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I. Introduction

It has long been recognized that policy changes which have similar qualitative impacts on tax burdens may have divergent economic impacts. To date, discussion of this issue has tended to emphasize factors such as differential rates of growth among firms, and different propensities to invest. For example, accelerated depreciation deductions are presumed to disproportionately benefit faster growing firms; investments tax credits are viewed as particularly beneficial to firms actively engaged in making new investments; and reductions in tax rates are perceived as benefiting all firms proportionately, regardless of their investment behavior.

In this paper, we use the Treasury Department's Corporate Microdata File (hereafter, the "Corporate Tax Model") to provide some empirical evidence on the comparative impact of increasing depreciation deductions as opposed to reducing corporate tax rates. The next section briefly describes the specific policy alternatives compared as well as the Corporate Tax Model used to make comparisons. Section III presents and discusses the results of the comparisons. The principal conclusions are developed in Section IV.

II. Policy Comparisons and the Corporate Tax Model

In the analysis below we compare the impact of increasing depreciation deductions by 5.1 percent with a reduction in all corporate marginal tax rates of one percentage point (that is, for example, from 46 to 45 percent). The two alternatives have been designed to be equivalent in the sense that each reduces aggregate corporate tax liabilities by an equal amount. The specific impacts considered are the effects of these changes on firms of different size and taxable income levels, as well as on different industries.

Our comparisons are based on simulations done with the Treasury Corporate Tax Model as described in Nester (1977). This model consists of a microdata file of corporate tax returns which is programmed to calculate the minimum tax liability of each firm in the file. The basic data in the file are items from 1976 corporate tax returns, although the parameters of the tax calculator may be modified to reflect the current state of tax law. The estimates presented below are based on 1976 tax data, and 1981 law.

III. Effects of Changes in Deductions and Tax Rates

The actual tax value per dollar of incremental depreciation deductions equals $\Delta TL / \Delta d$, where ΔTL is the reduction in corporate tax liabilities due to the increase, Δd in depreciation deductions. When the effective tax value of incremental deductions equals the statutory tax advantage, $\Delta TL / \Delta d$ equals the statutory marginal tax rate, t_s . However, $\Delta TL / \Delta d$ may be less than t_s due to one or more of the following features of the corporate income tax: (1) rules for computing and claiming net operating loss (NOL) deductions, (2) the alternative tax on corporate capital gains, (3) rules for computing and claiming the foreign tax credit (FTC), (4) rules governing the use of the

investment tax credit (ITC), and (5) the corporate minimum tax.

Net Operating Loss Deductions

If current allowable tax deductions exceed taxable income, net operating losses are generated. Firms are presently allowed to first carry these losses back to offset any taxable income earned in the prior three years and then to carry net losses forward to the succeeding seven years. An increase in depreciation deductions will cause some firms to incur net operating losses. If the full amount of such extra deductions may be carried back to prior tax years, the effective tax value of these incremental deductions will equal their statutory value. If, however, all or some portion of extra deductions must be carried forward, their effective tax value will be diminished.

Alternative Tax on Corporate Capital Gains

Corporations cannot take advantage of the 60% capital gain exclusion available to individuals. Instead, corporations must first include the excess of net long-term gain over net short-term capital losses in taxable income and compute the tax at the regular statutory corporate rate. Corporations may then compute an alternative tax determined by: (1) computing a tax at the regular tax rates on taxable income minus the excess of net long-term capital gains over net short-term capital losses multiplied by the alternative capital gains rate of 28%. The method producing the lower total tax liability is used. It is not always advantageous for the corporation to elect to be taxed at the alternative rate. For some firms, increased deductions may reduce taxable income sufficiently to make taxation at the alternative rate the less attractive option. While this feature of the tax law may be important for some firms, it is not included in the corporate model.

Foreign Tax Credit

Corporations are allowed a credit against U.S. corporate tax liabilities based on foreign taxes paid. However, limitations are placed on the total amount of credits that may be claimed. The limitation is computed by multiplying the U.S. tax liability by the ratio of taxable income from foreign sources to worldwide income. When there are domestic losses exceeded by foreign source taxable income (so that worldwide income is positive), the foreign tax credit is limited to U.S. tax liability. In this case, an increase in domestic losses reduces the amount of foreign tax credit that can be claimed because U.S. tax liability decreases.

If foreign taxes paid exceed the limitation in the current tax year, firms are permitted two year carrybacks and five year carryforwards. Both carrybacks and carryforwards are limited to the amount by which the maximum allowable foreign tax credits exceeds taxes paid in any given carryback or carryforward year.

Investment Tax Credit

After computing its tax liability based on deductions, the alternative tax on capital gains, and foreign tax credits, the firm is allowed to

claim an investment tax credit. However, the amount of investment credits which may be used in any given year is subject to a limitation. For 1981 the tax credit can be used to offset the first \$25,000 of taxes but only up to 80% of the tax liability exceeding \$25,000. The 80% limitation is scheduled to increase to 90 percent in 1982 and thereafter. Extra deductions, by reducing potential tax liability, may lead to a loss in investment credits. Credits that cannot be used in the current year can be carried back three years and forward seven years.

Minimum Tax

Changes in deductions can also affect the "add-on minimum tax" on tax preference items. In particular, a 15% tax is levied on a base which equals the tax preference items less the greater of \$10,000 or the full amount of the corporation's income tax. Thus, for corporations whose tax liability exceeds \$10,000, extra depreciation deductions increase the base for the 15% add-on tax. For the corporate taxpayer, preference items are defined as: accelerated depreciation or real property in excess of the adjusted basis, amortization in excess of otherwise allowable depreciation, and some portion of net capital gains.

In the depreciation experiments, some assumptions must be made about the fraction of incremental depreciation deductions subject to the minimum tax. Preference income from the additional depreciation was increased, for each firm, in proportion to its ratio of existing preference income to existing depreciation deductions.

The Actual Tax Value of Additional Depreciation Deduction

Estimates of the initial impact on corporate tax liabilities of incremental depreciation deductions are presented in Tables 1, 2, and 3. Since the Corporate Tax Model does not contain firm-specific information on the ability of firms to carryback and/or carryforward unused credits or deductions, the estimates in Tables 1 and 2 understate the actual tax value of additional depreciation deductions.

Table 1 presents data on the changes in depreciation deductions and tax liabilities by taxable income class. For the sample as a whole, $\frac{\Delta TL}{\Delta d} = .32$. Part of the reason that this number falls below .46 is that the corporate rate schedule is graduated. For firms with taxable income strictly exceeding \$100,000 to which the statutory rate of 46% applies, the incremental value of debt deductions is 36%. The table also shows that the fraction of the gap between the effective and statutory rates attributable to the loss in foreign tax credits is eight tenths of one percent of the change in depreciation deductions while the loss of the investment tax credit accounts for seven and one-half percent. The remainder is accounted for by changes in net operating losses and the minimum tax.

Tables 2 and 3 present similar information broken down by asset size class and industry type, respectively. From the asset class breakdown, it is evident that the loss of foreign tax credits is a factor only for large firms. The loss of the investment credit, however, affects firms of all sizes. There is also a "U" shape pattern evident in the incremental value of additional depreciation deductions; both the smallest and largest firms (as measured by assets) would benefit

relatively more from extra deductions. The industry figures displayed in Table 3 are noteworthy in that they exhibit significant variation. The tax value of extra depreciation deductions to the instrument industry is roughly one-fourth the statutory marginal tax rate, while such additional deductions would be valued at roughly the statutory marginal tax rate in the case of textiles and tobacco.

Some of the inter-industry differences observed in Table 3 are attributable to variation in the ability to utilize incremental deductions fully. In addition, the impact of additional depreciation deductions on industry tax liabilities will vary with the industry ratio of depreciable assets to total assets used in production. Table 4 provides some information on the significance of this latter source of variation.

The first two columns of Table 4 contain the estimated changes in industry tax liabilities resulting from a 5.1 percent increase in depreciation deductions, and from a reduction in all corporate marginal tax rates by one percentage point. This rate cut produces a change in aggregate corporate tax burdens equal to the aggregate change in tax liabilities resulting from the increase in depreciation deductions. It is readily seen that some industries would benefit more from increased depreciation deductions while others would prefer rate cuts. Depreciation increases would be strongly preferred by the utility and communication industries. Service industries would prefer the rate cuts. The differences hinge primarily on the amount of depreciable capital employed by the industries relative to their income.

IV. Conclusions

Tax scholars have long recognized that changes in tax policy may have differential impacts on firms in varying economic circumstances and in different industries. This paper has shown how the Treasury Department's Corporate Tax Model may be used to examine the initial sectoral impacts of particular tax policies. The results suggest that particular tax policies will have diverse initial effects on corporate tax liabilities of firms of different size and in different industries.

The differential impact between equal yield depreciation increases and corporate rate cuts has important implications for the political economy of tax cuts. It suggests that there is not a uniform "business position" on tax change or tax reform. Industry specific factors are crucial in evaluating the impact of tax law changes and business lobbying interest will naturally advocate those policies most beneficial to their industries.

By merging the Corporate Tax Model with other data, it would be possible to extend the analysis. For example, it could be possible to analyze the impact of alternative tax policies by regional location, age of the firm, or other variables of interest. In addition, the marginal effective value of deductions can be used to address questions in the theory of corporate taxation as indicated in Cordes and Sheffrin (1981).

It is, however, important to recognize some limitations of our tax-impact analysis. The change in tax liabilities that we calculate pertains to the initial or impact effect of tax law

changes. Over time, one would expect the behavior of firms to change in response to changes in tax law. Thus, the long run impact on tax liabilities may differ from the short-run impact. On the other hand, it often takes a considerable time for firms to adjust their behavior. A careful analysis of initial impacts can thus provide useful guidance for medium-term as well as short-term analysis.

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References

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The views expressed in this paper are the authors' own and do not necessarily reflect those of the Office of Tax Analysis.

Table 1.--Effects of Depreciation Increases by Taxable Income
(million \$)

Taxable Income (thousand \$)	Increase in Depreciation (ΔD)	Decrease in Liability (ΔTL)	Change in FTC	Change in ITC	Change in Minimum Tax	$\frac{\Delta TL}{\Delta D}$
< 25	346	21	0	14	2	.06
25-50	115	17	0	8	0	.15
50-70	54	13	0	6	0	.24
70-100	62	15	0	7	0	.24
> 100	3409	1226	33	263	0	.36
Total	3986	1292	33	298	17	.32

1976 Data
1981 Law

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Table 2.--Effects of Depreciation Increases by Asset Size
(million \$)

Assets (thousand \$)	Increase in Depreciation (ΔD)	Decrease in Liability (ΔTL)	Change in FTC	Change in ITC	Change in Minimum Tax	$\frac{\Delta TL}{\Delta D}$
< 25	23	6	0	1	0	.26
25-50	13	2	0	1	0	.15
50-100	33	4	0	2	0	.12
100-500	179	27	0	9	0	.15
500-5,000	392	103	0	26	0	.26
5,000-25,000	241	81	0	16	1	.34
25,000-100,000	222	78	1	10	2	.35
100,000-500,000	459	156	7	34	1	.34
> 500,000	2426	836	24	202	13	.34
Total	3986	1292	33	298	17	.32

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Depreciation increased by 5.1 percent
Preference income from the additional depreciation
increased in proportion to the ratio of existing preference income to
depreciation.

Table 3.--Decrease in Tax Liability

(million \$)

Industry	Change in Depreciation Deductions (ΔD)	Change in Tax Liability (ΔTL)	$\frac{\Delta TL}{\Delta D}$
Agriculture	32	6	.19
Mining and Extraction	87	17	.20
Construction	92	24	.26
Transportation	247	41	.17
Communication	466	200	.43
Utility Services	475	118	.25
Wholesale Trade	142	44	.31
Retail Trade	230	79	.34
Services	245	44	.18
Manufacturing	1717	643	.37
Food	135	57	.42
Tobacco	16	7	.44
Textiles	44	20	.45
Lumber and Wood	55	15	.27
Furniture	8	3	.38
Paper	77	28	.36
Printing and Publishing	52	21	.40
Chemicals	206	82	.40
Petroleum and Refining	234	87	.37
Rubber and Plastics	41	14	.34
Leather Products	5	2	.40
Stone, Clay, and Glass	56	20	.36
Primary Metal	122	20	.16
Fabricated Metal	74	29	.39
Machinery	190	77	.41
Electrical Equipment	147	56	.38
Motor Vehicles	162	70	.43
Transportation Equipment	37	15	.41
Instruments	34	4	.12
Other Manufacturing	17	7	.41

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Table 4.--Decrease in Tax Liability

(million \$)

Industry	Depreciation Change	Rate Cut	Difference
Agriculture	6	8	- 2
Mining and Extraction	17	23	- 6
Construction	24	35	- 11
Transportation	41	26	15
Communication	200	49	151
Utility Services	118	49	69
Wholesale Trade	44	98	- 54
Retail Trade	79	106	- 27
Services	44	145	-101
Manufacturing	643	710	- 67
Food	57	71	- 14
Tobacco	7	16	- 9
Textiles	20	26	- 6
Lumber and Wood	15	8	7
Furniture	3	6	- 3
Paper	28	23	5
Printing and Publishing	21	32	- 11
Chemicals	82	90	- 8
Petroleum and Refining	87	91	- 6
Rubber and Plastics	14	11	3
Leather Products	2	4	- 2
Stone, Clay, and Glass	20	15	5
Primary Metal	20	19	1
Fabricated Metal	29	42	- 13
Machinery	77	79	- 2
Electrical Equipment	56	51	5
Motor Vehicles	70	75	- 5
Transportation Equipment	15	15	0
Instruments	14	24	- 10
Other Manufacturing	7	11	- 4

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