

AN INVESTIGATION OF THE VALUE RELEVANCE OF THE CORPORATE TAX REDUCTIONS FROM 1987 CANADIAN TAX REFORM

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ABSTRACT

This paper examines the impact of tax savings from the 1987 Canadian Tax Reform on firm equity value in the context of a tax-based market valuation model. The 1987 Canadian Tax Reform, which dramatically changes the tax regime in Canada, provides a unique opportunity to test the effects of the changes in corporate taxes on the implementation of the market valuation model. This study assesses the incidence of the Canadian Tax Reform and the firms' potential tax savings under the reform, and links this to market value. The empirical results document a significant and positive association between levels of tax savings from the tax reform and levels/changes of stock prices. This paper provides evidence consistent with the perceived importance of corporate tax payment in the marketplace.

INTRODUCTION

It is important to understand the effect of corporate taxes on equity valuation (Dempsey, 1996, 1998a, 1998b, Pincus, 1997) and the firm's responses to anticipated tax changes (Givoly et al, 1992, Scholes et al, 1992, etc.). In this paper, I examine the impact of tax savings from the 1987 Canadian Tax Reform on firm equity value in the context of a tax-based market valuation model.

The 1987 Canadian Tax Reform, which dramatically changes the tax regime in Canada, provides a unique opportunity to test the effects of the changes in corporate taxes on the implementation of the market valuation model. A complete assessment of these effects may require the evaluation of hundreds of changes that are contained in the reform, which is an impractical work. Hence, I concentrate on those changes that are more likely to influence the corporate tax payment.

The most significant changes are the reduction on federal statutory tax rates and the tax base broadening. Several other changes directly or indirectly affect corporate taxes. For example, capital gains inclusion rate increases from 1/2 to 2/3; general investment tax credits are eliminated except in the area of Gaspe and Atlantic. However, this study does not examine those changes because the data is not available. Two major changes relevant to corporate taxation are examined by this study. They are tax rate reduction and capital cost allowance restriction.

Tax rate reduction. Federal statutory corporate tax rates are lower starting July 1, 1988. The general federal rate falls from 36% to 28%. The tax rate for manufacturing income is reduced from 30% to 26% in 1988, and thereafter is reduced by 1% per year to reach 23% on July 1, 1991 (see Table 1 for the details). Reducing the statutory tax rate has confounding effects on the market valuation question. Lower corporate tax reduces a firm's tax payment (current tax and deferred tax).

The tax base is broadened by the restriction on the capital cost allowance of manufacturing machinery and

equipment. The 3-year straight-line write-off for machinery and equipment acquired after 1987 is reduced to a 25% declining balance rate (the half-year rule remains). The restriction on capital cost allowance reduces tax deductions, i.e., increases a firm’s taxable income.

Table 1: Federal Corporate Statutory Tax Rates

	Before 1988	1988	1989	1990	1991- 2001	2002	2003	2004	After 2004
General Business	36	28	28	28	28	27	25	23	21
Manufacturing Business	30	26	24	23	21	21	21	21	21

Source: *The White Paper Tax Reform 1987*, p. 44

In summary, compared with the year 1987, in 1988, firms have lower federal statutory tax rates; the taxable income might be increased because the capital cost allowance on machinery and equipment acquired in 1988 are reduced.

This study assesses the incidence of the tax reform and the firms’ potential tax savings under the reform, and links this to market value. The empirical results document a significant and positive association between levels of tax savings from the tax reform and levels/changes of stock prices. This paper provides evidence consistent with the perceived importance of corporate tax payment in the marketplace.

LITERATURE

It is generally argued that corporate taxes reduce firm value and thus a reduction on corporate tax payments will increase share prices, the empirical evidence is mixed. For example, Biddle and Lindahl (1982) examine the market reaction to the firms that adopted LIFO in the period of 1973-1980. Excess returns are regressed on the unexpected earnings and a measure of the tax savings from LIFO adoption. The coefficient on the tax saving variable is positive and significant, which leads to the conclusion that the market reacts positively to the tax savings.

Pincus (1997) analyses the legislative event of LIFO’s incorporation into the US tax code around the year 1938. He finds a positive net market reaction to the legislative event for the firms having the largest estimated LIFO tax benefits. He argues that this is because LIFO provides the opportunity for these firms to defer taxes on inventory profits.

On the other hand, Lev and Nissim (2002) and Hanlon (2003) find that large book-tax gaps are associated with a subsequent negative abnormal return, which indicates that tax-motivated activities do not correspond into higher share value. However, the book-tax gap need not represent increasing of tax sheltering to save taxes. Especially, earning management, i.e., the smoothing/increasing of reported financial income over time to reach bonus targets, to avoid reporting losses, and to achieve other aims, might have contributed to this large gap.

Weisbach (2002) asks why firms do not use the tax shelters to reduce tax liabilities more extensively, given the ease and low expected costs of such shelters. He calls it “undersheltering puzzle”. Desai and Dharmapala (2004) explain that shareholders do not want managers to engage in tax sheltering to save taxes, despite the obvious gains in after-tax firm value, because doing so may create opportunities for managers to divert firms’ earnings.

The 1987 Canadian Tax Reform, which dramatically changes the tax regime in Canada, provides a unique

opportunity to examine the impact of corporate taxes on firm value. This study seeks to test the effects of the changes in corporate tax payment on the implementation of the market valuation model. In this study, I develop a tax-based valuation model based on Ohlson (1995) residual model. Ohlson (1995) examines the relation between firm market value and accounting data such as book value, earnings, and dividends under clean surplus accounting. He combines the dividend-discounted model and clean surplus accounting, and indicates that firm market value is a function of the firm's current book value plus the present value of the expected future abnormal earnings. The tax-based valuation model incorporates taxes into the model and indicates that a firm's market value is a function of the firm's current book value and the present value of the expected future abnormal earnings, net of the present value of the expected future tax payment.

The purposes of this paper are two-fold. First, it assesses the impacts that the tax reform has on corporate taxes. Second, this paper links the impact of the tax reform to market value using a tax-based valuation model. The empirical tests using Canadian public firms' financial data show a positive association between the level/change in market value and the tax savings.

METHODOLOGY AND DATA

Tax-Based Market Valuation Model

Consistent with the terminology in Ohlson's (1995) model, I let

bv_t = firm book value, date t.

x_t = earnings (before tax) for period (t-1, t).

d_t = dividends (and share repurchases), net of capital contributions, date t.

P_t = firm market value, date t.

R_F = one plus the risk-free interest rate r.

In addition, I define the following variables.

T_t = the difference between accounting deductible accruals and tax-deductible accruals (for example, capital cost allowance or depreciation allowed for tax purposes); $x_t - T_t$ = taxable income.

τ_t = corporate tax rate, date t.

The firm's market value P_t is equal to the present value of the expected dividends discounted at the risk-free interest rate:

$$P_t = \sum_{j=1}^{\infty} R_F^{-j} E_t[d_{t+j}] \quad (1)$$

The accounting variables satisfy the clean surplus relation, that is, all changes in book value are reported as either income (net of tax and deferred tax) or dividends:

$$bv_t = bv_{t-1} + [x_t - \tau_t(x_t - T_t) - \tau_t T_t] - d_t = bv_{t-1} + (1 - \tau_t)x_t - d_t \quad (2)$$

Where the tax payment is $\tau_t(x_t - T_t)$; the deferred tax is $\tau_t T_t$.

Notice that I distinguish before-tax earnings x_t and earnings net of the tax payment and deferred tax, i.e., $x_t - \tau_t(x_t - T_t) - \tau_t T_t$.

From equation (2), dividends are equal to

$$d_t = bv_{t-1} - bv_t + (1 - \tau_t)x_t \quad (3)$$

Similarly, I define the after-tax abnormal earnings as

$$x_t^a = (1 - \tau_t)x_t - (1 - \tau_t)(R_F - 1)bv_{t-1} \quad (4)$$

That is, the after-tax abnormal earnings are the difference between the actual after-tax earnings and the estimate of after-tax earnings.

The definition of the after-tax abnormal earnings shows that the estimate of after-tax earnings is $(1 - \tau_t)(R_F - 1)bv_{t-1}$, and thus the estimate of total taxes (current taxes and deferred taxes) is $\tau_t(R_F - 1)bv_{t-1}$. The present value of the estimate of the future total taxes will

$$\text{be } \tau_t(R_F - 1) \sum_{j=1}^{\infty} R_F^{-j} E_t[bv_{t-1+j}].$$

Combining equation (1), (3), and (4) arrives at the tax-based market valuation model.

$$P_t = bv_t + \sum_{j=1}^{\infty} R_F^{-j} E_t[x_{t+j}^a] - \tau_t(R_F - 1) \sum_{j=1}^{\infty} R_F^{-j} E_t[bv_{t-1+j}] \quad (5)$$

Provided $R_F^{-j} E_t[bv_{t+j}] \rightarrow 0$, as $j \rightarrow \infty$.

Under the tax-based model, firm stock price is a function of the current book value and the present value of the expected future after-tax abnormal earnings, net of the present value of the expected estimate of the future taxes. It shows that any tax change, which influences the firm's expected future tax payment (e.g., the change in corporate tax rates), may affect its market value. Hence, the model provides a theoretical framework for analysis of the tax effects on firm market value.

Empirical Regression Models

The tax-based framework shows that firm market value is a function of current book value and the present value of the expected future abnormal earnings, net of the present value of the expected future tax payment. It is a price-level regression model:

$$P_{it} = \beta_0 + \beta_1 bv_{it} + \beta_2 x_{it}^a + \beta_3 \Delta tax_{it} + v_{it} \quad (6)$$

In addition, I test the first difference of the model, i.e., the change in share price is regressed on the change in book value, the change in the expected future abnormal earnings, and the change in the expected future tax payment:

$$P_{it} = \alpha_0 + \alpha_1 \Delta bv_{it} + \alpha_2 \Delta x_{it}^a + \alpha_3 \Delta tax_{it} + \varepsilon_{it} \quad (7)$$

Data Collection and Variable Definition

The data is obtained from the “Canadian Financial Post Card” database. The database provides detailed information about Canadian public and private companies, company directors, archival financial information, etc. The firms used in the tests should satisfy the following conditions: (1). public companies with share prices listed on the Toronto Security Exchange market (TSX). (2). available accounting data for the years 1983 to 1988. (3). fiscal year ended on December 31 in 1988. (4). not in the banking, real estate, insurance, and financial institutions. There are 206 firms.

The first condition is necessary to compute the firm market value. The second condition is necessary to compute variables whose computation requires 6 years. The third condition is required to maintain a uniform period when analysing the tax savings from the 1987 Tax Reform. The fourth condition eliminates firms in certain industries since they are affected by the 1987 Tax Reform differently.

The variables for the tests are measured as follows: the market value is measured as the shares outstanding at the end of the year, multiplied by the year-end share price listed on the TSX. The dependent variable is the first difference between the 1988 market value and the 1987 market value.

The book value is measured as the shareholders’ equity at the end of the year from the balance sheet. The change in book value is the first difference between the 1988 book value and the 1987 book value. The abnormal earnings are calculated as the 1988 after-tax earnings, minus the averaged after-tax earnings. The averaged after-tax earnings are the averaged after-tax earnings for the previous five years, from 1983 to 1987. I assume that the difference between the 1988 earnings and the averaged previous 5 years’ earnings relates to the change in the expected future abnormal earnings. Hence, the 1988 abnormal earnings are used as a proxy for the variable of the change in the expected future abnormal earnings.

The changes in the tax payment in 1988 due to the tax reform are calculated as follows: for non-manufacturers, the statutory tax rate is reduced from 36% to 28% starting from July 1, 1988. That is an 8% reduction on the tax rate for a whole year, and a 4% reduction for half a year. For manufacturers, the statutory tax rate is reduced from 30% to 26% starting from July 1st, 1988. That is a 4% reduction on the tax rate for a whole year, and a 2% reduction for half a year. Hence, the tax savings due to the reduction in statutory tax rates is, $(R_F - 1)bv_{t-1} \times 4\%$ for a non-manufacturing business, and $(R_F - 1)bv_{t-1} \times 2\%$ for a manufacturing business. The previous book value, multiplied by the risk-free interest rate, is the estimate of current earnings before tax. Risk-free interest rate is measured as the one-year yield at the end of 1988 on the Treasury bill (Bank of Canada Review, 1988).

The increase in the tax payment due to the change in capital cost allowance on machinery and equipment is calculated as follows: before the tax reform, the write-offs on machinery and equipment involved a

three-year straight-line deduction (i.e., a 33.33% deduction each year). In 1988, the machinery and equipment were written-off by 25%. That is, the write-offs on the machinery and equipment that were newly acquired in 1988 decreased from 33.33% to 25%. The reduction on capital cost allowance for machinery and equipment in 1998 (compared that in 1987) is:

$$1/2 \times (33.33\% - 25\%) \times M \& E = 1/24 \times M \& E .$$

M&E are the machinery and equipment that were newly acquired in 1988. M&E can be obtained either from the balance sheet under the fixed assets of plant, property and equipment, or from the footnotes to the fixed assets. A firm’s taxable income would be increased due to the deduction on capital cost allowance. Thus, the tax payment would be increased, which is equal to $\tau_e \times 1/24 \times M \& E$. Where τ_e represents the effective tax rate in the year 1988. It can be collected from the tax footnotes in the financial reports. In summary, the tax savings from the 1987 Canadian Tax Reform are calculated as follows:

$$(R_F - 1)bv_{t-1} \times \Delta\tau - \tau_e \times 1/24 \times M \& E$$

$\Delta\tau$ is the percentage of statutory corporate tax rate that was reduced in 1988, equal to 2% for manufacturers, and 4% for other general business.

RESULTS

Table 2 presents the descriptive statistics of the four independent variables: the change in book value, after-tax abnormal earnings, and the tax savings due to the 1987 Tax Reform. The mean and median of the tax savings are 1.2137 and 0.2280, which implies that corporate taxes are generally reduced after the tax reform. That is, the impact of tax rate reduction dominates the impact of capital cost allowance restriction.

Table 2: Descriptive Statistics of Independent Variables

Variables	Mean	Median	Std. Dev.	Max.	Min.
Change in Book Value	34.6168	5.800	110.88	841.1	-427.7
Abnormal Earnings	21.7830	1.4200	99.681	768.25	-194.8
Tax Saving	1.2137	0.2280	4.0620	36.258	-18.292

This table shows the mean, median, standard deviation, maximum, and minimum values of the independent variables.

Table 3 presents the results similar to the work of Biddle and Lindahl (1982) where two explanatory variables are used in the regression model. The independent variables are abnormal earnings and tax savings. It is shown that the coefficients have the signs as predicted and statistically significant at 0.01 levels. Abnormal earnings are positively associated with the change in market value and significant at 0.01 levels. The changes in tax payment, i.e., tax savings, are also positively associated the change in market value and significant at 0.01 level. The results are consistent with Biddle and Lindahl (1982) and support the argument that tax payments/savings decrease/increase firm market value.

Table 3: Regression Results

Variables	Predicted Sign	Co. Eff.	Std. Err.	t-Test
Intercept		17.317	16.258	1.0651
Abnormal Earnings	+	0.3992	0.1565	2.5509*
Tax Saving	+	8.5269	3.8398	2.2206*

*This table shows the predicted sign, co-efficient, standard error and t-statistics. * significant at 0.01 level $R^2 = 0.0591$*

Table 4 presents the results when the change in market value is regressed on the change in book value, abnormal earnings, and tax savings. It is shown that the coefficients of all the three variables have the signs as predicted and statistically significant, which supports the tax-adjusted market valuation model. The tax savings and abnormal earnings are positively and significantly (at 0.05 levels) associated to the change in firm market value. Change in book value is positive and significant at 0.1 levels.

Table 4: Regression Results from the Change Model (7)

Variables	Predicted Sign	Co.Eff.	Std. Err.	t-Test
Intercept		12.703	16.473	0.7712
Change in Book Value	+	0.2351	0.1515	1.5518*
Abnormal Earnings	+	0.3223	0.1637	1.9694**
Tax Saving	+	7.0030	3.9506	1.7727**

This table shows the predicted sign, co-efficient, standard error and t-statistics on regressing model (7).

*** significant at 0.05 level*

** significant at 0.1 level*

$R^2 = 0.5484$

Table 5 presents the results from the regression of the price-level market valuation model, i.e., regressing stock prices on book value, abnormal earnings, and the tax savings. It is shown that the coefficients of all the three independent variables are positive and significant. The tax savings are positively and significantly (at 0.05 levels) associated with stock prices. Book value and Abnormal earnings are positively and significantly (at 0.01 levels) associated with stock prices. The results support Ohlson (1995) model and the tax-adjusted model.

Table 5: Regression results from the Price-level Model (6)

Variables	Predicted Sign	Co. Eff.	Std. Err.	t-Test
Intercept		6.2257	0.6018	10.345**
Book Value	+	1.1847	0.1932	6.132**
Abnormal Earnings	+	0.3710	0.1408	2.2643**
Tax Saving	+	65.367	37.24	1.7553*

This table shows the predicted sign, co-efficient, standard error and t-statistics on regressing model (6).

*** significant at 0.01 level*

** significant at 0.05 level*

R^2 is 0.5583

Table 6 presents the correlation of the independent variables. The change in book value and the change in abnormal earnings have the highest correlation (.332). The correlation of the independent variables is generally low, which indicates that multicollinearity is not a severe problem in the analysis.

Table 6: Correlation Matrix of Independent Variables

Variables	Change in Book Value	Abnormal Earnings	Tax Saving
Change in Book Value	1		
Abnormal Earnings	0.3320	1	
Tax saving	0.2843	0.1592	1

I further use White’s test to test for heteroskedasticity (White, 1980). That is, I regress the squared residuals on all the squared independent variables and their cross products. The resulting R^2 is very low (0.0199),

which suggests that a constant variance cannot be rejected.

CONCLUSIONS AND LIMITATIONS

This paper examines the impact of tax savings from the 1987 Canadian Tax Reform on equity valuation in the context of a tax-based market valuation model. The 1987 Canadian Tax Reform, which dramatically changes the tax regime in Canada, provides a unique opportunity to test the effects of the changes in corporate tax payment on the implementation of the market valuation model. This study assesses the incidence of the Canadian Tax Reform and the firms' potential tax savings under the reform, and links this potential tax savings to market value.

Using Canadian public firms' financial data, I document a significant and positive association between tax savings from the tax reform and levels/changes of stock prices. This paper provides evidence consistent with the perceived importance of corporate tax payment in the marketplace.

This study is interesting to both the corporations and the policy makers, to the extent that it assists them in understanding the share price changes and market reactions to the tax reform.

This paper, however, ignores individual taxes. Quite a few recent literatures (for example, Dempsey, 1996, 1998a, 1998b, Harris and Kemsley, 1999) incorporate individual taxes into the market valuation model. Future research may seek to incorporate both corporate and individual taxes and analyse their effects on marketplace. In addition, future researches are encouraged to examine data in recent years.

REFERENCES

Bank of Canada Review, 1988.

Biddle G.C. and F.W.Lindahl (1982) "Stock Price Reactions to LIFO Adoptions: The Association between Excess Returns and LIFO Tax Savings," *Journal of Accounting Research*, vol. 20(2), Autumn, p. 551-588

Dempsey M (1996) "The Cost of Equity at the Corporate and Investor Levels allowing a Partial Expectations Model with Personal Taxations," *Journal of Business Finance and Accounting*, vol. 23(9)&(10), December, p. 1319-1331

Dempsey M (1998a) "Capital Gains tax: Implications for the Firm=s Cost of Capital, Share Valuation and Investment Decision-making," *Accounting and Business Research*, vol. 28(2), Spring, p. 91-96

Dempsey M (1998b) "The Impact of Personal Taxation on the Firm=s Weighted Average Cost of Capital and Investment Behaviour: A Simplified Approach Using the Dempsey Discounted Dividend Model," *Journal of Business Finance and Accounting*, vol. 25(5)&(6), June/July, p. 747-763

Desai, M. A., and D. Dharmapala (2004) "Corporate Tax Avoidance and High Powered Incentives," Working Paper, Harvard University

Givoly D., C. Hayn, A. R. Ofer, and O. Sarig (1992) "Taxes and Capital Structure: Evidence from Firms' Response to the Tax Reform Act of 1986," *The Review of Financial Studies*, vol. 5(2), p. 331-355

Hanlon, M (2003) "What Can We Infer about a Firm's Taxable Income from its Financial Statements?" *National Tax Journal*, vol. 56, p. 831-863

Harris, T. and D. Kemsley (1999) "Dividend Taxation in Firm Valuation: New Evidence," *Journal of Accounting Research*, vol. 37, p. 275-292

Lev, B. and D. Nissim (2002) "Taxable Income as an Indicator of Earnings Quality" Working Paper

Ohlson, J (1995) "Earnings, Book Values, and Dividends in Equity Valuation," *Contemporary Accounting Research*, Spring, p. 661-687

Pincus M (1997) "Stock Price Effects of the Allowance of LIFO for Tax Purposes," *Journal of Accounting and Economics*, vol. 23, p. 283-308

Scholes M.S., Wilson, G. P. and M.A. Wolfson (1992) "Firm's Responses to Anticipated Reductions in Tax Rates: The Tax Reform Act of 1986," *Journal of Accounting Research*, vol. 30, Supplement, p. 161-191

Weisbach, D (2002) "Ten Truths about Tax Shelters," *Tax Law Review*, vol. 55, p. 215-253

White, H (1980) "A Heteroscedasticity Consistent Covariance Matrix estimator and a Direct Test for Heteroscedasticity," *Econometrica*, May, p. 817-838

The White Paper Tax Reform, 1987.

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