12	3.74	0.87	2.61	4.34
30 AUTO REPAIR + SERVICES	0.20	0.73	1.54	0.39	1.33	2.53	0.57	1.82	3.21	0.74	2.23	3.72
31 AMUSEMENTS	0.16	0.59	1.44	0.30	1.04	2.06	0.44	1.40	2.50	0.56	1.69	2.82
32 MED.,ED.SERV.+NONPROF.	0.12	0.44	0.93	0.23	0.79	1.52	0.34	1.09	1.92	0.45	1.34	2.23
33 MISCELLANEOUS	0.06	0.21	0.45	0.11	0.39	0.73	0.17	0.53	0.95	0.22	0.65	1.09
34 IMPORTS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Note: Reductions in prices are for all components of final demand in VAT-exclusive producer prices: if $\alpha = 0$, there are no price changes.

[a]Industries correspond closely to the SIC two-digit classification and to that employed by Aaron.

initial level of gross-of-tax profits (also direct and indirect). Thus, in comparing industries the relative price reduction will be greater the larger the total initial CIT component of output price (first column of Table 3-6), regardless of the degree of CIT reduction and (positive) shifting.

In general, the dominant *own-industry* CIT coefficient will depend upon gross-of-tax profit as a proportion of value added in the industry, which will in turn depend upon:

1. The capital intensity of the industry and the rate of capital turnover (or equivalently, the capital-output ratio);
2. The rate of return to capital in the industry;
3. The extent of incorporation in the industry, as measured, e.g., by the corporate proportion of industry sales or of industry value added (gross product originating); and
4. The CIT rate (affected by the special corporate tax treatment given to some industries, e.g., oil depletion allowances).

These characteristics of supplier industries similarly serve to determine the "other-industry" component of the total CIT coefficient.

The largest price reductions are observed, then, in those industries which are most highly incorporated and capital-intensive. Assuming CIT repeal and complete forward CIT shifting, the largest price reductions are found in communications (11.9 percent), chemicals (10.5 percent), utilities (9.6 percent), and tobacco processing (9.2 percent), all noted for both extreme incorporation and relatively large profit shares of value added (capital intensity).[7] Correspondinly, the smallest price reductions occur in unincorporated, relatively labor-intensive industries: real estate and rental (2.2 percent), agriculture (2.2 percent), medical, educational, and related services (2.2 percent), and amusements (2.8 percent). The real estate industry may in addition be subject to preferential CIT treatment (depreciation, capital gains, etc.); the small price effect may then represent an artifically low effective CIT rate, even considering the degree of incorporation.

As has been explained, if the CIT is repealed, the percentage price reduction in any industry is simply proportionate to the CIT shifting parameter (Rule 1). A fivefold increase in shifting (from $\alpha = 0.2$ to $\alpha = 1$) then implies a fivefold increase in the percentage price reduction. For example, agricultural prices decline by 0.44

7. The largest reduction, 16.3 percent in finance and insurance, is primarily due to the definition of gross product originating; see Appendix A.

percent if the CIT is shifted only 20 percent ($\alpha = 0.2$), but by 2.2 percent if the CIT is fully shifted. Communications prices, on the other hand, decline by 2.37 percent under 20 percent shifting but by 11.86 percent in the case of full CIT shifting.

If the CIT is not completely repealed, however, the change in price is more than proportionate to the change in CIT shifting (Rule 2). For example, with a 50 percent reduction in CIT rates a change in α (the CIT shifting parameter) from 0.2 to 1 (a 400 percent increase in the degree of CIT shifting) results in a 557 percent increase in the magnitude of the agricultural price reduction; in communications, the figure is 548 percent. The *absolute* price reduction is, of course, greater in communications than in agriculture (6.85 percentage points vs. 1.28 points), since the effective CIT rate is higher and the profit share of value added is larger in the former industry than in the latter (see Rules 3 and 10).

Similarly, the effect of an increase in the degree of CIT shifting is observed to be greater the greater the reduction in effective CIT rates (Rule 4). Communications again provides a case in point: The absolute increase in the magnitude of price reduction resulting from an increase in the degree of CIT shifting from 0.2 to 1 is 6.85 percentage points if effective CIT rates are halved ($S = 50$ percent), but 9.49 percentage points if the CIT is completely repealed.

That price reductions are greater the greater the degree of CIT reduction (Rule 6) should be obvious. Thus, assuming full shifting of the CIT, a 50 percent reduction in CIT rates results in a price reduction of 1.5 percent in agriculture, while CIT repeal reduces prices in this industry by 2.2 percent. In communications, under similar assumptions, the respective reductions are 8.1 percent and 11.9 percent. Note, however, that the increased degree of price reduction is less than proportionate to the percentage increase in the CIT reduction (Rule 7): in both agriculture and communications, doubling the CIT reduction (from 50 percent to complete repeal) increases the price reduction only by about 46 percent.

That an increase in S reduces prices more when shifting is great (Rule 8) is apparent in the communications industry: with a shifting parameter of 0.2, prices decline by 1.25 percent when CIT rates are reduced by 50 percent; if the CIT is repealed, prices decline by 2.37 percent. The percentage point increment due to the increase in S is thus about 1.12 percent. However, with full CIT shifting, this increment increases to 3.8 percentage points (price reduction rises from 8.1 percent to 11.9 percent as a result of the increase in S). In agriculture, similarly, this percentage point in-

crement due to a move from 50 percent CIT reduction to repeal is less than 0.2 percent if the shifting parameter is 0.2 (price reductions of 0.23 percent versus 0.44 percent) but 0.7 percent (price reductions of 1.5 percent versus 2.2 percent) if the CIT is fully shifted. The smaller magnitude of the price reduction in agriculture than in communications reflects the less important role of corporate profits and the lower effective (direct and indirect) CIT rate in the agricultural sector.

Producer price reductions by input-output sector (104 industries), under the alternative CIT reduction and shifting assumptions, are given in Table 3-8. A comparison of the price changes by input-output sector and by two-digit industry indicates that very little information is lost by restricting discussion to the higher level of aggregation. Of course, variations in producer price reductions (assuming, e.g., full CIT reduction and shifting) are observed within a two-digit classification. For example, the average price reduction of 6.2 percent in the nonelectrical machinery industry is the result of ten individual industry price reductions ranging from 5.9 percent (special industrial machinery) to 8 percent (machine shop products). Similarly, price reductions in foods range from 3.1 percent (meat products) to 5.2 percent (beverages), with a weighted average of 4.1 percent. However, the two-digit aggregation in general more than compensates in comprehensibility for its loss of detail. Nevertheless, variation within two-digit classifications is certainly significant in particular cases.

Although the producer prices discussed above exclude trade and transportation margins, these are relatively minor components of final purchase prices facing government, investment, and export purchasers. Thus, producer price reductions provide close approximations of purchaser price reductions for those components of final demand which are not subject to a net VAT liability. Of course, the two-digit indices would differ somewhat for each of the three final demand components due to differences in the weights applied to the individual industries.

Consumption, however, must be treated separately. First, markups (trade and transportation margins) are a much more important component of final sale price. More importantly, these purchases alone are subject to a full VAT liability, not offset by rebates or credits. Thus, on both counts, final VAT-inclusive consumption prices will necessarily diverge from VAT-exclusive producer prices.

Percentage consumer price *increases* (VAT-inclusive), under alternative CIT reduction and shifting assumptions, are displayed by

Table 3-8. Percentage Reductions in VAT-Exclusive Producer-Prices, for Alternative Degrees of CIT Reduction (*S*) and Shifting (α), by Industry

Industry	S = 25%			S = 50%			S = 75%			S = 100%		
	α=.2	α=.6	α=1.0	α=.2	α=.6	α=1.0	α=.2	α=.6	α=1.0	α=.2	α=.6	α=1.0
1 LIVESTOCK	0.14	0.53	1.13	0.28	0.95	1.82	0.41	1.30	2.30	0.53	1.60	2.66
2 OTHER AGRICLTURE	0.11	0.40	0.86	0.21	0.73	1.39	0.31	0.99	1.76	0.41	1.22	2.03
3 FOREST + FISHERY	0.13	0.47	1.03	0.25	0.85	1.64	0.36	1.16	2.05	0.47	1.41	2.35
4 AG ETC SERVICE	0.16	0.58	1.25	0.30	1.03	2.00	0.44	1.40	2.50	0.57	1.71	2.86
5 IRON MINING	0.21	0.75	1.58	0.41	1.37	2.60	0.60	1.89	3.33	0.78	2.33	3.88
6 NONFERROUS MINING	0.19	0.70	1.45	0.38	1.27	2.40	0.55	1.75	3.08	0.72	2.16	3.60
7 COAL MINING	0.23	0.79	1.59	0.44	1.46	2.71	0.65	2.04	3.56	0.85	2.54	4.23
8 CRUDE PETROLEUM-GAS	0.35	1.19	2.32	0.69	2.22	4.05	1.01	3.14	5.45	1.32	3.97	6.62
9 STONE-CLAY MINING	0.23	0.81	1.63	0.46	1.51	2.79	0.67	2.11	3.68	0.88	2.64	4.39
10 CHEMICAL ETC MINERALS	0.24	0.85	1.72	0.47	1.56	2.90	0.69	2.18	3.81	0.90	2.71	4.52
11 RESIDENTIAL BUILDING	0.24	0.85	1.76	0.46	1.55	2.92	0.68	2.14	3.77	0.88	2.64	4.41
12 PRIVATE INDUST BUILD	0.23	0.84	1.74	0.45	1.52	2.88	0.66	2.10	3.70	0.86	2.59	4.32
13 OTHER PRI NON-RES BUILD	0.24	0.87	1.80	0.47	1.58	2.99	0.69	2.18	3.85	0.90	2.70	4.50
14 OTHER PRIVATE CONST	0.21	0.74	1.54	0.40	1.35	2.55	0.59	1.87	3.29	0.77	2.31	3.85
15 PUBLIC NON-RES BUILDINGS	0.26	0.91	1.87	0.50	1.66	3.12	0.73	2.30	4.04	0.95	2.84	4.74
16 HIGHWAYS	0.22	0.78	1.60	0.43	1.43	2.68	0.63	1.99	3.48	0.82	2.46	4.11
17 OTHER PUBLIC CONST	0.23	0.80	1.64	0.44	1.46	2.74	0.64	2.03	3.56	0.84	2.51	4.18
18 MAINT-REPAIR CONST	0.21	0.74	1.52	0.41	1.36	2.54	0.60	1.88	3.30	0.78	2.33	3.88
19 ORDNANCE AND ACCESS	0.28	1.01	2.13	0.54	1.83	3.49	0.79	2.51	4.44	1.03	3.08	5.14
20 MEAT PRODUCTS	0.17	0.62	1.33	0.33	1.12	2.15	0.48	1.54	2.72	0.63	1.88	3.14
21 DAIRY PRODUCTS	0.22	0.81	1.73	0.43	1.47	2.81	0.63	2.01	3.55	0.82	2.46	4.10
22 CANNING AND PRESERVING NON-MEATS	0.24	0.88	1.89	0.47	1.60	3.06	0.69	2.18	3.86	0.89	2.67	4.46
23 GRAIN MILL PROD	0.24	0.87	1.86	0.46	1.56	3.00	0.67	2.13	3.78	0.87	2.61	4.36
24 BAKERY PRODUCTS	0.27	1.00	2.13	0.53	1.81	3.46	0.78	2.47	4.38	1.01	3.03	5.05
25 SUGAR	0.18	0.65	1.39	0.35	1.17	2.24	0.50	1.60	2.84	0.65	1.96	3.27

Table 3–3 continued

26 CONFECTIONARY PROD	0.24	0.86	1.83	0.46	1.55	2.97	0.67	2.12	3.76	0.87	2.60	4.34
27 BEVERAGE INDUSTRIES	0.28	1.03	2.18	0.55	1.86	3.55	0.80	2.54	4.50	1.04	3.12	5.20
28 MISC FOODS	0.23	0.84	1.78	0.45	1.51	2.89	0.65	2.07	3.66	0.85	2.54	4.23
29 TOBACCO MANUFACTURE	0.51	1.88	4.11	0.98	3.36	6.52	1.43	4.56	8.11	1.85	5.55	9.24
30 FABRICS,YARN,THREAD MILLS	0.35	1.26	2.69	0.67	2.28	4.37	0.98	3.12	5.53	1.28	3.83	6.38
31 MISC TEXTILE-FLOOR COVERINGS	0.35	1.26	2.68	0.67	2.27	4.35	0.98	3.11	5.50	1.27	3.81	6.34
32 APPAREL	0.31	1.12	2.35	0.60	2.03	3.86	0.88	2.78	4.91	1.14	3.41	5.69
33 MISC FABRICATED TEXTILES	0.32	1.17	2.47	0.63	2.12	4.04	0.92	2.91	5.14	1.19	3.58	5.96
34 LUMBER-WOOD PROD,EXC CONTAINER	0.27	0.92	1.84	0.52	1.71	3.16	0.76	2.39	4.18	1.00	2.99	4.99
35 WOODEN CONTAINERS	0.30	1.04	2.06	0.59	1.93	3.55	0.86	2.70	4.70	1.13	3.38	5.65
36 HOUSEHOLD FURNITURE	0.32	1.16	2.42	0.65	2.10	3.99	0.91	2.89	5.10	1.19	3.56	5.93
37 OTHER FURNITURE-FIXTURES	0.29	1.05	2.20	0.57	1.91	3.63	0.83	2.63	4.64	1.08	3.24	5.39
38 PAPER-ALLIED PROD,EXC CONTAINER	0.38	1.38	2.86	0.75	2.51	4.74	1.09	3.46	6.09	1.42	4.26	7.10
39 PAPERBOARD CONTAINERS	0.32	1.50	3.12	0.82	2.74	5.18	1.19	3.78	6.65	1.55	4.66	7.77
40 PRINTING-PUBLISHING	0.31	1.59	3.18	0.80	2.72	5.19	1.17	3.72	6.59	1.52	4.57	7.61
41 CHEMICALS-SEL PROD	0.61	2.22	4.75	1.18	4.00	7.69	1.72	5.46	9.69	2.23	6.69	11.14
42 PLASTICS AND SYNTHETIC MAT	0.63	2.31	4.94	1.23	4.16	7.99	1.79	5.68	10.07	2.32	6.95	11.58
43 DRUGS-CLEANING-TOILET PREP	0.56	2.03	4.34	1.08	3.66	7.03	1.57	5.00	8.87	2.04	6.12	10.20
44 PAINTS AND ALLIED PROD	0.61	2.21	4.73	1.18	3.99	7.66	1.71	5.45	9.66	2.22	6.67	11.12
45 PETROLEUM REFINING, ETC	0.24	0.83	1.68	0.47	1.55	2.86	0.69	2.16	3.77	0.90	2.71	4.51
46 RUBBER AND MISC PLASTIC PROD	0.35	1.27	2.69	0.68	2.30	4.39	0.99	3.14	5.56	1.28	3.85	6.42
47 LEATHER TANNING-INDUST LEATHER	0.35	1.28	2.72	0.69	2.32	4.43	1.00	3.18	5.62	2.30	3.90	6.49
48 FOOTWEAR AND OTHER LEATHER PROD	0.26	0.95	2.00	0.51	1.73	3.29	0.75	2.37	4.19	0.97	2.92	4.86
49 GLASS AND GLASS PRODUCTS	0.37	1.33	2.75	0.72	2.42	4.57	1.05	3.33	5.87	1.37	4.11	6.85
50 STONE AND CLAY PRODUCTS	0.37	1.33	2.77	0.72	2.43	4.59	1.06	3.34	5.89	1.37	4.12	6.87
51 PRIMARY IRON-STEEL MAN	0.27	0.95	1.94	0.52	1.73	3.25	0.76	2.39	4.21	0.99	2.96	4.94
52 COPPER MANUFACTURE	0.21	0.76	1.58	0.42	1.39	2.63	0.61	1.92	3.38	0.79	2.37	3.96
53 ALUMINUM MANUFACT	0.29	1.04	2.16	0.57	1.91	3.60	0.83	2.63	4.63	1.08	3.25	5.42
54 OTHER NONFERROUS MANUFACT	0.24	0.88	1.82	0.48	1.60	3.02	0.70	2.20	3.88	0.91	2.72	4.53
55 METAL CONTAINERS	0.36	1.31	2.76	0.71	2.38	4.53	1.03	3.27	5.78	1.34	4.02	6.71
56 HEATING-PLUMBING-STRUCT METAL PROD	0.36	1.29	2.72	0.70	2.34	4.46	1.02	3.22	5.69	1.32	3.96	6.59
57 STAMPING,SCREWMACHINE PROD, BOLTS	0.35	1.28	2.69	0.69	2.31	4.41	1.00	3.17	5.61	1.30	3.90	6.50
58 OTHER FABRICATED METAL PRODUCTS	0.34	1.23	2.59	0.66	2.23	4.25	0.97	3.06	5.41	1.25	3.76	6.27
59 ENGINES AND TURBINES	0.35	1.26	2.67	0.67	2.28	4.35	0.98	3.12	5.52	1.28	3.83	6.38
60 FARM MACHINERY-EQUIPMENT	0.33	1.20	2.54	0.64	2.18	4.15	0.94	2.98	5.27	1.22	3.66	6.10
61 CONSTRUCTION-MINING-OIL FIELD MACH	0.35	1.27	2.69	0.68	2.30	4.39	0.99	3.15	5.57	1.29	3.87	6.45
62 MATERIALS HANDLING EQUIPMENT	0.34	1.23	2.60	0.66	2.22	4.25	0.96	3.05	5.39	1.25	3.74	6.24
63 METALWORKING EQUIPMENT	0.34	1.23	2.60	0.66	2.22	4.24	0.96	3.04	5.38	1.24	3.73	6.22
64 SPECIAL INDUSTRY MACHINERY	0.32	1.16	2.45	0.62	2.10	4.00	0.91	2.87	5.08	1.18	3.53	5.88
65 GENERAL INDUSTRIAL MACHINERY	0.35	1.28	2.70	0.68	2.31	4.41	1.00	3.16	5.59	1.29	3.88	6.47
66 MACHINE SHOP PRODUCTS	0.43	1.57	3.32	0.84	2.84	5.42	1.23	3.89	6.88	1.59	4.77	7.95
67 OFFICE,COMPUTING,ACCOUNTING MACH	0.33	1.20	2.54	0.64	2.17	4.14	0.93	2.96	5.24	1.21	3.63	6.06

Table 3-8 continued

68 SERVICE INDUST MACHINES	0.35	1.26	2.66	0.67	2.28	4.35	0.98	3.12	5.52	1.28	3.83	6.39
69 ELECTRICAL EQUIP	0.35	1.29	2.74	0.69	2.33	4.46	1.00	3.19	5.65	1.30	3.91	6.52
70 HOUSEHOLD APPLIANCES	0.37	1.35	2.87	0.72	2.45	4.68	1.06	3.35	5.93	1.37	4.11	6.86
71 ELECTRIC LIGHTING-WIRING EQUIP	0.39	1.41	2.99	0.75	2.54	4.87	1.10	3.48	6.16	1.42	4.26	7.11
72 RADIO,TV,COMMUNICATION EQUIPMENT	0.39	1.41	3.00	0.75	2.54	4.87	1.09	3.47	6.16	1.42	4.26	7.09
73 ELECTRIC COMPONENTS AND ACCESS	0.39	1.41	3.01	0.75	2.55	4.89	1.10	3.49	6.18	1.42	4.27	7.12
74 MISC ELECTRICAL MACHINERY	0.31	1.12	2.37	0.60	2.02	3.86	0.87	2.76	4.89	1.13	3.38	5.63
75 MOTOR VEHICLES-EQUIPMENT	0.37	1.34	2.84	0.72	2.43	4.63	1.05	3.33	5.88	1.36	4.08	6.80
76 AIRCRAFT AND PARTS	0.27	0.98	2.07	0.53	1.78	3.39	0.77	2.44	4.31	1.00	3.00	5.00
77 OTHER TRANSPORT EQUIPMENT	0.27	0.96	2.01	0.52	1.74	3.31	0.75	2.39	4.22	0.98	2.94	4.89
78 SCIENTIFIC-CONTROL INSTRUMENTS	0.46	1.68	3.58	0.90	3.04	5.82	1.31	4.16	7.37	1.70	5.10	8.50
79 OPTICAL,OPHTHALMI,-PHOTO EQUIP	0.50	1.83	3.90	0.98	3.31	6.34	1.42	4.53	8.02	1.85	5.54	9.24
80 MISC MANUFACTURING	0.29	1.03	2.16	0.56	1.87	3.55	0.81	2.57	4.54	1.05	3.16	5.27
81 TRANSPORTATION-WAREHOUSING	0.18	0.71	1.74	0.35	1.24	2.49	0.51	1.65	2.96	0.66	1.98	3.30
82 COMMUNICATIONS,EXC RADIO-TV	0.64	2.34	4.96	1.25	4.24	8.10	1.83	5.80	10.27	2.37	7.12	11.86
83 RADIO-TV BROADCASTING	0.42	1.54	3.35	0.81	2.77	5.34	1.18	3.77	6.69	1.53	4.60	7.67
84 ELECTRIC UTILITIES	0.52	1.84	3.78	1.01	3.37	6.34	1.47	4.65	8.19	1.92	5.76	9.59
85 GAS UTILITIES	0.52	1.85	3.74	1.02	3.39	6.34	1.50	4.72	8.27	1.95	5.86	9.77
86 WATER AND SANITARY SERVICES	0.48	1.72	3.53	0.94	3.14	5.91	1.38	4.34	7.64	1.79	5.37	8.95
87 WHOLESALE-RETAIL TRADE	0.23	0.82	1.66	0.45	1.50	2.80	0.66	2.08	3.65	0.86	2.58	4.30
88 FINANCE AND INSURANCE	0.89	3.32	7.26	1.73	5.93	11.52	2.52	8.04	14.32	3.26	9.78	16.30
89 REAL ESTATE AND RENTAL	0.12	0.43	0.91	0.23	0.78	1.49	0.34	1.07	1.89	0.44	1.31	2.19
90 HOTELS,PERSONAL-REPAIR SERVICES	0.23	0.83	1.74	0.45	1.51	2.86	0.66	2.08	3.66	0.85	2.56	4.26
91 BUSINESS SERVICES	0.25	0.90	1.91	0.48	1.64	3.12	0.71	2.24	3.96	0.92	2.75	4.59
92 RESEARCH AND DEVELOPMENT	0.20	0.72	1.49	0.39	1.31	2.48	0.57	1.80	3.18	0.74	2.22	3.71
93 AUTO REPAIR SERVICES	0.20	0.73	1.54	0.39	1.33	2.53	0.57	1.82	3.21	0.74	2.23	3.72
94 AMUSEMENTS	0.16	0.59	1.44	0.30	1.04	2.06	0.44	1.40	2.50	0.56	1.69	2.82
95 MEDICAL,EDUCATIONAL,NONPROFIT ORG	0.12	0.44	0.93	0.23	0.79	1.52	0.34	1.09	1.92	0.45	1.34	2.23
96 FEDERAL GOV'T ENTERPRISES	0.07	0.25	0.54	0.13	0.44	0.85	0.19	0.60	1.07	0.24	0.73	1.22
97 ST & LO GOV'T ENTERPRISES	0.11	0.38	0.79	0.21	0.70	1.31	0.30	0.96	1.69	0.40	1.19	1.98
98 GROSS IMPORTS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
99 BUSI TRAVEL, ENTERTAI'T & GIFTS	0.15	0.57	1.26	0.30	1.02	1.97	0.43	1.38	2.46	0.56	1.69	2.81
100 OFFICE SUPPLIES	0.40	1.46	3.08	0.78	2.65	5.04	1.15	3.63	6.42	1.49	4.46	7.44
104 HOUSEHOLD INDUSTRY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Note: Reductions in prices are for all components of final demand in VAT-exclusive producer prices; if $\alpha = 0$, there are no price changes.

two-digit industry in Table 3-9 and by disaggregated input-output sector in Table 3-10. With zero CIT shifting, of course, VAT-*exclusive* consumption prices are unaffected by the tax substitution, and VAT-*inclusive* prices rise across the board by the VAT *rate* (1.9, 3.8, 5.8, and 7.7 percent with 25, 50, 75, and 100 percent CIT removal, respectively; see Table 3-1). VAT-exclusive consumption prices respond to forward CIT shifting in the same manner as the producer prices previously discussed. In all cases it is assumed that the VAT is fully shifted forward, and VAT-inclusive prices are simply VAT-exclusive prices previously discussed multiplied by 1 plus the VAT rate.

Overall, consumption prices must rise as a result of the tax substitution. However, although these prices rise on average, individual prices may rise by more or less than the average, depending on the pre-tax substitution CIT liability incorporated in final consumption prices. In some cases VAT-inclusive prices actually fall if the CIT is shifted, e.g., tobacco, chemicals and communications. All variation around the average is necessarily explained by the shifted CIT reduction. Those industries in which CIT liabilities, relative to sales, are greatest exhibit the smallest price increases (greatest price reductions) when the VAT replaces the CIT and the reduction in the latter is shifted forward to the benefit of purchasers.

With full CIT shifting (regardless of the degree of CIT reduction), five two-digit industries exhibit price *reductions*: tobacco (a VAT-inclusive consumer price change of -0.9 percent when the CIT is fully removed), chemicals (-1 percent), utilities (-3 percent), communications (-6 percent), and finance and insurance (-10.3 percent). With CIT shifting of 0.6 only two industries exhibit such price reductions: communications (-0.2 percent with full CIT reduction) and finance and insurance (-3.1 percent). With CIT shifting of only 0.2, there are no price reductions, and this is also true for the 100-industry classifications.

Similarly, the *largest* consumer price increases are observed in those industries which benefit *least* from the CIT reduction. With full CIT shifting and CIT removal (S = 100 percent and α = 1), the required VAT rate is 7.2 percent, while the aggregate VAT-inclusive consumer price index (Table 3-5) rises by 1.7 percent (less than the VAT rate due to the CIT-shifting-induced decline in VAT-exclusive producer prices). However, in the five industries exhibiting the biggest price increases (Table 3-9, ignoring "miscellaneous" and "imports"), these increases are all more than *twice* the average: real estate and rental (a 4.9 percent price increase with full CIT removal and shifting); medical, educational, and related services

Table 3-9. Percentage Increases in VAT-Inclusive Consumer Prices, for Alternative Degrees of CIT Reduction (S) and Shifting (α), by Two-Digit Aggregated Industry Classification[a]

Industry	S = 25%			S = 50%			S = 75%			S = 100%		
	α=.2	α=.6	α=1.0	α=.2	α=.6	α=1.0	α=.2	α=.6	α=1.0	α=.2	α=.6	α=1.0
1 AGRICULTURE	1.87	1.76	1.59	3.64	3.19	2.62	5.33	4.38	3.34	6.92	5.40	3.87
3 COAL,STN,CLAY MNG+PROD	1.75	1.32	0.70	3.40	2.37	1.08	4.96	3.23	1.31	6.44	3.95	1.46
4 OIL + GAS	1.81	1.54	1.19	3.51	2.77	1.87	5.31	3.77	2.28	6.65	4.60	2.55
6 ORDNANCE	1.78	1.42	0.92	3.46	2.58	1.46	5.05	3.53	1.82	6.56	4.33	2.09
7 FOOD	1.81	1.54	1.17	3.52	2.79	1.88	5.15	3.82	2.36	6.69	4.70	2.70
8 TOBACCO	1.62	0.82	-0.45	3.15	1.50	-0.68	4.60	2.06	-0.80	5.97	2.54	-0.87
9 TEXTILES + APPAREL	1.76	1.34	0.73	3.41	2.41	1.15	4.98	3.26	1.43	6.47	4.05	1.63
10 LUMBER,WOOD PRODUCTS	1.79	1.47	1.08	3.47	2.64	1.66	5.07	3.59	1.97	6.58	4.37	2.16
11 FURNITURE + FIXTURES	1.76	1.35	0.75	3.41	2.42	1.18	4.99	3.31	1.45	6.47	4.05	1.64
12 PAPER + PRODUCTS	1.71	1.17	0.40	3.32	2.10	0.57	4.84	2.85	0.65	6.28	3.48	0.68
13 PRINTING + PUBLISHING	1.68	1.07	0.15	3.27	1.92	0.19	4.77	2.61	0.21	6.19	3.20	0.21
14 CHEM.,PLAST.,DRUGS,PNT	1.62	0.84	-0.35	3.15	1.51	-0.62	4.59	2.04	-0.80	5.95	2.50	-0.95
15 RUBBER + LEATHER	1.74	1.26	0.56	3.37	2.27	0.87	4.92	3.11	1.09	6.39	3.82	1.24
16 FOOTWEAR	1.79	1.46	1.00	3.48	2.64	1.59	5.08	3.61	1.98	6.60	4.43	2.26
17 PRIMARY METAL	1.79	1.46	1.00	3.43	2.63	1.58	5.08	3.59	1.96	6.59	4.41	2.22
18 FABRICATED METAL	1.74	1.28	0.61	3.38	2.30	0.93	4.93	3.14	1.14	6.40	3.84	1.29
19 NONELECT. MACHINERY	1.73	1.24	0.52	3.36	2.24	0.84	4.91	3.07	1.00	6.37	3.91	1.15
20 ELECTRICAL EQUIPMENT	1.71	1.19	0.41	3.34	2.15	0.64	4.87	2.95	0.79	6.33	3.62	0.90
21 TRANSP. EQUIPMENT	1.71	1.16	0.33	3.32	2.09	0.51	4.84	2.85	0.63	6.29	3.50	0.71
22 INSTRUMENTS	1.69	1.11	0.26	3.29	2.00	0.36	4.80	2.73	0.41	6.25	3.34	0.44
23 MISC. MANUFACTURING	1.78	1.42	0.92	3.46	2.57	1.45	5.05	3.51	1.80	6.55	4.30	2.05
24 TRANSP. + WAREHOUSING	1.86	1.65	1.13	3.62	3.05	2.21	5.29	4.25	3.04	6.88	5.29	3.69
25 COMMUNICATIONS	1.39	-0.01	-2.18	2.58	-0.07	-3.61	3.90	-0.15	-4.71	5.04	-0.22	-5.49
26 UTILITIES	1.52	0.51	-0.92	2.94	0.85	-1.67	4.28	1.08	-2.45	5.54	1.25	-3.02
27 FINANCE + INSURANCE	1.13	-0.02	-4.56	2.19	-1.85	-7.25	3.17	-2.53	-9.01	4.09	-3.09	-10.26
28 REAL ESTATE + RENTAL	1.92	1.94	1.97	3.75	3.53	3.26	5.48	4.86	4.18	7.12	6.00	4.88
29 HOTELS + SERVICES	1.81	1.52	1.10	3.51	2.75	1.78	5.13	3.77	2.25	6.67	4.64	2.59
30 AUTO REPAIR + SERVICES	1.84	1.63	1.32	3.58	2.96	2.17	5.23	4.07	2.78	6.79	5.01	3.23
31 AMUSEMENTS	1.99	1.77	1.43	3.67	3.26	2.66	5.37	4.52	3.54	6.99	5.59	4.20
32 MED.,ED.SERV.+NONPROF.	1.92	1.93	1.96	3.74	3.51	3.23	5.47	4.84	4.14	7.11	5.98	4.84
33 MISCELLANEOUS	2.02	2.29	2.73	3.94	4.18	4.52	5.76	5.78	5.80	7.50	7.14	6.76
34 IMPORTS	1.96	2.08	2.29	3.82	3.78	3.77	5.58	5.21	4.81	7.26	6.43	5.59

Notes: Changes in prices are for private consumption expenditures at VAT-inclusive purchaser prices (i.e., producer price plus transportation and trade margins). VAT is assumed to be fully shifted for alternative combinations of S and α. If $\alpha = 0$, percentage price changes are the same for all industries, and are equal to the VAT rate: 1.92 percent for $S = 25$ percent, 3.84 percent for $S = 50$ percent, 5.76 percent for $S = 75$ percent, and 7.68 percent for $S = 100$ percent.

[a]Industries correspond closely to the SIC two-digit classification and to that used by Aaron.

Table 3-10. Percentage Increases in VAT-Inclusive Consumer Prices, for Alternative Degrees of CIT Reduction (S) and Shifting (α), by Industry

	S = 25%			S = 50%			S = 75%			S = 100%		
Industry	α=.2	α=.6	α=1.0	α=.2	α=.6	α=1.0	α=.2	α=.6	α=1.0	α=.2	α=.6	α=1.0
1	1.88	1.77	1.61	3.65	3.22	2.67	5.34	4.43	3.41	6.94	5.46	3.97
2	1.87	1.75	1.58	3.64	3.17	2.59	5.32	4.36	3.30	6.91	5.37	3.82
3	1.88	1.77	1.60	3.65	3.22	2.66	5.34	4.43	3.42	6.94	5.47	3.99
7	1.82	1.58	1.22	3.54	2.85	1.99	5.17	3.91	2.51	6.72	4.79	2.87
9	1.81	1.55	1.23	3.52	2.79	1.92	5.13	3.79	2.33	6.66	4.62	2.58
10	1.81	1.54	1.14	3.52	2.78	1.87	5.14	3.81	2.34	6.67	4.66	2.65
19	1.78	1.42	0.92	3.46	2.58	1.46	5.05	3.53	1.82	6.56	4.33	2.09
20	1.84	1.63	1.36	3.57	2.95	2.19	5.22	4.05	2.76	6.78	4.98	3.17
21	1.81	1.54	1.17	3.53	2.79	1.88	5.15	3.83	2.36	6.69	4.70	2.71
22	1.80	1.51	1.10	3.51	2.74	1.77	5.13	3.75	2.23	6.66	4.61	2.56
23	1.81	1.52	1.12	3.51	2.75	1.80	5.13	3.78	2.27	6.67	4.64	2.60
24	1.79	1.46	0.98	3.48	2.63	1.57	5.08	3.60	1.96	6.59	4.42	2.24
25	1.83	1.62	1.33	3.57	2.93	2.14	5.21	4.02	2.70	6.77	4.93	3.10
26	1.81	1.52	1.13	3.52	2.76	1.81	5.13	3.78	2.28	6.67	4.64	2.61
27	1.79	1.46	1.01	3.48	2.64	1.60	5.08	3.62	1.99	6.60	4.43	2.27
28	1.81	1.53	1.15	3.52	2.78	1.84	5.14	3.80	2.32	6.68	4.67	2.66
29	1.62	0.82	-0.46	3.15	1.50	-0.69	4.60	2.06	-0.81	5.97	2.54	-0.88
30	1.75	1.33	0.72	3.41	2.40	1.13	4.98	3.28	1.39	6.46	4.02	1.59
31	1.75	1.33	0.72	3.41	2.41	1.14	4.99	3.29	1.41	6.47	4.04	1.61
32	1.76	1.35	0.76	3.42	2.43	1.19	4.99	3.33	1.48	6.48	4.08	1.68
33	1.72	1.21	0.44	3.35	2.18	0.69	4.89	2.29	0.87	6.34	3.67	0.99
34	1.79	1.47	1.08	3.47	2.64	1.66	5.07	3.59	1.97	6.58	4.37	2.16
36	1.76	1.34	0.74	3.41	2.41	1.16	4.98	3.29	1.42	6.46	4.03	1.60
37	1.78	1.44	0.94	3.47	2.59	1.50	5.06	3.55	1.87	6.57	4.35	2.13
38	1.71	1.17	0.41	3.32	2.11	0.58	4.84	2.86	0.66	6.28	3.49	0.70
39	1.69	1.10	0.26	3.28	1.96	0.31	4.78	2.66	0.31	6.20	3.24	0.28
40	1.68	1.07	0.15	3.27	1.92	0.19	4.77	2.61	0.21	6.19	3.20	0.21
41	1.58	0.70	-0.68	3.07	1.25	-1.13	4.48	1.69	-1.44	5.81	2.06	-1.67
42	1.51	0.41	-1.31	2.92	1.72	-2.16	4.25	0.97	-2.74	5.51	1.17	-3.17
43	1.62	0.85	-0.34	3.15	1.52	-0.60	4.60	2.06	-0.78	5.96	2.52	-0.92
44	1.60	0.78	-0.49	3.11	1.39	-0.84	4.54	1.88	-1.10	5.88	2.30	-1.29
45	1.81	1.54	1.19	3.51	2.77	1.87	5.31	3.77	2.28	6.65	4.60	2.55
46	1.74	1.26	0.56	3.37	2.27	0.87	4.92	3.11	1.09	6.39	3.82	1.24
48	1.79	1.46	1.00	3.48	2.64	1.55	5.08	3.61	1.98	6.60	4.43	2.26
49	1.73	1.24	0.55	3.35	2.22	0.80	4.89	3.02	0.94	6.35	3.69	1.02
50	1.73	1.24	0.54	3.36	2.22	0.80	4.90	3.03	0.95	6.35	3.70	1.04
51	1.79	1.47	1.02	3.48	2.66	1.62	5.09	3.63	2.02	6.60	4.45	2.29
53	1.77	1.38	0.85	3.50	2.49	1.31	5.01	3.39	1.60	6.50	4.15	1.79
54	1.80	1.51	1.10	3.25	2.72	1.75	5.11	3.72	2.17	6.64	4.56	2.48
56	1.71	1.15	0.33	3.32	2.08	0.50	4.84	2.84	0.60	6.29	3.48	0.67

Table 3-10 continued

57	1.74	1.28	0.61	3.38	2.30	0.93	4.93	3.14	1.14	6.40	3.84	1.29
58	1.74	1.29	0.63	3.39	2.32	0.97	4.94	3.17	1.20	6.41	3.88	1.35
59	1.71	1.16	0.33	3.32	2.10	0.52	4.85	2.87	0.65	6.29	3.52	0.75
60	1.74	1.26	0.55	3.37	2.27	0.87	4.92	3.11	1.09	6.39	3.82	1.24
63	1.72	1.21	0.45	3.35	2.19	0.70	4.89	2.99	0.87	6.34	3.67	1.00
64	1.75	1.32	0.69	3.40	2.38	1.80	4.97	3.26	1.35	6.45	3.99	1.54
67	1.76	1.34	0.73	3.41	2.41	1.14	4.98	3.30	1.42	6.47	5.04	1.62
68	1.73	1.24	0.52	3.36	2.24	0.82	4.91	3.07	1.01	6.37	3.76	1.15
69	1.71	1.16	0.33	3.32	2.10	0.52	4.85	2.87	0.65	6.29	3.52	0.75
70	1.72	1.21	0.45	3.35	2.18	0.70	4.88	2.98	0.86	6.34	3.66	0.97
71	1.71	1.16	0.35	3.32	2.10	0.53	4.85	2.87	0.65	6.29	3.52	0.74
72	1.70	1.14	0.30	3.31	2.06	0.46	4.83	2.83	0.57	6.28	3.47	0.66
73	1.70	1.14	0.30	3.31	2.06	0.46	4.83	2.82	0.57	6.27	3.46	0.65
74	1.76	1.36	0.77	3.43	2.46	1.23	5.01	3.37	1.54	6.50	4.14	1.78
75	1.70	1.11	0.24	3.30	2.01	0.35	4.81	2.74	0.43	6.24	3.36	0.48
76	1.77	1.38	0.82	3.44	2.51	1.31	5.03	3.44	1.66	6.53	4.22	1.92
77	1.78	1.44	0.93	3.47	2.60	1.50	5.06	3.56	1.88	6.58	4.37	2.16
78	1.69	1.09	0.21	3.28	1.96	0.28	4.79	2.68	0.32	6.21	3.27	0.34
79	1.70	1.14	0.31	3.31	2.05	0.45	4.82	2.79	0.52	6.26	3.41	0.56
80	1.78	1.42	0.92	3.46	2.57	1.45	5.05	3.51	1.80	6.55	4.30	2.05
81	1.86	1.65	1.13	3.62	3.05	2.21	5.29	4.25	3.04	6.88	5.29	3.69
82	1.39	-0.02	-2.19	2.68	-0.08	-3.62	3.90	-0.16	-4.72	5.04	-0.23	-5.50
84	1.52	0.49	-0.98	2.94	0.83	-1.72	4.27	1.06	-2.51	5.53	1.23	-3.06
85	1.51	0.49	-0.94	2.92	0.80	-1.72	4.25	1.00	-2.59	5.49	1.12	-3.25
86	1.55	0.62	-0.72	3.01	1.06	-1.38	4.38	1.39	-1.92	5.67	1.64	-2.37
88	1.13	-0.02	-4.56	2.19	-1.85	-7.25	3.17	-2.53	-9.01	4.09	-3.09	-10.26
89	1.92	1.94	1.97	3.75	3.53	3.26	5.48	4.86	4.18	7.12	6.00	4.88
90	1.81	1.53	1.13	3.52	2.77	1.82	5.14	3.80	2.30	6.68	4.67	2.65
91	1.79	1.45	0.94	3.48	2.63	1.55	5.09	3.62	1.98	6.61	4.46	2.31
93	1.84	1.63	1.32	3.58	2.96	2.17	5.23	4.07	2.78	6.79	5.01	3.23
94	1.99	1.77	1.43	3.67	3.26	2.66	5.37	4.52	3.54	6.99	5.59	4.20
95	1.92	1.93	1.96	3.74	3.51	3.23	5.47	4.84	4.14	7.11	5.98	4.84
96	1.98	2.13	2.36	3.85	3.88	3.93	5.63	5.36	5.06	7.33	6.62	5.91
97	1.94	1.99	2.10	3.77	3.62	3.45	5.51	4.98	4.39	7.17	6.14	5.10
98	1.96	2.08	2.29	3.82	3.78	3.77	5.58	5.21	4.61	7.26	6.43	5.59
104	2.04	2.38	2.91	3.99	4.34	4.82	5.83	6.00	6.19	7.59	7.41	7.22

Note: Same as Table 3-9.

(4.8 percent); amusements (4.2 percent); agricultural produce (3.9 percent); and transportation and warehousing (3.7 percent).

With full CIT removal the *range* of consumer price changes with full shifting is from a 6.8 percent increase (miscellaneous) to a 10.3 percent reduction (finance and insurance), with an average increase of 1.7 percent. However, with CIT shifting of 0.6 and CIT repeal the range is from 7.1 to -3.1 percent, the higher average price increase of 4.1 percent explained by the higher VAT rate required for partial compared to full shifting. With shifting of 0.2 this consumer price range is from 7.5 to 4.1 percent with an average of 6.5 percent. And, of course, zero shifting of the CIT implies that prices inclusive of VAT will rise by 7.7 percent (the VAT rate) in all industries.

For a CIT reduction of less than 85 to 90 percent, *reductions* in the degree of CIT shifting imply *reductions* in the VAT rate. In consequence, the largest price increases decline and the smallest increases rise, relative to the mean, thus necessarily reducing the range in consumer price variation resulting from the tax substitution.

In summary, consumer prices (VAT inclusive) are highly sensitive to CIT reduction and shifting. This sensitivity is compounded by the relationships between CIT reduction and shifting, on the one hand, and the compensating VAT rate on the other. With a high degree of CIT shifting, relative (intercommodity) consumer prices are significantly changed, and these relative price changes are greater the greater the degree of CIT removal.