Corporate Effective Tax Rates and Tax Reform: Evidence from Australia

1. Introduction

The Ralph Review of Business Taxation, which submitted its recommendations to the Australian Government on 30 July 1999, represented an important event in the corporate tax reform process in Australia (Cooper et al., 2002, p. 20; Gilders et al., 2004, p. 16). Some of its key recommendations were designed to promote equity in the corporate tax system by removing several major tax incentives (Ralph, 1999, p. 15). For example, accelerated depreciation, which favors capital intensive firms, was recommended for removal. The Ralph Review also recommended a phased-in reduction of the corporate tax rate as trade-off to firms for the removal of accelerated depreciation. The Australian Government implemented these key Ralph Review recommendations, and they came into law in the *Income Tax Assessment Act 1997*, applying from the 1999/2000 tax year.

The Ralph Review tax reform provides a unique opportunity to analyze corporate effective tax rates (ETRs)[1] in Australia spanning the tax reform. Specifically, we examine differences in the level of effective tax rates for two different tax regimes: the years preceding the Ralph Review (1996-1999), and the years following this tax reform (2001-2004). Moreover, to gain a better understanding of the causes of the variability in ETRs across the two different tax regimes, we consider the major determinants of ETRs documented in the literature, including capital intensity, inventory intensity, R&D intensity, leverage and firm size. Our study adds to the scarce literature on ETRs and tax reform. Additionally, our results provide some further insights into ETRs that should be helpful to policymakers.

The evidence shows that the Ralph Review tax reform resulted in a major reduction in the level of ETRs. Moreover, our regression results for the years prior to the Ralph Review indicate a significant negative (positive) association between ETRs and capital intensity and R&D intensity (inventory intensity). The regression results also show that ETRs continue to be associated with capital intensity, inventory intensity and R&D intensity following the tax reform. Our results suggest that although the Ralph Review's goal was to promote equity in Australia's corporate tax system, it still appears inequitable at least in terms of some of the firm-specific characteristics analyzed in this study.

The remainder of the paper is organized as follows. Section 2 presents a brief summary of the major Ralph Review tax reform proposals likely to impact on ETRs. Section 3 reviews the major determinants of ETRs and develops hypotheses. Section 4 describes the research design. Section 5 reports the results. Finally, Section 6 concludes.

2. Ralph Review tax reform

Given the significant interest shown in Australia regarding the introduction of the Ralph Review tax reforms, and the effect that it could potentially have on corporate taxpayers, this study investigates whether the major tax reforms impacted on ETRs. The major Ralph Review tax reform proposals are summarized in Table 1, along with their estimated corporate tax revenue impacts over the period 1999–2005.

[Insert Table 1 Here]

Table 1 shows that several of the tax reforms were designed to decrease tax incentives, so they should be considered base-broadening tax reforms. The replacement of accelerated depreciation with an effective life depreciation regime was the most important base-broadening tax reform with an estimated increase in corporate tax revenue of AUD$10.87 billion. Minor base-broadening tax reforms, with an estimated increase in corporate tax revenue of AUD$2.62 billion in total comprised high-level tax design reforms (e.g., the removal of the 13-month prepayment rule that previously allowed firms to claim tax deductions in advance), changes to the taxation of investments (e.g., the removal of taxation on the profit on sale of depreciable assets), integrity measures (e.g., restrictions on the use of unrealized losses for firms), and capital gains tax reforms (e.g., the removal of asset indexation).

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[1] There are many different types of ETRs in the literature (see, e.g., Plesko, 2003, p. 206). Distinctions are made between average ETRs and marginal ETRs. Average ETRs are defined as tax liability divided by income, while marginal ETRs are defined as the change in tax for a given change in income. The appropriateness of each type depends on a study's research question. Average ETRs are suitable to examine the distribution of tax burdens across firms or industries, while marginal ETRs are suitable to analyze the incentives of new investments (Gupta and Newberry, 1997, p. 1). This study uses the term ETRs to represent average effective tax rates, and two different measures are used to improve the robustness of our results: income tax expense divided by book income and income tax expense divided by operating cash flows.

Additionally, Table 1 shows that some of the tax reforms were designed to decrease corporate tax revenue. The phased-in reduction of the corporate tax rate for the 2000–01 tax year (from 36% to 34%), and for the 2001–02 tax year and thereafter (from 34% to 30%) was the most important tax-reform measure intended to decrease corporate tax revenue with an estimated reduction in corporate tax revenue of AUD$14.45 billion. The remaining tax-reform measures were estimated to have a slighter negative impact on tax revenue of AUD$4.03 billion in total. These include changes to the taxation of income from business entities (e.g., refunding dividend imputation credits), and small business measures (e.g., allowing cash accounting).

2. Major determinants of ETRs and hypotheses

To improve our understanding of the causes of the variability in ETRs covering the periods before and after the Ralph Review tax reform, we consider the major determinants of ETRs recognized in the literature, and develop hypotheses.

Firms' investment decisions could impact on ETRs (Stickney and McGee, 1982; Gupta and Newberry, 1997). Given that tax statutes normally permit taxpayers to write-off the cost of depreciable assets over periods shorter than their economic lives; firms that are more capital-intensive are expected to have lower ETRs (Stickney and McGee, 1982, p. 142). Following from this discussion, we hypothesize that:

H1: All else being equal, ETRs are negatively associated with firm capital intensity.

To the extent that inventory intensity is a substitute for capital intensity, inventory-intensive firms should possess higher ETRs (Zimmerman, 1983, p. 130). Gupta and Newberry (1997, p. 21) present evidence that firms with a larger proportion of fixed assets have lower ETRs due to tax incentives, while firms with a greater proportion of inventory have higher ETRs. Following from this discussion, we hypothesize that:

H2: All else being equal, ETRs are positively associated with firm inventory intensity.

R&D expenditure provides an investment tax shield for R&D-intensive firms. This investment tax shield suggests a negative association with ETRs (Gupta and Newberry, 1997, p. 15). Following from the above discussion, we hypothesize that:

H3: All else being equal, ETRs are negatively associated with firm R&D intensity.

Firms' financing decisions could also impact on ETRs since tax statutes usually allow differential tax treatment to the capital structure decisions of firms (Gupta and Newberry, 1997, p. 7). For example, where a firm relies more heavily on debt financing instead of equity financing to support its business operations, given that interest expenditure is tax deductible while dividends are not, firms with higher leverage are expected to have lower ETRs. Research by Stickney and McGee (1982) and Gupta and Newberry (1997) finds a negative association between ETRs and leverage. Following from this discussion, we hypothesize that:

H4: All else being equal, ETRs are negatively associated with firm leverage.

There are two opposing views about the association between ETRs and firm size: the political cost theory and the political power theory. According to the political cost theory, the higher visibility of larger firms causes them to become victims of greater regulatory actions by government and wealth transfers (Watts and Zimmerman, 1986, p. 235). Because taxes are one part of the total political costs borne by firms, this theory claims that larger firms have higher ETRs. The alternative view under the political power theory is that larger firms have lower ETRs because they have substantial resources available to them to influence the political process in their favor, engage in tax-planning and organize their activities to achieve optimal tax savings (Siegfried, 1972, pp. 32–36).

Studies of U.S. firms on the association between ETRs and firm size have produced mixed results (see e.g., Zimmerman, 1983; Porcano, 1986). Australian research on ETRs and firm size is virtually non-existent. However, Tran (1997, p. 529) finds a negative association between ETRs and firm size. Therefore, we expect a negative association between ETRs and firm size in our study. Following from this discussion, we hypothesize that:

H5: All else being equal, ETRs are negatively associated with firm size.

3. Research design

3.1. Sample and data

The sample consists of two panels of publicly listed Australian firms collected from the Aspect Financial Database for the time periods 1996-1999 and 2001-2004, respectively. These time periods were selected to construct equally-long panels spanning the pre and post Ralph review tax reform periods, and permits the investigation of the determinants of ETR variability over two different taxation regimes. The year 2000 was excluded because it is a transitional tax year in terms of the Ralph Review proposals, and prior research (e.g., Dhaliwal and Wang, 1992; Scholes et al., 1992; Guenther, 1994) shows that firms generally respond to tax

legislation changes one year after tax legislation becomes operative.

The final sample consists of 148 firms (592 firm years) for the time period 1996-1999 and 156 firms (624 firms years) for the time period 2001-2004 after excluding firms that fall into the following categories:

- Financial firms, since government regulation faced by these firms is likely to affect their ETRs differently from other firms.
- Foreign firms, as these firms' financing and investment decisions may be impacted upon by resident country tax laws that differ from Australian tax laws.
- Firms with missing data and/or no activity firms.
- Firms with negative income or tax refunds, since their ETRs are distorted (Zimmerman, 1983; Omer et al., 1993).
- Firms that have NOL carry-forwards because their ETRs are difficult to interpret, and are not included in conventional ETR research (Wilkie and Limberg, 1993).
- Firms with ETRs exceeding one, since this can cause model estimation problems (Stickney and McGee, 1982; Gupta and Newberry, 1997).

3.2. Dependent variable

The dependent variable is represented by ETRs. In traditional research, ETRs are measured based on information collected from financial statements[2] as tax liability divided by income. However, the appropriate definition of both the numerator and the denominator of this equation is open to debate (e.g., Shevlin and Porter, 1992; Wilkie and Limberg, 1993).

The matter of which taxes to include in the numerator of the equation is important since any significant omission can bias the overall tax burdens of firms. Some researchers (e.g., Porcano, 1986; Gupta and Newberry, 1997) ignore deferred tax expense and use the income tax expense of firms. Others (e.g., Stickney and McGee, 1982; Omer et al., 1993) argue for an adjustment based on deferred tax expense. Because deferred tax expense is not reported in Australian firms' financial statements based on *Accounting Standard AASB 1020: Accounting for Income Tax (Tax-Effect Accounting)*, income tax expense is used as the numerator of our equation.

The matter of how income should be measured in the denominator of the equation occurs because of the difference between accounting (book) income and taxable income. The choices include taxable income, book income and cash flow from operations. Gupta and Newberry (1997, p. 12) argue that taxable income should not be used if the purpose of a study is to capture the impact of tax incentives on ETRs. If both the numerator (income tax expense) and the denominator (income) are after tax incentives, then any systematic variation in ETRs due to tax incentives will not be detected. We use book income as the primary income measure. Cash flow from operations is used as an alternative ETR measure as this controls for systematic differences in accounting method choices that are related to firm size (Zimmerman, 1983, p. 123).

In summary, we use two different measures of ETRs as the dependent variable in the study to improve the robustness of our results. The first measure is represented by ETR1: income tax expense divided by the book income. The second measure is denoted by ETR2: income tax expense divided by operating cash flows.

3.3. Independent variables

3.3.1. Firm-specific variables

Firm-specific variables are represented by capital intensity (CINT), inventory intensity (INVINT) and R&D intensity (RDINT), financial leverage (LEV) and firm size (SIZE). Specifically, CINT is measured as net property, plant and equipment divided by total assets (both at book values). INVINT is measured as inventory divided by total assets (both at book values). RDINT is measured as R&D expenditure divided by net sales. LEV is measured as long-term debt divided by total assets (both at book values). Finally, SIZE is measured as the natural logarithm of total assets (at book value).

3.3.2. Control variables

Firms' operations could also impact on ETRs. Specifically, ETRs are a function of the ratio of tax incentives to book income, where tax incentives (e.g., depreciation) are items that cause book income to differ from taxable income. To the extent that tax incentives are not proportionately related to book income, ETRs can change simply due to changes in book income (Wilkie, 1988). Thus, we use return on assets (ROA) to control

[2] Firm level tax return data is private in nature, so non-governmental researchers must construct tax variables from financial statements.

for changes in firms' operating results. ROA is measured as pre-tax income divided by total assets. We expect ROA to have a positive sign as an increase in ROA leads to an increase in ETRs (Gupta and Newberry, 1997, p. 15).

Industry-sector (INSEC) dummy variables defined at the two-digit Global Industry Classification Standard (GICS) code level are also included as control variables in our study because it is possible for ETRs to vary across different industry sectors (see, e.g., Omer et al., 1993; McIntyre and Nguyen, 2000; Derashid and Zhang, 2003). We include nine INSEC dummy variables in our study: energy, materials, industrials, consumer discretionary, consumer staples, health care, information technology, telecommunications and utilities (with utilities being the omitted sector in our regression model). No sign predictions are made for the INSEC dummies.

3.4. Regression model

We estimate the following ordinary least squares (OLS) regression model:

$$ETR_{it} = \alpha_0 + \beta_1 CINT_{it} + \beta_2 INVINT_{it} + \beta_3 RDINT_{it} + \beta_4 LEV_{it} + \beta_5 SIZE_{it} + \beta_6 ROA_{it} + \beta_{7\text{-}14} INSEC_{it} + \varepsilon_{it} \quad (1)$$

where the dependent variable, ETR_{it}, is the corporate effective tax rate proxy for firm *i* in time period *t*. The independent variables (with subscripts omitted) are capital intensity (CINT), inventory intensity (INVINT), R&D intensity (RDINT), leverage (LEV), firm size (SIZE), return on assets (ROA) and industry sectors (INSEC). Finally, all variables are computed based on financial statement data taken from the Aspect Financial Database.

4. Results and analyses

4.1. Descriptive statistics

Table 2 reports the descriptive statistics for the ETR measures (panel A) and the independent variables (panel B).

[Insert Table 2 Here]

For the sample, Table 2 shows that the mean ETRs are 26.96% for ETR1 and 20.52% for ETR2 for 1996-1999, while the mean ETRs are 25.94% for ETR1 and 19.99% for ETR2 for 2001-2004. Given that both ETR measures have the same numerator, and that cash flows are normally greater than book income, the mean of the book-income based ETR1 is greater than the cash-flow based ETR2 in both periods, as expected.

The relative magnitude of the ETRs pre and post the Ralph Review tax reform is another important issue to consider. Given the Ralph Review's objective to reduce corporate tax rates, post Ralph Review ETRs are expected to be lower than the pre Ralph Review ETRs. This is the situation as reported in Table 2 with the mean for ETR1, which decreases from 26.96% to 25.94%. For ETR2, its mean also decreases from 20.52% to 19.99%.

Another important issue about the Ralph Review tax reform is the removal of accelerated depreciation. It is expected that post Ralph Review CINT is lower than pre Ralph Review CINT because there is less tax incentive for firms to invest in property, plant and equipment as a result of this tax policy alteration (Ralph, 1999, p. 29). Table 2 (panel B) shows that this expectation occurs in the sample with CINT down from .39 to .33.

The descriptive statistics for INVINT, RDINT, LEV, SIZE AND ROA reported in Table 2 (panel B) indicate that on the whole, their distributions are fairly similar for the pre and post Ralph Review tax reform periods. This is consistent with expectations, as the Ralph Review made no tax policy alterations to these variables.

4.2. Correlations

The Pearson pairwise correlation coefficients are summarized in Table 3 for the pre tax reform period (panel A) and for the post tax reform period (panel B).

[Insert Table 3 Here]

Panel A shows significant correlations for several of the independent variables. CINT LEV, SIZE, ROA ($p < .01$), RDINT ($p < .05$) and INVINT ($p < .10$) are significantly associated with ETR1, while INVINT, LEV, SIZE, ROA ($p < .01$), CINT ($p < .05$) and RDINT ($p < .10$) are significantly associated with ETR2. Panel B also reports significant associations for some of the independent variables. CINT, LEV, ROA ($p < .01$), RDINT and SIZE ($p < .05$) are significantly associated with ETR1, while CINT, INVINT, LEV, SIZE and ROA ($p < .01$) are significantly associated with ETR2. Finally, Table 3 indicates that low levels of collinearity exist between the independent variables. None of the correlations are above .40.

4.3. Regression results

Table 4 presents the pooled cross-sectional OLS regression results that consider the determinants of

corporate ETRs in Australia for the pre and post Ralph Review tax reform periods separately. The *t*-statistics are shown in parentheses, and regression estimates are based on the Huber/White/Sandwich estimator of standard errors (see, e.g., Froot, 1989; Wooldridge, 2002).

[Insert Table 4 Here]

All of the regression models in Table 4 are significant ($p < .01$). Adjusted R^2s range from 8% (model for 2001-2004 with ETR1) to 20% (model for 1996-1999 with ETR2). The pre tax reform models with both ETR measures have higher adjusted R^2s than the post tax reform models. The regression results suggest that the ability of CINT, INVINT, RDINT, LEV, SIZE and ROA to explain ETRs decreased slightly after the tax reform.

Regarding the significance of the regression coefficients for the independent variables, the results in Table 4 show that CINT has a significant negative association with ETR1 and ETR2 in the pre tax reform period ($p < .10$), and again with ETR1 and ETR2 in the post tax reform period ($p < .01$ and $p < .10$, respectively). These results support H1 such that firms which are more capital intensive have lower ETRs. The finding that CINT has a significant negative association with ETRs in the post tax reform period is interesting because the Ralph Review removed the accelerated depreciation tax incentive, so there should have been less cause for firms to invest in property, plant and equipment after this tax policy change (Ralph, 1999, p. 29). INVINT has a positive association with ETR1 and ETR2 in the pre tax reform period ($p < .01$) and again with ETR1 in the post tax reform period ($p < .05$). These results support H2, such that inventory intensive firms have higher ETRs. For RDINT, we find a significant positive association between RDINT and ETR1 and ETR2 in the pre tax reform period ($p < .01$), and again with ETR1 and ETR2 in the post tax reform period ($p < .01$). These results support H3: firms which are more R&D intensive have lower ETRs. LEV is included in our study as a proxy for firms' capital structure. We find that it is not significantly associated with ETR1 or ETR2 in either the pre or post tax reform periods, so H4 is not supported by the results. In terms of SIZE, it has a significant negative association with ETR1 in the post tax reform period ($p < .01$). This result provides limited support for H5, but is consistent with the political power theory and prior Australian research by Tran (1997). It seems that larger firms are better able to reduce their explicit tax burdens than smaller firms. Finally, ROA is included in our study to control for firms' operations. As expected, the results show that it has a significant positive association with ETR1 and ETR2 in both the pre and post tax reform periods ($p < .01$). These results emphasize the need to control for firm incomes when making inferences about factors associated with ETR variability as has been claimed in previous research (see, e.g., Wilkie, 1988; Shevlin and Porter, 1992).

4.4. Robustness checks

To consider the robustness of our results summarized in Table 4, we performed several robustness checks. First, variance inflation factors (VIFs) were calculated for each independent variable in our regression models. Overall, the VIFs show that multicollinearity is not problematic in any of the models because the VIFs are all below two.[3] Second, to deal with potential outlier problems, we re-estimated our regression models after excluding several outliers, based on the method suggested by Neter et al. (1996). Our results in terms of sign and statistical significance are similar to those reported in Table 4. Finally, we re-estimated our regression models to include NOL carry-forward firms. The results indicate that the coefficient estimates had comparable signs, but weaker levels of statistical significance, as expected (see, e.g., Wang, 1991).

5. Conclusion

This paper examines ETRs of Australian firms for two periods spanning the Ralph Review of Business Taxation reform: 1996-1999 and 2001-2004. Specifically, we consider differences in the level of effective tax rates during these periods, and identify firm-specific characteristics that explain the changes in effective tax rates over these periods.

We find that the Ralph Review tax reform produced a significant reduction in the level of ETRs in Australia. Moreover, our regression results for the years prior to the Ralph Review show a significant negative (positive) association between ETRs and capital intensity and R&D intensity (inventory intensity). The regression results also indicate that ETRs continue to be associated with capital intensity, inventory intensity and R&D intensity after the tax reform. Our results suggest that while the Ralph Review promoted equity in Australia's corporate tax system, it still seems to be inequitable at least with regards to several of the firm-specific characteristics considered in this study. Our study adds to the sparse literature on ETRs and tax reform. Additionally, the results of this study offer some further insights into ETRs that should assist policymakers.

Our study has several limitations. First, the sample is based on publicly-listed Australian firms. Due to data

[3] A VIF greater than ten is regarded as an indication of high multicollinearity (Hair et al., 1999, p. 220).

unavailability, it was not possible to include unlisted firms in our sample. Second, we computed our ETR measures using financial statement data because tax return data are private and unavailable. The literature (see, e.g., Plesko, 2003) questions the accuracy of financial-statement-based ETR measures, so our results should be interpreted with some care. Finally, our ETR model could be incomplete. For instance, the extent of firms' foreign operations and ownership structure might impact on ETRs. We excluded these variables owing to data and cost constraints. Future research could investigate these issues.

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Table 1
Estimated effects of the Ralph Review tax reform on corporate tax revenues over the period 1999–2005 (AUD$Billions)

	AUD$B	AUD$B
Tax reforms increasing corporate tax revenue		
Removal of accelerated depreciation	10.87	
High-level tax design reforms	.97	
Changes to the taxation of investments	.89	
Integrity measures	.53	
Capital gains tax reforms	.23	13.49
Tax reforms decreasing corporate tax revenue		
Reduction in corporate tax rates	(14.45)	
Changes to the taxation of income from entities	(2.02)	
Small business measures	(2.01)	(18.48)
Net corporate tax revenue impact		(4.99)

Source: Ralph (1999, p. 698).

Table 2
Descriptive Statistics

Panel A: ETRs						
	1996-1999[a]			2001-2004[b]		
Distribution (in %)	ETR1	ETR2		ETR1	ETR2	
Mean	26.96	20.52		25.94	19.99	
Median	28.89	20.30		26.91	19.37	
Standard deviation	10.63	10.32		8.79	8.96	
Panel B: Independent Variables						
	1996-1999[a]			2001-2004[b]		
Variable	Mean	Median	Std. dev.	Mean	Median	Std. dev.
CINT	.39	.37	.23	.33	.30	.22
INVINT	.14	.10	.13	.14	.09	.15
RDINT	.01	0	.01	.01	0	.01
LEV	.17	.16	.12	.19	.17	.15
SIZE	19.07	18.75	1.90	19.71	19.53	1.82
ROA	.10	.09	.06	.11	.09	.07

Variable definitions: ETR1 is income tax expense divided by book income, ETR2 is income tax expense dividend by operating cash flows, CINT is net property, plant and equipment divided by total assets, INVINT is inventory divided by total assets, RDINT is R&D expenditure divided by net sales, LEV is long-term debt divided by total assets, SIZE is the natural logarithm of total assets, and ROA is pre-tax income divided by total assets.

[a]n = 148 firms (592 firm years).

[b]n = 156 firms (624 firm years).

Table 3
Pearson correlations

Panel A: 1996-1999 period [a]								
	ETR1	ETR2	CINT	INVINT	RDINT	LEV	SIZE	ROA
CINT	-.10***	-.07**	1					
INVINT	.06*	.16***	-.28***	1				
RDINT	-.08**	-.06*	-.02	.01	1			
LEV	-.28***	-.22***	.20***	-.23***	-.09**	1		
SIZE	-.11***	-.17***	.07	-.19***	.01	.29***	1	
ROA	.30***	.43***	.01	.03	-.04	-.30***	-.23***	1
Panel B: 2001-2004 period [b]								
	ETR1	ETR2	CINT	INVINT	RDINT	LEV	SIZE	ROA
CINT	-.13***	-.11***	1					
INVINT	.04	.10***	-.31***	1				
RDINT	-.07**	-.01	-.02	-.01	1			
LEV	-.24***	-.16***	.31***	-.26***	-.05**	1		
SIZE	-.07**	-.19***	.16***	-.25***	.03	.27***	1	
ROA	.24***	.40***	.02	.03	-.14***	-.20***	-.35***	1

Variable definitions: ETR1 is income tax expense divided by book income, ETR2 is income tax expense dividend by operating cash flows, CINT is net property, plant and equipment divided by total assets, INVINT is inventory divided by total assets, RDINT is R&D expenditure divided by net sales, LEV is long-term debt divided by total assets, SIZE is the natural logarithm of total assets, and ROA is pre-tax income divided by total assets.

[a] n = 148 firms (592 firm years).

[b] n = 156 firms (624 firm years).

*, **, *** Significant at .10, .05 and .01 levels. *p*-Values are one-tailed for directional hypotheses and two-tailed otherwise.

Table 4
Pooled cross-sectional OLS regression results

		1996-1999 Period[a]		2001-2004 Period[b]	
Variable	**Predicted Sign**	**ETR1**	**ETR2**	**ETR1**	**ETR2**
Constant		.23 (2.96)***	.17 (4.10)***	.46 (4.99)***	.18 (4.22)***
CINT	-	-.05 (-1.19)*	-.06 (-1.38)*	-.11 (-2.62)***	-.07 (-1.57)*
INVINT	+	.18 (3.78)***	.12 (2.82)***	.08 (1.68)**	.05 (1.12)
RDINT	-	-.07 (-4.21)***	-.05 (-3.60)***	-.07 (-2.98)***	-.07 (-2.47)***
LEV	-	-.01 (.03)	-.03 (-.66)	.06 (1.52)	-.04 (-.77)
SIZE	-	-.01 (-.27)	-.03 (-.88)	-.10 (-2.34)***	-.02 (-.53)
ROA	+	.27 (6.74)***	.38 (7.79)***	.21 (4.85)***	.39 (8.52)***
Adjusted R^2		.11	.20	.08	.17
F-value		13.43	26.12	9.73	22.88
(two-tailed *p* value)		.01	.01	.01	.01

Variable definitions: ETR1 is income tax expense divided by book income, ETR2 is income tax expense dividend by operating cash flows, CINT is net property, plant and equipment divided by total assets, INVINT is inventory divided by total assets, RDINT is R&D expenditure divided by net sales, LEV is long-term debt divided by total assets, SIZE is the natural logarithm of total assets, and ROA is pre-tax income divided by total assets. Our regression model also includes dummy control variables for industry-sector effects.

$$ETR1_{it} \text{ or } ETR2_{it} = \alpha_0 + \beta_1 CINT_{it} + \beta_2 INVINT_{it} + \beta_3 RDINT_{it} + \beta_4 LEV_{it} + \beta_5 SIZE_{it} + \beta_6 ROA_{it} + \beta_{7\text{-}14} INSEC_{it} + \varepsilon_{it} \quad (1)$$

Note, the coefficients for the industry-sector dummy control variables are untabulated.

[a]n = 148 firms (592 firm years).

[b]n = 156 firms (624 firm years).

*, **, *** Significant at .10, .05 and .01 levels. *p*-Values are one-tailed for directional hypotheses and two-tailed otherwise.

Regression estimates are based on the Huber/White/Sandwich estimator of standard errors (see, e.g., Froot, 1989; Wooldridge, 2002).