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Earnings Management and the Corporate Alternative Minimum Tax

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1. *Introduction*

This study tests whether firms affected by the U.S. corporate alternative minimum tax (*AMT*) enacted as part of the Tax Reform Act of 1986 (TRA 86) managed their 1986 and 1987 earnings to reduce their tax liabilities. One provision of TRA 86 required the inclusion of a variant of financial accounting income (*AMT* book) in the *AMT* income tax base for 1987 through 1989.

The *AMT* created an incentive to shift income to 1986 from 1987 to avoid the 20% tax rate on alternative minimum taxable income (*AMTI*) and an effective marginal rate of 10% on *AMT* book exposure. On the

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other hand, the decrease in the regular tax rate from 46% as of June 1987 to 34% as of June 1988 in monthly steps of one percentage point created an incentive to shift income forward in time. Scholes, Wilson, and Wolfson [1992] find evidence that sales were shifted from the last quarter of one year into the first quarter of the next year during 1986–88. In designing our tests of earnings management attributable to exposure to the *AMT* book provision, we allow for the effects of this incentive.

Financial accounting research offers competing explanations for earnings management including compensation maximization (Healy [1985] and McNichols and Wilson [1988]) and regulatory incentives (Jones [1991]). We extend the existing earnings-management models, particularly Jones [1991], to test the association between exposure to the *AMT* book provision in 1987 and unexpected "book-only" total accruals in 1986 and 1987. Our model treats as expected any persistent accrual behavior and any accruals predicted by economic variables. The remaining unexpected accruals are, we argue, "book-only" in the sense that they are not predicted by the economic control variables. We test for the use of book-only accruals to manage *AMT*-book tax exposure by identifying unexpected total accruals and testing for an association of such unexpected accruals with measures of exposure to the *AMT*-book provision. Our tests use financial data drawn from *Compustat* files and tax data from confidential research files of U.S. corporate tax returns prepared by the Statistics of Income (SOI) division of the Internal Revenue Service (IRS).

We find evidence that firms subject to the *AMT* in 1987 that were unable to reduce their *AMT* exposure through the use of net operating losses (*NOL*s) and foreign tax credits (*FTC*s) managed their 1987 earnings by taking unusual income-decreasing discretionary accruals. Such evidence of *AMT*-related earnings management is inversely related to firm size, with no evidence of unexpected accruals due to the *AMT* among the largest sample firms. We find no evidence that firms manipulated their 1986 earnings in anticipation of the 1987 *AMT*. These results have implications for both tax and financial reporting policy, because they provide evidence of the selectiveness and strength of behavioral responses to tax policy changes, as firms worked to minimize their tax exposure, even at the cost of reducing reported financial income.

Section 2 discusses the motivation for this study, related *AMT* research, and states the two hypotheses to be tested. Section 3 describes the mechanics of the corporate *AMT* in 1987. In section 4 we review the use of discretionary accruals proxies in earnings management research and discuss competing explanations for earnings management. In section 5 we describe our sample and develop our discretionary accruals proxy. In the remaining sections we present and discuss our results. Appendix A provides a comparison of financial ratio exposure measures developed by Gramlich [1988; 1991] to the measure used in this study.

2. *Related Research*

Many tax policymakers and practitioners expressed concern that the *AMT* book provision would lead firms to manage their earnings in order to reduce their potential *AMT* liability.[1] Several studies have tested for evidence of such earnings management. Based on an analysis of *Compustat* data, Gramlich [1988; 1991] reports that firms likely to be affected by the *AMT* made income-decreasing accruals in 1987, and income-increasing accruals in 1986, relative to a control group. Profitable firms that tended to defer income taxes between 1984 and 1986 were considered likely to be affected by the *AMT*, while profitable firms that generally paid income taxes as the book expense was recognized were considered likely to be unaffected.[2]

Choi, Gramlich, and Thomas [1991] extended Gramlich's earlier work by increasing the sample size and extending the data through 1988. In addition to using the Gramlich affected–unaffected model they also employed the firm-specific Jones [1991] model to estimate unexpected accruals, examined several specific accruals, and incorporated the concept of varying exposure to the *AMT* caused by *NOL*s and *FTC*s. Choi, Gramlich, and Thomas [1992] increased the sample to all *Compustat* firms, allowed for the effects of various rates of decline in the regular tax rates, and tested for the effects of using the 1984–86 period as a basis for choosing firms likely to be exposed to the *AMT*. They found that using 1983–85 for the base period resulted in a finding of income-decreasing accruals for *both* 1986 and 1987 for their affected firms, relative to their unaffected firms, and concluded that their results might be sensitive to the sample selection process. Further, they did not find evidence of earnings management in a sample of firms that mentioned *AMT* exposure in their annual reports. They did, however, report evidence of significant income-decreasing discretionary accruals in certain industries and among larger firms for the quartile of firms most likely affected given their measure. They reported that the evidence of earnings management was strongest in inventories and account payables, and that other current and noncurrent accruals were largely unaffected.

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[1] See Sunley [1986], Sheppard [1986], and Wilkins [1989]. Treubert and Pavelko [1992] emphasized the importance of the *AMT* book provision as a source of *AMT* revenues in 1987. They reported [1992, p. 34] companies paying "the greatest share of the *AMT* did so for two reasons: the inclusion of taxable income before *NOL*s and the net book income adjustment." Of the industry groups they examined, the *AMT* book provision accounted for from 12.9% of *AMTI* (nonelectrical machinery) to 68.1% of *AMTI* (electrical, gas, and sanitary services).

[2] Two aspects of Gramlich [1988; 1991] proved important in later extensions. First, Gramlich did not separate his test period (1986–87) from his base period (1984–86) in developing his measures. Second, he used a random walk model (one-year differencing) to determine unexpected accruals rather than a model which explicitly accounted for economic changes.

Manzon [1992] used cross-sectional data from 1983–87 to estimate the effects of *AMT* exposure on discretionary accruals related to long-term assets, including depreciation charges. *AMT* exposure was identified by searching financial statement footnotes. Manzon's results support the hypothesis that firms managed earnings in 1987, and that firms without *NOL*s were more likely to do so.

This study differs from prior research in five ways. First, our expectation model treats as expected any accrual behavior that is either persistent or associated with economic variables. Second, we take account of the effects of *NOL*s and *FTC*s, which could be used to reduce any tentative *AMT* by up to 90%. Third, we model the effects of corporate size, because of the closer surveillance received by larger firms from both the markets and the IRS. Fourth, we use tax return data from the *SOI* corporate files to determine firms subject to the *AMT*. Fifth, we use 1981–85 as the base period to develop measures for the test period of 1986 and 1987.

We test two hypotheses:

*H*1: Firms without substantial *NOL*s and *FTC*s that were exposed to the *AMT* book provision in 1987 will exhibit greater unexpected income-decreasing accruals in 1987 than firms not so exposed to the *AMT*.

*H*2: Firms without substantial *NOL*s and *FTC*s that were exposed to the *AMT* book provision in 1987 will exhibit greater unexpected income-increasing accruals in 1986 than firms not exposed or not so exposed to the *AMT*.

3. *Mechanics of the Corporate AMT in 1987*

The TRA 86's corporate *AMT* is found in *Internal Revenue Code* (*IRC*) sections 53 through 59A. The *AMT* book provision is found in section 56(f). IRS Form 4626 is used to calculate the corporate *AMT* as well as the environmental tax assessed on all corporate *AMTI* before *NOL*s in excess of $2 million. Larger firms may file Form 4626 because of the environmental tax, even though they have no *AMT* liability. In addition, many corporations with no *AMT* liability and no environmental tax liability file Form 4626 voluntarily.

The starting point for calculating *AMTI* is regular taxable income before any offset by *NOL*s, which is then adjusted for several differences in the accounting methods allowed for the regular tax and for the *AMT*. For example, a less accelerated depreciation method over a longer life may be required for the *AMT*. Conceptually, adjustments may be either positive or negative, but initially are positive. Various preference amounts must then be added, for example, percentage depletion in excess of original cost. The income determined by adding such *AMT* adjustments and preferences to regular taxable income is *AMTI* before the included portion of *AMT* book for 1987–89.

AMT book is the pretax book income of the consolidated *financial* entity attributable to the consolidated *tax* entity. *AMT* book income

could differ substantially from the pretax book income reported on financial statements. In particular, the *AMT* book income of the tax entity to which the parent corporation of the financial entity belongs will have excluded all revenues and expenses of subsidiaries consolidated for financial reporting purposes but not for tax purposes.[3]

The alternative minimum taxable income arrived at after applying the *AMT* book provision could be reduced by up to 90% by *NOL*s. The balance not reduced by *NOL*s could, for certain low-income corporations, be reduced by an *AMT* exemption of up to $40,000. The remaining *AMTI* was subject to a tentative tax of 20%, which could be further reduced by *FTC*s provided the final amount was not less than a 20% tax on 10% of the *AMTI* before *NOL*s but after a recalculated *AMT* exemption amount. The general effect for larger corporations not entitled to an exemption amount is that *NOL*s and *FTC*s could reduce *AMT* by up to 90%.

The *AMT* and regular tax systems are parallel tax systems, in that the *AMT* determines the minimum payment due. An excess of *AMT* over regular tax will generally give rise to a credit (the *AMT* credit) against the excess of regular tax over *AMT* in a subsequent year. During 1987–89, *AMT* credits are allowed for items involving timing differences only, and not for permanent differences. However, any difference arising because of the *AMT* book provision is treated as a timing difference. The effect of the *AMT* is to increase the present value of income taxes paid by accelerating the payment of taxes deferred by the regular tax. For firms with sufficient *NOL*s and *FTC*s, the cost or benefit of any *AMT* book change would only be, at most, 1%.

Many accounting adjustments that affect the timing of the recognition of income occur at year-end and in the period up to the release of financial statements one or more months after year-end. Corporate tax returns are filed later, often 8½ months after year-end (e.g., September 15, 1987, for a year-end of December 31, 1986). TRA 86 was enacted in October 1986, with the corporate *AMT* applying to tax years beginning on or after January 1, 1987. The first full-year returns subject to the *AMT* ended in December 1987, more than 14 months after the passage of TRA 86.

4. *Development of a Discretionary Accruals Proxy (DAP)*

Reported book income (RBI_t) may be decomposed into operating cash flows (CF_t) and operating total accruals (TA_t), which in turn may be further decomposed into nondiscretionary accruals (NA_t) and discretionary accruals (DA_t) with the result that:

$$TA_t = RBI_t - CF_t = NA_t + DA_t. \tag{1}$$

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[3] Dworin [1985] provides an analysis of the significance of tax versus financial statement consolidation.

Earnings management research has been concerned with developing a proxy for discretionary accruals.[4] The researcher attempts to predict the discretionary accrual proxy (DAP_t) consistent with the hypothesized response of management to an incentive to manage income. Following the formulation of McNichols and Wilson [1988], if an estimate of NA_t, $NAEST_t$, is available, then DAP_t may be calculated as a proxy for DA_t:

$$DAP_t = TA_t - NAEST_t. \tag{2}$$

In her model of nondiscretionary accruals Jones [1991] argued that economic circumstances such as changing revenues affect the level of nondiscretionary accruals, so an expectation model for $NAEST_t$ should take into account such predictable economic and accounting interrelations. She regressed total accruals on changes in sales and gross plant, property, and equipment (*GPPE*). She argued that changes in sales were logically related to changes in working capital accounts and that *GPPE* was logically related to depreciation. After scaling her variables by prior year assets to reduce heteroscedasticity, she treated the regression error as DAP_t. We follow Jones [1991] in using changes in sales and *GPPE*. However, while she constructed firm-specific estimation models, we use firm-specific intercepts and pooled industry slopes.

The presence of competing pressures to manage earnings, such as earnings-based management compensation plans and earnings-based debt covenants, complicates the identification of the response, if any, of management to the *AMT* book provision. Our expectation model should minimize the extent to which our results are influenced by these effects provided that firms are subject to these incentives every year. Our expectation model treats any persistent accrual behavior as expected (nondiscretionary). Our model would, however, incorrectly identify a change in accruals in 1986 or 1987 caused by factors other than the *AMT* as due to the *AMT* book provision if the change was not also associated with the economic variables we incorporate. This disadvantage, however, is even greater in random walk or one-year differencing models.

5. *A Simple Model for DAP and the Partitioning of Firms*

5.1 MEASURING DISCRETIONARY ACCRUALS

We selected from the 1989 *Compustat* primary and secondary files all firms with SIC codes of 2000 to 4599 and complete data for 1980 to 1988 on total assets, total sales, current assets components, current liabilities components, gross plant, property, and equipment, and total depreciation.[5] These groups represent manufacturing and transportation, industries targeted by *AMT* supporters in 1986 as having reduced

[4] For a summary of the current earnings management literature, see Schipper [1989].

their tax liability through the use of tax shields. A total of 649 firms met our data requirements. The firms were grouped into 36 two-digit or three-digit SIC industries (15 within 2000–2999; 17 within 3000–3999; 4 within 4000–4599).

We define total accruals (*TA*) as the change in current assets less change in cash less change in current liabilities plus change in income taxes payable plus changes in current maturities of long-term debt less total depreciation, depletion, and amortization.[6]

Within each industry a firm was further classified as "large" if 1985 total assets were at least 80% of the 1985 total assets of the fifth largest firm in the industry. A "small" firm had 1985 total assets equal to or less than 10% of the total assets of the fifth largest firm in the industry. Based on these classifications, binary variables *LARGE* or *SMALL* were set equal to one if the firm met the definition, zero otherwise.

Total accruals for each year, 1981–85, were regressed against the change in sales, gross property, plant, and equipment (*GPPE*), and *LARGE* and *SMALL* as interaction terms with change in sales and gross property, plant, and equipment, a total of six regressors. All accounting variables were scaled by lagged assets. The regression was run using pooled data within each industry in deviation form.[7] The slopes for the regressors were the pooled cross-sectional time-series industry slopes. The estimated equation for each industry (expressed in terms of the ith firm) is:

$$\left(\frac{TA_{i,t}}{A_{i,t-1}} - \mu_{\frac{TA}{A},i}\right) = \beta_1\left(\frac{\Delta Sales_{i,t}}{A_{i,t-1}} - \mu_{\frac{\Delta Sales}{A},i}\right) + \beta_2\left(\frac{GPPE_{i,t}}{A_{i,t-1}} - \mu_{\frac{GPPE}{A},i}\right)$$

$$+ \beta_3\left(\frac{\Delta Sales_{i,t}}{A_{i,t-1}} - \mu_{\frac{\Delta Sales}{A},i}\right)LARGE + \beta_4\left(\frac{GPPE_{i,t}}{A_{i,t-1}} - \mu_{\frac{GPPE}{A},i}\right)LARGE$$

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[5] The following industries are missing from the sample: 3211–3231, Glass; 3630–3640, Appliances; 3651–3695, Electronics; 3711–3716, Motor Vehicles; 3812, Aero-systems; 3821–3829, Scientific Instruments; and 3873–3931, Watches, Jewelry, and Musical Instruments.

[6] Following Jones [1991], we calculate total accruals indirectly from the balance sheet and income statement rather than from the *Compustat* cash flow or working capital statement because of the many changes in reporting standards in recent years. While the indirect calculation is consistent over time, successive year-end balance sheets cannot necessarily be reconciled with income statement data if a significant acquisition or divestiture has occurred.

[7] The econometrics of panel data can be found in Hsiao [1986]. To control for firm effects, we use deviations of each firm's observation from the firm-specific mean. Regression in deviation form does not have an explicit intercept; rather, the firm-specific means function as the implicit, firm-specific intercepts. Our equations are essentially of the form of equation 16.2.16 in Judge et al. [1982].

$$+\beta_5\left(\frac{\Delta Sales_{i,t}}{A_{i,t-1}}-\mu_{\frac{\Delta Sales}{A},i}\right)SMALL+\beta_6\left(\frac{GPPE_{i,t}}{A_{i,t-1}}-\mu_{\frac{GPPE}{A},i}\right)SMALL$$

$$+\varepsilon_{i,t} \tag{3}$$

where A represents firm assets, and $\mu_{.,i}$ represents the mean of the variable for the ith firm for the 1981–85 base period. Although the a priori expectation for the sign of the coefficient of the change in sales is positive (indicating an increase in noncash working capital) and negative for gross property, plant, and equipment (indicating an increase in depreciation), the results are mixed. There is no a priori expectation about the sign of the coefficients for *LARGE* and *SMALL*. Table 1 lists the 36 industry groups included in the study along with some summary statistics.[8]

We interpret the generally high F statistics as indicating the model is applicable.[9] Treating the error terms in the regression equations as proxies for discretionary accruals (*DAP*), the range of adjusted R^2s suggests a range of discretionary accruals across industries.

The mean scaled total accruals for 1981–85 for each firm and the pooled industry slopes were then used to forecast scaled nondiscretionary total accruals ($\hat{NAEST}_i$) for 1986–88. The general form for each firm (i) in each year (t) is:

$$\hat{NAEST}_{i,t}=\mu_i+(b_1+b_3LARGE+b_5SMALL)\frac{\Delta Sales_{i,t}}{A_{i,t-1}}$$

$$+(b_2+b_4LARGE+b_6SMALL)\frac{GPPE_{i,t}}{A_{i,t-1}} \tag{4}$$

where b_i is the estimate of β_i. The difference between the observed scaled total accruals and the forecast (i.e., the forecast error) was taken as the discretionary accrual proxy (*DAP* scaled): $DAP_{i,t}=TA_{i,t}-NAEST_{i,t}$.[10]

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[8] Complete results are available upon request from the authors. The R^2 and F statistics have been adjusted to correct for estimating the model in deviation form (see Judge et al. [1982, p. 482], following equation 16.2.19).

[9] When the F statistic is not significant, the estimate of total accruals reduces to the firm-specific mean total accrual during the base period. Relative to a first-difference model, this model uses the means of *several* prior years as the estimate rather than the prior year. Since these are forecasting equations, the signs of the individual variables are not of particular interest. Of the 29 equations with statistically significant F statistics (at at least the 10% level), 28 contained at least one pair of variables interacting with a size dummy. Of those 28, 17 contained at least one statistically significant variable relating to size (at at least the 10% level).

[10] By construction, *DAP* sums to zero over 1981–85.

TABLE 1

Description of the Compustat Sample Used to Estimate Total Accruals[a]

Compustat Industry Code	Industry Group	*N*	*F*	Adj. R^2
2000–2199	Food and Tobacco	45	2.7**	.05
2200–2273	Textiles	24	15.0***	.47
2300–2390	Apparel	16	5.3***	.29
2400–2430	Wood Products	4	35.8***	.81
2451–2452	Mobile Homes	5	1.1	.02
2510–2590	Furniture	14	15.5***	.61
2600–2673	Paper	29	10.2***	.32
2711–2741	Publishing	16	2.7**	.10
2750–2790	Printing	19	0.7	−.03
2800–2821	Chemicals	22	8.7***	.35
2833–2836	Pharmaceutical	30	664.9***	.97
2840–2844	Soap and Cosmetics	17	5.1***	.27
2851–2857	Paint	9	24.0***	.72
2860–2891	Organic Chemicals	11	4.3***	.31
2911–2990	Petroleum Refining	32	2.1*	.05
3011–3060	Rubber	9	4.0***	.34
3080–3089	Plastics	12	2.0	.08
3100–3140	Leather	9	1.2	−.08
3241–3290	Cement	15	5.5***	.31
3310–3320	Steel	18	5.4***	.20
3330–3390	Nonferrous Metals	16	5.1***	.28
3411–3490	Fabricated Metal	46	9.7***	.22
3510–3569	Machinery	60	8.1***	.15
3570–3579	Computers	31	32.9***	.61
3580–3585	Refrigeration & Heating	10	2.2*	.11
3590–3590	Industrial Equipment	5	25.8***	.83
3600–3621	Electrical	16	1.5	.04
3720–3790	Transportation Equipment	31	6.1***	.20
3841–3851	Medical Equipment	13	5.9***	.36
3861–3861	Photographic Equipment	7	0.7	−.04
3942–3949	Toys and Sporting Goods	13	7.9***	.44
3950–3990	Miscellaneous Mfg.	9	7.4***	.42
4011–4011	Railroads	10	7.5***	.50
4100–4213	Trucking	8	2.2*	.13
4400–4412	Water Transport	4	2.9*	.32
4512–4522	Air Transport	14	0.8	−.03
	Total	649		

[a]*N* represents the total number of firms. The sample period for the regressions is 1981–85. The *F* and adjusted R^2 are from the industry forecast equations for total accruals and are corrected for the deviation model.

*Significant at the .10 level.
**Significant at the .05 level.
***Significant at the .01 level.

5.2 PARTITIONING FIRMS

Of the 649 *Compustat* firms, 574 were matched with the *SOI* corporate tax return file for the period July 1987 to June 1988.[11] Of the 574

[11] The 1987 *SOI* file contains tax return information on 86,646 corporations with year-ends July 1987–June 1988. Confidentiality law requires that no information be released

matched firms, 107 were discarded because their fiscal years ended before December 1987. An additional 53 firms were eliminated because of an incomplete or unusable Form 4626.[12] The final sample contains 414 firms.

We partition the sample and attempt to explain *DAP* by a regression of *DAP* on independent binary variables. The binary variable for a partition will equal one if the characteristics of the firm place it in that partition. The regression on binary variables is a test of the difference in the mean value of the dependent variable between the partition represented by the intercept and the partitions represented by the binary variables.[13] The intercept term captures the mean value of the dependent variable for firms not included in any partition represented by the binary explanatory variables. A regression coefficient for a binary variable represents the *difference* between the mean of that partition and the intercept.[14] The model we estimate is:

$$DAP_i = \alpha + \sum_{k=1}^{N-1} \gamma_k P_{i,k} + \varepsilon_i \tag{5}$$

where there are N partitions, P_0 to P_{N-1}, and $P_{i,k} = 1$ if firm i is in partition k, and 0 otherwise. The γ_k are the coefficients to be estimated.

Our partitions are based on *AMT* exposure as a measure of tax status. If *DAP* is unrelated to the difference between the status represented by a partition and the status represented by the intercept group, then the mean value of *DAP* for the partition will be insignificantly different from the mean value of *DAP* for the intercept. It is critical, therefore, that the independent binary regression variables not be correlated with *DAP* by construction. Our final partitioning of the binary regression variables was determined without reference to the value of *DAP* to avoid this possibility.

The sample of 414 firms was first divided into two partitions based on the presence of a Form 4626.[15] For those firms with a Form 4626,

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that could identify a firm and no statistic be released that is the result of a calculation involving fewer than three firms. The authors without access to the *SOI* file do not know the identities of the matched firms.

[12] Most of these 53 firms paid the environmental tax but did not provide the information necessary to compute tentative *AMT*, since they were not subject to the *AMT*.

[13] There are a number of advantages to the regression approach over analysis of variance or covariance. First, regression allows us to test simultaneously for differences among a number of partitions. Second, we are able to test whether any individual coefficient is different from zero. Third, the adjusted R^2 associated with each equation will provide us with an indication of how much of the unexpected accrual can be explained by the partitions. Fourth, the regression model allows us to test nested specifications of the model. See Kennedy [1992] and Kmenta [1986].

[14] See Pindyck and Rubinfeld [1991, sec. 5.2 and appendix 5.1], Kennedy [1992, chap. 14], and Kmenta [1986, chap. 11].

[15] Twenty-seven firms without Form 4626 met our other data requirements. These firms were either small or without taxable income; except for the absence of the Form 4626, these firms have the same characteristics as other sample firms not exposed to the *AMT* and are combined with that group for the study.

we used that data to calculate "as if" *AMT* liability. For each firm, our estimate of discretionary accruals (*DAP*) was subtracted from the adjusted book income reported on Form 4626 in order to calculate book income in the absence of discretionary accruals. We then determined the firm's *AMT* liability given this revised *AMT* book. This "as if" *AMT* liability formed our "calculated prior *AMT*," i.e., our estimate of the *AMT* liability given the firm's "trial" *AMT* book income before discretionary accruals represented by *DAP*.[16] Our sample contained only one firm that would not experience a change in tentative *AMT* as a result of subtracting *DAP* from observed *AMT* book. All sample firms would have experienced a change in the *AMT* book income preference as a result of the apparent discretionary accrual behavior. Thus, *AMT* book exceeded *AMTI* before book either prior to the *DAP* adjustment, or after the *DAP* adjustment, or both.

We then used the observed and calculated prior *AMT* to further divide the partition of firms with a Form 4626. Given our two sets of classifications, one based on the observed *AMT* liability and the other based on our estimate, there are four possible partitions for a firm: a positive *AMT* for both the observed and calculated prior; no *AMT* in either state; a positive *AMT* in the observed state but not for the calculated prior; a positive *AMT* for the calculated prior but not the observed. Our fifth partition consists of firms without a Form 4626. Each of the five partitions can be further divided into those firms with a positive *DAP* and those with a negative *DAP*. This yields ten mutually exclusive partitions, which we have labeled 0 to 9 in table 2.

If all of the firms assigned to a binary regression variable have the same sign for their value of *DAP*, the variable would, by construction, be correlated with the value of *DAP* and would bias the results of the regression. To address this, we combine our initial partitions into larger partitions that may exhibit either a positive or negative *DAP* and will not be biased. Partitions 0, 1, 8, and 9 represent firms with no *AMT* liability in either the observed or calculated state. We combine these into a single partition (0,1,8,9). Partitions 6 and 7 represent the firms with a positive *AMT* in both states. We combine these into (6,7). Partitions 2 and 5 represent firms with a positive *AMT* in one state. These are firms which apparently changed their *AMT* status through the use of discretionary accruals. We combine partitions 2 and 5 into partition (2,5). The partitions (2,5) and (6,7) may be further combined into partition (2,5,6,7) to represent firms with a positive *AMT* in either the observed and/or calculated prior state. Our regression variables, then, before we consider *NOL*s and *FTC*s, are (0,1,8,9) for firms with zero

[16] We assume only that the unexpected deviation in the accrual component of financial entity book income is a proxy for the same deviation in the accrual component of the tax entity *AMT* book income. We are not equating the *levels* of financial entity book and tax entity *AMT* book. We have noted earlier that these levels may differ substantially because of differences between financial and tax-consolidated entities.

TABLE 2
Distribution and Characteristics of Firms by Partition[a]

Partition	*N*	Observed *AMT*	Calculated Prior	*DAP*[b]
0	146	0	0	+
1	112	0	0	–
2	15	+	0	+
3[c]	0	+	0	–
4[c]	0	0	+	+
5	44	0	+	–
6	32	+	+	+
7	38	+	+	–
8[d]	11	0	0	+
9[d]	16	0	0	–
Total	414			

[a]Observed *AMT* represents whether firms in the partition paid the *AMT* in 1987 (indicated by +). The calculated prior represents the estimate of firms' *AMT* liability after *DAP* has been subtracted from their reported *AMT* book income. *N* is the number of firms in each partition.

[b]*DAP* is the sign of the estimated discretionary accrual. A negative sign for *DAP* implies that firms undertook income-decreasing accruals.

[c]Partitions 3 and 4 are empty because the sign of *DAP* is inconsistent with the indicated change between the observed and calculated prior.

[d]These firms did not file a Form 4626 but were otherwise identical to partitions 0 and 1 as firms not exposed to the *AMT* in either state. They are combined with partitions 0 and 1 in the statistical tests.

AMT in either state, and either (2,5) (positive *AMT* in one state) and (6,7) (positive *AMT* in both states) or (2,5,6,7).[17]

5.3 PARTITIONING WITH NOLS AND FTCS

The apparent discretionary accrual behavior of firms in partitions 2 and 6 is anomalous in that they apparently increased their exposure to the *AMT*. Such behavior would be explained if these firms were able to eliminate 90% (or more) of their *AMT* liability with *NOL*s, tax credits, or the *AMT* exemption. Of these, *NOL*s and *FTC*s were applicable to firms of all sizes and had designated lines on the 1987 Form 4626.[18]

To investigate the possible effects of *NOL*s and *FTC*s, we identified firms that eliminated the maximum 90% of *AMTI* with *NOL*s and constructed a binary variable, *LIMNOL*, equal to one for such firms. Next, firms that took the maximum *FTC*, given their *NOL*s, were identified and a binary variable, *LIMFTC*, was set equal to one for such firms. Finally, a binary variable, *LIMIT*, was set equal to one if either *LIMNOL* or *LIMFTC* was equal to one.

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[17] Partitions 3 and 4 are not used because they are empty. For these partitions the individual sign of *DAP* is inconsistent with the indicated change between observed and calculated prior states. For example, partition 3 represents a firm with no calculated *AMT* liability but which, by decreasing its *AMT* book, created an *AMT* liability.

[18] The 1987 version of the form should but did not have a line for claiming the general business credit, and many firms failed to claim the credit at the time of filing their original 1987 returns. The Technical Corrections Act of 1988 clarified the application of the general business credit to the *AMT* retroactive to 1987, and firms are expected to file amended returns to claim the credit.

Partitions 2, 5, 6, and 7 were further partitioned into *U*2, *U*5, *U*6, and *U*7 and *L*2, *L*5, *L*6, and *L*7, where, for example, *U*2 represents firms in partition 2 not in limit status with respect to *NOL*s and *FTC*s ("unlimited"). *L*2 represents those firms in partition 2 that were in limit status with respect to either *NOL*s, *FTC*s, or both ("limited"). The term "in limit status" will be used hereafter to mean "in limit status with respect to *NOL*s and *FTC*s." Treating the 47 firms in partitions 2 and 6 together (firms exposed to the *AMT* in at least one state that exhibit income-*increasing* accruals in 1987), 32 (68%) are in limit status (*L*2 or *L*6) and 15 are not (*U*2 or *U*6). Treating the 82 firms in partitions 5 and 7 together (firms exposed to the *AMT* in at least one state that exhibit income-*decreasing* accruals in 1987), 22 (27%) are in limit status (all 22 are in *L*7) and 60 are not (*U*5 or *U*7). Descriptive statistics for the complete sample and the final partitions are provided in table 3.

Partitions by limit status allow for the development of the following set of binary variables to be used in the regression model: *U*(2,5), *U*(6,7), and *U*(2,5,6,7) and *L*(2,5), *L*(6,7), and *L*(2,5,6,7). Confidentiality requirements preclude presentation of data for *L*(2,5) and *L*(6,7). Firms exposed to the *AMT* but in a limit status are represented by *L*(2,5,6,7).

Partition *U*(2,5,6,7) contains firms exposed to the *AMT* in 1987 but not in limit status. Partition (0,1,8,9) contains control firms. Partition *L*(2,5,6,7) contains firms not fully exposed to the *AMT* in 1987 due to *FTC*s and *NOL*s. We interpret a negative mean *DAP* for *U*(2,5,6,7) and its components compared to (0,1,8,9) as evidence that firms not in a limit status used negative discretionary accruals in response to the corporate *AMT*. We also expect a positive mean *DAP* in 1986 for *U*(2,5,6,7) as compared to (0,1,8,9) if *AMT* planning for 1987 extended to 1986.

Specifically, the equations to be estimated for each year are:

$$DAP_t = \alpha + \gamma_1 U(2,5,6,7) + \gamma_2 L(2,5,6,7) + \varepsilon. \quad (6)$$

$$DAP_t = \alpha + \gamma_3 U(2,5) + \gamma_4 U(6,7) + \gamma_2 L(2,5,6,7) + \varepsilon. \quad (7)$$

$$DAP_t = \alpha + \gamma_5 U(2) + \gamma_6 U(5) + \gamma_4 U(6,7) + \gamma_2 L(2,5,6,7) + \varepsilon. \quad (8)$$

6. *Results*

The results of regressing the partitions on discretionary accruals are presented in table 4.

The coefficients for the 1987 equations support hypothesis *H*1. The mean *DAP*87 of the intercept (the reference group (0,1,8,9)) is +0.01111. The mean *DAP*87 of partition *U*(2,5,6,7) differs from that of the intercept by –0.07455 and is statistically significant at the 1% level (equation (1) in table 4). The mean *DAP*87 of partition *U*(2,5,6,7) (–0.06344) is the sum of the intercept (0.01111) and the coefficient on the partition (–0.07455). This suggests that, compared to the patterns established in 1981–85, firms exposed to the corporate *AMT* took unexpected negative discretionary accruals compared to firms not exposed to the *AMT*. The

TABLE 3

Description of the Matched Data by Partition, 1987[a]

(Dollar Amounts in Millions)

	Complete Sample		Partition 0		Partition 1	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Number of Firms	414		146		112	
Total Assets, 1987 (*Compustat*)	2477.85	5811.28	2382.61	5022.02	2237.86	5744.57
Pretax Book Income[b] (*Compustat*)	0.0937	0.1490	0.1131	0.2012	0.1277	0.1197
Pretax Book Income[b] (Form 4626)	0.0695	0.1375	0.8000	0.2011	0.0983	0.1064
$NAEST^2$	−0.0346	0.0789	−0.0581	0.0728	−0.0163	0.0471
DAP[b]	−0.0016	0.1159	0.0635	0.0807	−0.0478	0.0510
NOL Limit (share of total sample)	0.1184		0.0068		0.0000	
FTC Limit (share of total sample)	0.0386		0.0616		0.0089	

	Partition *U*2		Partition *L*2		Partition *U*5[c]	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Number of Firms	10		5		44	
Total Assets, 1987 (*Compustat*)	4744.02	4692.48	2287.73	1526.52	2880.02	6263.28
Pretax Book Income[b] (*Compustat*)	0.0969	0.0759	0.0364	0.0347	0.0328	0.0790
Pretax Book Income[b] (Form 4626)	0.0767	0.0631	0.0336	0.0280	0.0299	0.0550
$NAEST^2$	−0.0544	0.0558	−0.0549	0.0288	−0.0032	0.0578
DAP[b]	0.1063	0.1082	0.0738	0.0538	−0.1121	0.1477
NOL Limit (share)	0.0000		0.6000		0.0000	
FTC Limit (share of total sample)	0.0000		0.4000		0.0000	

	Partition *U*6		Partition *L*6		Partition *U*7	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Number of Firms	5		27		16	
Total Assets, 1987 (*Compustat*)	5775.28	4916.57	1363.53	1905.42	7225.94	15484.3
Pretax Book Income[b] (*Compustat*)	0.1008	0.0421	0.0653	0.0662	0.0988	0.0668
Pretax Book Income[b] (Form 4626)	0.0837	0.0468	0.0581	0.0538	0.0556	0.0365
$NAEST^2$	−0.0456	0.0440	−0.0645	0.1455	0.0055	0.0982
DAP[b]	0.0289	0.0265	0.0806	0.1058	−0.0647	0.0864
NOL Limit (share of total sample)	0.0000		0.8519		0.0000	
FTC Limit (share of total sample)	0.0000		0.1481		0.0000	

TABLE 3 — *continued*

	Partition *L7*		Partiton 8		Partition 9	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Number of Firms	22		11		16	
Total Assets, 1987 (*Compustat*)	1490.91	2231.39	494.516	1306.36	1386.43	3528.70
Pretax Book Income[b] (*Compustat*)	0.0565	0.0577	0.0747	0.1061	-0.0441	0.1200
Pretax Book Income[b] (Form 4626)	0.0443	0.0601	NA[d]	NA[d]	NA[d]	NA[d]
$NAEST^2$	-0.0107	0.0588	-0.0943	0.1169	0.0069	0.1065
DAP[b]	-0.0703	0.0842	0.1180	0.1292	-0.1285	0.1209
NOL Limit (share of total sample)	1.0000		0.0000		0.0000	
FTC Limit (share of total sample)	0.0000		0.0000		0.0000	

[a]The data are for 414 firms for which both financial and tax data are available. The partition labels follow the layout of table 2 modified to show "*L*" if the firm used *NOL*s and/or *FTC*s to eliminate 90% (the limit) of its *AMT* liability.

[b]Scaled by 1986 total assets.

[c]Partition *L5* had no firms.

[d]Firms in these partitions did not file Form 4626.

TABLE 4

Partitioned Model with and without Limit Status, 1986 and 1987[a]

(Standard Errors in Parentheses)

	Intercept	*U*(2,5,6,7)	*U*(2,5)	*U*2	*U*5	*U*(6,7)	*L*(2,5,6,7)	*F*	R^2	Adj. R^2
Dependent Variable: *DAP87*										
(1)	0.01111*	−0.07455***					0.00626	13.935***	0.0635	0.0589
	(0.00666)	(0.01459)					(0.01669)			
(2)	0.01111*		−0.08273***			−0.05350**	0.00626	9.631***	0.0658	0.0590
	(0.00666)		(0.01668)			(0.02542)	(0.01668)			
(3)	0.01111*			0.09523***	−0.12318***	−0.05350**	0.00626	16.082***	0.1359	0.1275
	(0.00641)			(0.03483)	(0.01753)	(0.02448)	(0.01607)			
Dependent Variable: DAP86										
(4)	0.00068	−0.01737					−0.00839	0.590	0.0029	−0.0020
	(0.00752)	(0.01646)					(0.01883)			
(5)	0.00068		−0.01309			−0.02838	−0.00839	0.465	0.0034	−0.0039
	(0.00752)		(0.01885)			(0.02871)	(0.01885)			
(6)	0.00068			−0.09528**	0.00560	−0.02838	−0.00839	1.651	0.0159	0.0063
	(0.00748)			(0.04065)	(0.02046)	(0.02857)	(0.01875)			

[a]$N = 414$. The general form of the estimated equations is:

$$DAP_i = \alpha + \sum_{k=1}^{N-1} \gamma_k P_{i,k} + \varepsilon_i$$

where *DAP* is the discretionary accrual proxy for firm i in 1986 or 1987, α represents the estimate of *DAP* for firms not exposed to the *AMT* (those in partition (0,1,8,9)), and $P_{i,k}$ is equal to one if firm i is in partition k, and zero otherwise. Coefficient values are measured as a share of that year's total accruals scaled by previous year's assets. The intercept represents the mean of firms not exposed to the *AMT* (0,1,8,9).

*Significant at the .10 level.

**Significant at the .05 level.

***Significant at the .01 level.

coefficient of $L(2,5,6,7)$ is insignificantly different from zero at conventional levels.

Results in equation (2) suggest that splitting the exposed group, $U(2,5,6,7)$, into those who paid the tax, $U(2,5)$, versus those who completely eliminated it, $U(6,7)$, does not improve or change the results. A Chow test[19] does not allow us to reject the restricted model of $U(2,5,6,7)$ against the full model ($U(2,5)$ and $U(6,7)$ broken out) ($F_{1,410} = 1.02$).

Equation (3), which shows the effect of breaking $U(2,5)$ into $U(2)$ and $U(5)$, allows analysis of the decision to combine the crossover groups. $U(2)$ represents firms that apparently crossed over into the *AMT*, and $U(5)$ firms that apparently crossed out of the *AMT*. Breaking partition $U(2,5)$ into two separate partitions markedly increases the F statistic and adjusted R^2. As previously explained, we believe that the most conservative research approach is to offset the extremely strong results for $U(5)$ by combining $U2$ and $U5$ into $U(2,5)$ and further into $U(2,5,6,7)$.

The results for *DAP*86 do not indicate *AMT* planning in 1986 by firms exposed to the *AMT* in 1987. Hypothesis $H2$ is therefore not supported.

We tested for the sensitivity of our results to outliers by first defining as an outlier a firm with a 1987 scaled *DAP* value of ±2.575 standard deviations from the mean. An observation was classified as an outlier if its 1987 scaled *DAP* value was at least .30 (in absolute value). Of the 414 firms in our matched sample, 11 had such extreme values, or 2.7% of the total compared with the 1.0% of the total expected if normal. The results without these 11 outliers, not reported, continue to support hypothesis $H1$, and provide no support to hypothesis $H2$.[20]

Firms of different asset sizes may have differing abilities to manage their earnings; larger firms are generally subject to closer surveillance from both the financial markets and from the IRS.[21] This surveillance may reduce the incentive to employ earnings management to reduce *AMT* exposure. To explore this possibility, we repeat the tests in table 4 after partitioning on size.[22]

Our *DAP* model accounts for some of the effects of size. First, the data were scaled by prior year assets to reduce heteroscedasticity. Second, within each industry, we have explicitly controlled for the effects

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[19] See Judge et al. [1982], Kennedy [1992], Kmenta [1986], or Pindyck and Rubinfeld [1991].

[20] These results are available from the authors upon request.

[21] The IRS uses dollars of assets as one of its basic classifiers in tracking corporate tax returns.

[22] Larger firms appear to be more likely to be subject to the *AMT*. Of the 98 firms with at least $2.5 billion in assets, 40 (40.8%) are exposed to the *AMT*. For the 316 firms with assets below $2.5 billion, 89 (28.2%) are exposed. A χ^2 test of the association between size and *AMT* exposure is significant at 0.05 ($\chi^2 = 5.7$).

of large and small companies in deriving our *DAP* forecast equation slopes.

In order to test further the sensitivity of our results to size, we divided partitions (0,1,8,9), *U*(2,5,6,7), and *L*(2,5,6,7) into five asset classes based on *Compustat* data for 1987: above $10.0 billion (23 firms); $2.5 to $10.0 billion (75 firms); $0.5 to $2.5 billion (114 firms); $0.1 to $0.5 billion (118 firms); and below $0.1 billion (84 firms). The regressions for *DAP*87 and *DAP*86 were then repeated for each asset class. Table 5 presents the results.

For the 23 firms with 1987 *Compustat* assets above $10.0 billion (equation (7)), there appears to be no statistical difference between the mean *DAP*87 of (0,1,8,9) (14 firms) and *U*(2,5,6,7) (9 firms). There are no firms in *L*(2,5,6,7). Based on these results, the 9 firms exposed to the *AMT* did not take more income-decreasing discretionary accruals than the 14 firms not exposed.

For all three asset classes between $0.1 and $10.0 billion (equations (8)–(11)), it appears firms exposed to the *AMT* and not in limit status took significantly more income-decreasing discretionary accruals than firms not exposed to the *AMT* or exposed to the *AMT* and in limit status. Within classes, the coefficient of *U*(2,5,6,7) becomes more negative as asset size decreases.

The coefficient of *U*(2,5,6,7) for the asset class below $0.1 billion is statistically insignificant at conventional levels, as is the equation. However, all of the 11 outliers are in the two smallest asset classes; if these outliers are removed the *F* statistics for the equations of both the $0.1 to $0.5 billion class and the below $0.1 billion class are significant at the .01 level or better. Similarly, the coefficient of *U*(2,5,6,7) is negative and significant at the .01 level in both regressions. Confidentiality requirements preclude the presentation of these two regressions.

The results for *DAP*86 in table 5 do not indicate *AMT* planning in 1986 by firms exposed to the *AMT* in 1987. The coefficient of *U*(2,5,6,7) is either not of the predicted sign for 1986 or is not significantly different from zero at the .10 level.

The results of table 5 indicate that the income-decreasing response is greater among smaller firms. If the 414 firms are divided into asset classes, the regression results suggest no response for the largest firms. For the remaining firms, with outliers removed, the general pattern that emerges is that the response to the *AMT* is inversely related to asset size.

7. *Summary*

This study tested whether firms affected by the *AMT* book income provision managed their earnings in 1986 and 1987 to reduce their tax liability. We find evidence that firms potentially exposed to the *AMT* undertook income-reducing accruals in 1987 when compared to firms not

TABLE 5

Partitioned Model by Asset Size[a] (Standard Errors in Parentheses)

		Intercept	$U(2,5,6,7)$	$L(2,5,6,7)$	F	R^2	Adj. R^2
Dependent Variable: *DAP87*							
(7)	assets > $10 billion	−0.00650	−0.00021	—	0.000	0.0000	−0.0476
	$N = 23$	(0.01173)	(0.01875)				
(8)	$2.5 billion < assets < $10 billion	0.02446*	−0.05625**	−0.02613	3.052*	0.0782	0.0525
	$N = 75$	(0.01242)	(0.02306)	(0.02601)			
(9)	$0.5 billion < assets < $2.5 billion	−0.00537	−0.06346***	0.03317	6.024***	0.0979	0.0817
	$N = 114$	(0.00898)	(0.02177)	(0.02363)			
(10)	$0.1 billion < assets < $0.5 billion[b]	0.02014	−0.13800***	−0.00346	10.375***	0.1529	0.1381
	$N = 118$	(0.01323)	(0.03065)	(0.03290)			
(11)	assets < $0.1 billion[b]	0.01565	−0.07529	0.01194	1.206	0.0289	0.0049
	$N = 84$	(0.02062)	(0.05084)	(0.05274)			
Dependent Variable: DAP86							
(12)	assets > $10 billion	0.00852	−0.01438	—	0.504	0.0234	−0.0231
	$N = 23$	(0.01267)	(0.02026)				
(13)	$2.5 billion < assets < $10 billion	−0.00432	−.00285	0.04328	1.347	0.361	0.0093
	$N = 75$	(0.01282)	(0.02378)	(0.02684)			
(14)	$0.5 billion < assets < $2.5 billion	0.00562	−0.02472	−0.00557	0.595	0.0106	−0.0072
	$N = 114$	(0.00936)	(0.02269)	(0.02463)			
(15)	$0.1 billion < assets < $0.5 billion	−0.01984	0.05762	−0.04493	1.867	0.0315	0.0146
	$N = 118$	(0.01743)	(0.04039)	(0.04336)			
(16)	assets < $0.1 billion	0.02368	−0.15415***	−0.01343	4.932***	0.1086	0.0865
	$N = 84$	(0.01996)	(0.04922)	(0.05106)			

[a]The regression model for firms in each asset grouping is:

$$DAP_i = \alpha + \gamma_1 U(2,5,6,7) + \gamma_2 L(2,5,6,7) + \varepsilon_i$$

where DAP_i is the estimated discretionary accrual for firm i in 1986 or 1987, α represents the estimate of *DAP* for firms not exposed to the *AMT* (those in partition (0,1,8,9)), and $U(2,5,6,7)$ is equal to one if firm i was fully exposed to the *AMT*, and zero otherwise, and $L(2,5,6,7)$ is equal to one if the firm was exposed to the *AMT* but could reduce its tax liability through the use of *NOL*s and tax credits, and zero otherwise. Coefficient values are measured as a share of total accruals scaled by the previous year's assets. N represents the number of observations in each asset category.

[b]For a discussion of the effects of removing outliers, see section 6 of the text.

*Significant at the .10 level.

**Significant at the .05 level.

***Significant at the .01 level.

so exposed. Some firms appeared to have eliminated all 1987 exposure to the *AMT* through income-decreasing accruals. In addition, we found that most firms not appearing to respond to *AMT* exposure eliminated 90% (the limit under *AMT* rules) of their corporate *AMT* liability with net operating loss carryovers (*NOLs*) and foreign tax credits (*FTCs*). Disaggregating by asset size, we find no evidence to suggest that the largest firms (1987 assets in excess of $10 billion) undertook income-decreasing accruals in response to the *AMT*. As asset size declines, evidence of earnings management becomes more pronounced. Prior literature has suggested that firms anticipating exposure to the *AMT* in 1987 might have attempted to decrease 1987 book income by accelerating income into 1986 and deferring expenses into 1987. Our results, however, do not provide evidence that this occurred.

APPENDIX A
The Use of Financial Data to Classify Firms' AMT Exposure

Gramlich [1988; 1991] formulated a relation between financial accounting data and the *AMT* goal of taxing full economic income, based on the assumption that the principal effect of the *AMT* versus the regular tax was to deny deferrals. He constructed a ratio of taxes paid to tax expense (*TP/TE*), where *TP* and *TE* were each defined as the total for a three-year base period, and hypothesized that firms with lower ratios of *TP/TE* were more likely to be affected by the *AMT* because they had most benefited from deferrals in previous years. A similar *TP/TE* ratio was tested by Choi, Gramlich, and Thomas [1991; 1992]. The extent to which *TP/TE* is actually related to *AMT* exposure is an empirical issue which can be tested using tax return information.

We ranked our sample of firms by *TP/TE* using four different sample selection rules and three base periods.[23] The first measure of *TP/TE* follows Gramlich [1988; 1991] and requires firms to have positive pretax income in each of 1984, 1985, and 1986.[24] We disagree with the re-

[23] The original *Compustat* data for this study were developed from the fall 1989 primary, secondary, and over-the-counter files using data through 1987 or, in a few cases, 1988. We updated our data to perform the tests of *TP/TE* using the fall 1991 primary, secondary, over-the-counter, *and* research files. An extract of the needed variables for all companies with SIC codes 2000–4599 was prepared and matched with our 414 firms by 1987 CUSIP number. Twenty-two firms could not be matched. Although the research staff at *Compustat* offered to determine the changed CUSIP numbers if the company names were furnished, this could not be done without potentially violating confidentiality restrictions.

[24] Two caveats should be noted. (1) We *do not* follow Gramlich in our definition of pretax income used for the restriction discussed above. Gramlich subtracted, rather than added, minority interest (*Compustat* item number 49) to net income (#18) and worldwide income tax expense (#16) to determine pretax income, while we use pretax income (#170, which is the sum of items 49, 18, and 16). (2) We *do* follow Gramlich in accepting the total tax expense as reported on *Compustat*, but note that this ignores taxes which have been netted against extraordinary items and discontinued operations (#48).

quirement in that we find no need for it. Our second model follows Choi, Gramlich, and Thomas [1991; 1992] in requiring only that the three-year denominator, *TE*, be greater than zero. Our priors were that firms with no total tax expense during the three-year base period were likely to be exposed to the *AMT* because they would have *NOL*s, and our third model assigns them a ratio of zero. In addition, our third model treats all ratios greater than one as equal to one because it is not clear that any distinction usefully can be made between such firms. Our fourth model extends the third model using a five- rather than a three-year base. To test the sensitivity of the *TP/TE* measure to the choice of a base period we test each measure in three different time periods. We begin with Gramlich's base period of 1984–86, although we believe 1986 should be excluded because it was part of his test period (and ours) of earnings management in 1986 and 1987. We also test three-year periods ending in 1985 and 1984. This framework establishes a total of twelve tests: four measures of *TP/TE* tested against each of three base periods.

For each model, and each base period, the ranked firms were divided into quartiles. We then tested whether the proportion of firms in the first three quartiles (those with the lowest ratio of *TP/TE*) who paid an *AMT* in 1987 differed from the proportion of firms who paid an *AMT* in the fourth quartile (those with the highest ratio of *TP/TE*). We also tested whether the proportion of firms in the first three quartiles who were exposed to the *AMT* (as discussed in this paper) differed from the proportion of firms so exposed in the fourth quartile. The emphasis in the literature to date has been on the fourth versus first quartile and has argued that the proportion of *AMT* firms will be greater in the first quartile than in the fourth. Accordingly, the results presented here are limited to a comparison of the differences, if any, between the proportion of *AMT* firms in the fourth quartile and firms in the first quartile. The results of these tests are shown in table 6.

Each cell in table 6 compares the proportion of firms in the fourth quartile who paid an *AMT* to the proportion in the first quartile. Gramlich argued that the proportion in the first quartile (the second proportion listed in each cell) will be the greater. We have indicated with a "+" each cell in which the first quartile has the higher proportion. We have also indicated whether the difference, positive *or* negative, is statistically significant. Finally, we have identified the three cells that have been used in earlier studies.

Only four of the twelve cells in table 6 show the pattern suggested in the literature. None of the four has been tested previously. Only two of the twelve cells show a significantly different (at .10 or better) proportion of firms paying the *AMT* in the two quartiles. Both of those cells were used by Choi, Gramlich, and Thomas, and both are of the wrong sign and significant at the .05 level. This suggests that the *TP/TE* ratio does not provide a sufficient discrimination of firms who paid the *AMT*.

TABLE 6

TP/TE as a Proxy for AMT Payment[a]

Base Period[b] (Ending Year)	*TP/TE* Measure[c] (1)	(2)	(3)	(4)
1984	.17, .22+	.27, .22	.25, .32+	.25, .30+
1985	.20, .15	.29, .18**[d]	.29, .30+	.30, .30
1986	.21, .12[e]	.29, .14**[d]	.30, .30	.31, .29

[a]This table shows the results of testing *TP/TE* against firms' payment of an *AMT* as reported on the tax return. The sample proportion of firms paying the *AMT* was .20. The first number represents the proportion of firms in the fourth quartile paying the *AMT*. The second number represents the proportion of firms in the first quartile paying the *AMT*. We test the statistical significance of the difference in these two proportions.

[b]The base periods are three years, except for the tests of *TP/TE* measure (4) when they are five years.

[c]The measures of *TP/TE* in each model are as follows: model (1) firms must have positive pretax income in each base year; model (2) firms must have a three-year $TE > 0$; model (3) any *TP/TE* ratio in excess of one is set equal to one and any *TP/TE* less than zero or missing is set equal to zero; model (4) same as model (3) but with a five-year base.

[d]Measures used by Choi, Gramlich, and Thomas [1991; 1992].

[e]Measure used by Gramlich [1988; 1991].

*Significant at the .10 level.

**Significant at the .05 level.

***Significant at the .01 level.

Table 7 repeats the tests presented in table 6 but uses exposure to the *AMT*, as developed in this paper, rather than payment of the *AMT* as the benchmark. Eight of the twelve cells show a greater proportion of firms exposed to the *AMT* in the first quartile than the fourth. Two of the measures show a statistically significant difference (at .10 or better), and both are of the correct sign. Table 7 suggests that a *TP/TE* ratio, appropriately modified, is sensitive in identifying these firms.

In summary, we find no statistical difference at usual levels of significance between the two tested proxies of *AMT* tax status and membership in the first (lowest) and fourth (highest) *TP/TE*-ratio quartiles as

TABLE 7

TP/TE as a Proxy AMT Exposure[a]

Base Period[b] (Ending Year)	*TP/TE* Measure[c] (1)	(2)	(3)	(4)
1984	.25, .36+	.33, .36+	.32, .46+**	.36, .43+
1985	.31, .29	.40, .34[d]	.40, .43+	.38, .49+*
1986	.30, .26[e]	.40, .31[d]	.40, .43+	.38, .45+

[a]This table shows the results of testing *TP/TE* against our measure of *AMT* exposure (that is, a firm in partition (2,5,6,7)). The sample proportion of firms paying the *AMT* was .31. The first number represents the proportion of firms in the fourth quartile exposed to the *AMT*. The second number represents the proportion of firms in the first quartile exposed to the *AMT*. We test the statistical significance of the difference in these two proportions.

[b]The base periods are three years, except for the tests of *TP/TE* measure (4) when they are five years.

[c]The measures of *TP/TE* in each model are as follows: model (1) firms must have positive pretax income in each base year, (2) firms must have a three-year $TE > 0$, (3) any *TP/TE* ratio in excess of one is set equal to one and any *TP/TE* less than zero or missing is set equal to zero, (4) same as model (3) but with a five-year base.

[d]Measures used by Choi, Gramlich, and Thomas [1991; 1992].

[e]Measure used by Gramlich [1988; 1991].

*Significant at the .10 level.

**Significant at the .05 level.

***Significant at the .01 level.

previously formulated in the literature. Tables 6 and 7 suggest that the financial statement ratios identified by Gramlich (model 1) and by Choi, Gramlich, and Thomas (model 2) do not capture *AMT* tax status as reported on tax returns. While these earlier studies have used larger samples and a broader range of industries, there do not seem to be any apparent reasons why the results of table 6 and table 7 would change under those circumstances. This suggests the reliance on the coincidence of a low *TP/TE* ratio and a one-year change in total accruals for an indicator of *AMT*-induced earnings management is also not sufficient.

REFERENCES

CHOI, W. W.; J. D. GRAMLICH; AND J. K. THOMAS. "Firm Responses to the Book Income Adjustment of the Corporate Alternative Minimum Tax." Paper presented at the annual meeting of the American Accounting Association, Nashville, Tennessee, August 1991.

———. "Earnings Management in Response to the Book Income Adjustment of the Corporate Alternative Minimum Tax." Working paper, Columbia University, 1992.

DWORIN, L. "On Estimating Corporate Tax Liabilities from Financial Statements." *Tax Notes* (December 2, 1985): 965–71.

GRAMLICH, J. D. "An Empirical Analysis of the Effect of the Alternative Minimum Tax Book Income Adjustment on the Extent of Discretionary Accounting Accruals." Ph.D. dissertation, University of Missouri, Columbia, 1988.

———. "The Effect of the Alternative Tax Book Income Adjustment on Accrual Decisions." *Journal of the American Taxation Association* 13 (Spring 1991): 36–56.

HEALY, P. M. "The Impact of Bonus Schemes on the Selection of Accounting Principles." *Journal of Accounting and Economics* 7 (April 1985): 85–107.

HSIAO, C. *Analysis of Panel Data.* Cambridge: Cambridge University Press, 1986.

JONES, J. "The Effects of Foreign Trade Regulation on Accounting Choices." *Journal of Accounting Research* 29 (Autumn 1991): 193–228.

JUDGE, G. G.; R. C. HILL; W. E. GRIFFITHS; H. LUTKEPOHL; AND T. LEE. *Introduction to the Theory and Practice of Econometrics.* New York: Wiley, 1982.

KENNEDY, P. *A Guide to Econometrics.* Cambridge, Mass.: The M.I.T. Press, 1992.

KMENTA, J. *Elements of Econometrics.* New York: Macmillan, 1986.

MANZON, G. B., JR. "Earnings Management of Firms Subject to the Alternative Minimum Tax." *Journal of the American Taxation Association* 14 (Fall 1992): 88–111.

MCNICHOLS, M., AND G. P. WILSON. "Evidence of Earnings Management from the Provision for Bad Debts." *Journal of Accounting Research* 26 (Supplement 1988): 1–31.

PINDYCK, R. S., AND D. L. RUBINFELD. *Econometric Models and Economic Forecasts.* New York: McGraw-Hill, 1991.

SCHIPPER, K. "Commentary on Earnings Management." *Accounting Horizons* 3 (December 1989): 91–102.

SCHOLES, M. S.; G. P. WILSON; AND M. A. WOLFSON. "Firms' Response to Anticipated Reductions in Tax Rates: The Tax Reform Act of 1986." *Journal of Accounting Research* (Supplement 1992): 161–85.

SHEPPARD, L. "The Book Income Preference in the Corporate Minimum Tax." *Tax Notes* (November 17, 1986): 616–19.

SUNLEY, E. "Thinking about Senator Packwood's Alternative Minimum Tax for Corporations." *Tax Notes* (April 28, 1986): 395–98.

TREUBERT, P., AND A. PAVELKO. "The Alternative Minimum Tax: An Analysis of its Effect on Corporations in 1987." In *Statistics of Income and Related Administrative Record Research: 1990.* Publication no. 1299. (Rev. ed., July 1992.) Washington, D.C.: Internal Revenue Service, 1992.

WILKINS, J. Testimony on H.R. 1761 before the Select Revenues Subcommittee of the House Ways and Means Committee, June 8, 1989.