Impact of Corporate Income Tax on the Capital Structure of Canadian Listed Companies

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Abstract

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This study investigates the impact of capital structure on the profitability of non-financial listed companies in China for the period 2010 to 2014. The entire sample data includes 571 companies from 12 different industries. The study builds a panel-data model for the data, uses both linear model and quadratic model to test the relationship between capital structure and profitability.

Through correlation and regression analysis, the study finds that the relationship between total debt-asset ratio and profitability is negative, and relationship between long-term debt to total debt ratio and profitability is positive. Moreover, the quadratic model indicates that the evidence of optimal capital structure exists in the Chinese capital market.

The conclusion is a company with higher tax rate, basically the company will obtain lower cash flow from operating activities. However, the model indicates that the short term liability will decrease when a company faced higher marginal tax rate, the long term debt has no proportional change.

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1. INTRODUCTION

1. 1 Research background

Firms need funds for the development. Nowadays, one of the most significant parts of the operation and management of business is financing decision. For any firm, the ratio of equity capital to long-term debt capital shows corporate capital structure. The capital structure theory is therefore one of the most significant parts of the financial researches. However, the practical application of capital structure theory still yields mixed results. (Ross S. A., Westerfield R. W., Jaffe J. F.. 2000)

As an important part of western financial theory, modern capital structure theory starts with the Modigliani and Miller theory. According to the theory, under the perfect market with no corporate income tax, the marginal cost of debt financing should be equal to the marginal cost of equity financing, which means there is no relationship between income tax and capital structure. Modigliani and Miller (1963) further proposed that since interest is tax deductible, but the dividend is not, the optimal capital structure should be 100 percent debt financing. Kraus and Litzenberger (1973) and Kim (1978) established that the capital structure is a trade-off between tax savings and bankruptcy costs from debt financing. Miller (1977) showed a capital structure model which consolidated the personal income tax and corporate income tax. Companies that have higher corporate income tax rate tend to be the highly indebted.

According to the western financial theory, the choice of corporate financing methods has a generally follows the pecking order theory, in this theory, companies first consider the

internal financing, then consider debt financing, and the last is equity financing. In the external financing channels, enterprises generally first consider the issue of bonds, if funds still not enough, they will issue shares for equity financing.

1.2 Research method

This paper mainly uses empirical research methods, through the selection of explanatory variables and control variables, to perform a multivariate linear regression analysis to examine the impact of corporate income tax on the capital structure of Canadian firms.

1.3 Structures of thesis

This paper is divided into five parts. The first part is the introduction. And the second part is the literature review. The third part is the design of the empirical test. In this part, the choice of dependent variables, explanatory variables, control variables, and sample selection is discussed. The fourth part deals with the analysis of the empirical results and the impact of corporate income tax on capital structure. The last part deals with conclusions drawn from the research and implications for future research in this area.

2. LITERATURE REVIEW

2.1 Capital structure theories

2.1.1 Early capital structure theory

The early capital structure theory can trace back to the topic "Value and Capital" by John Richard Hicks (1939). Durand (1952) divided capital structure into three components: the net income theory, the net operating income theory, and the traditional theory.

The net income theory, asserts that the more debt in the capital structure, the higher the value of the enterprise. According to this view, the source of the enterprise to obtain funds is not restricted, the cost of debt and the cost of shareholders' equity are constant, the firms will be unaffected by financial leverage. Based on the fixed bond yield, and liquidation preference of creditors, risk of creditors is lower than the risk of shareholders, cost of debts of the enterprise is generally lower than the cost of shareholders' equity. Therefore, the higher the corporate debt, the lower the weighted average risk, the higher the value of the enterprise. If this hypothesis is true, in order to maximize a firm's value. Enterprises should use debt financing as much as possible. Therefore, the enterprise should use 100% debt financing.

Conversely, the net operating income theory believes there is no relationship between cost of capital and capital structure, and there is no relationship between capital structure and value of the enterprise. Based on this point of view, if the cost of debt of the enterprise is a very low constant, but the cost of shareholders' equity is variable. In this way, the higher the company's liabilities, the greater the leverage, the higher the cost of equity. The Company's cost of capital

is constant and it should be a constant. Which means that no matter what kind of the degree of financial leverage, for the enterprise, the overall cost of capital is constant. Due to the change of the degree of financial leverage does not change the overall cost of capital to the enterprise, the capital structure cannot influence the value of the enterprise which means that all kinds of capital structure could be the optimal capital structure.

Traditional theory assumed that the capital cost of shareholder's equity will rise up with the improvement of financial leverage, when the degree of financial leverage to achieve the critical point, the cost of debt will begin to increase. Since a higher financial leverage for the creditors also mean a higher risk. Based on the traditional theory, it shows that debt increase is good for improving enterprise value, but it should be moderate. If the company over-indebted, the cost of capital increase because both of the debt financing and equity financing require a higher return, it will drop the value of the enterprise when the return rate reaches a certain level. In this view, they believe there should be an optimal capital structure makes the value of firms maximum. Usually, the optimal capital structure makes the marginal cost of debt equal to the marginal cost of equity.

2.1.2 Modern capital structure theory

2.1.2.1 MM theory

The classic MM theory is the most important in part western financial capital structure research basic theory. In the theoretical study of the financial, MM model is the most widely accepted theory. This study also provides extended hypothesis framework.

At first, the MM model assumes the market is perfect, and the corporate income tax is not a factor. Capital market is balanced. There is no relationship between the values of the enterprise and the debt-equity ratio. Since taxes are ubiquitous in the economic and social life. Modigliani and Miller (1963) add tax as factor and got a new MM model. The main point of this theory is that because of the existence of enterprise income tax, interest on debt can deduct the income, so it can reduce the amount of tax payable, increase the company's cash flow, so the enterprise value will rise up due to the improvement of the assets-liabilities ratio.

2.1.2.2 Trade-off Theory

Based on the MM model, scholars add other factors that may affect the capital structure of the companies, get the optimal capital structure by traded-off the benefits and costs of debt financing in consideration of various factors.

If a company excessive reliance on debt financing, will improve the financial leverage of enterprises, resulting in a greater financial risk, that is, the bankruptcy costs. Robichek and Myers (1966) propose that the optimal capital structure of the company can be determined by weighing the bankruptcy cost and tax deductibility by the debt financing. Kraus and Litsenberser (1973) made a model and found that a company which is not using the 100% debt financing can also make the bankruptcy cost and tax deductibility equilibrium. Based on those two models, Jensen and Meckling (1976), and Miller (1977) added the agency costs as a factor, and got a new trade-off theory which considered the bankruptcy cost, agency cost and the tax deductibility cost.

With this series of similar trade-off theory was proposed, the old MM theory which under the strict assumptions was extended, thus draws the conclusion that, considering the existence of financial risk costs and agency costs, the company's capital structure is impossible to use 100% of the debt asset ratio.

2.1.2.3 Pecking order theory

Based on the pecking order theory, compared to external financing, the company will be more inclined to internal financing. If they have to use the external financing, the companies more inclined to issue bonds rather than issue shares. Since there is a difference between internal financing and external financing, in "The Determination of Financial Structure: The Incentive-signaling Approach" by Ross (1977), "Informational Asymmetries, Financial Structure and financial Intermediation" by Leland and Pyle (1977), and "Corporate Financing and Investment Decisions when Firms have Information that Investors do not have" by Myers and Majluf (1984), the credit information is introduced as a variable.

Usually, the pecking order can be interpreted as arising by the transaction costs and distribution costs. If firms choose to use the undistributed profit which means there are no transaction cost, transaction costs generated by the issuance of bonds would be lower than transaction costs generated by the issue of shares. If firms have the business taxable income, debt financing also involves the proceeds of the tax shield. Myers and Majluf (1984) explained the pecking order theory by leading into the asymmetric information theory. The signal model shows that in the pecking order theory of capital structure, usually, only the companies with low profit will choose to issue shares. For the rational investors, they will ask a discount for

the IPO. The discount is the cost of shareholders' equity of internal financing. Therefore, if a company chose the debt financing, usually means this company is in good condition.

Nowadays, many accounting and financial research got the marginal tax rate from the accounting reports, and use it to test the impact of corporate income tax on capital structure. Shevlin (1990) and Graham (1996) produced a decisive contribution for the development of academic research. Usually, the decision of investment and finance with cash flow could be across many periods, but the marginal tax rate only shows the current interest tax deductible income. If the measure of the marginal tax rate was incorrect which changed the conclusions of previous studies, I will try to improve the measurement method.

Shevlin (1990) pointed that for a company, the situation can be divided into three categories, and then we can delimit the marginal tax rate for those three categories: if the taxable income is greater than zero, the marginal tax rate is equal to the statutory tax rate; if the taxable income is smaller than zero (there is a loss which did not offset in the past year), the marginal tax rate is equal to half of the statutory tax rate; if the taxable income is smaller than zero (there is not a loss which did not offset in the past year), the marginal tax rate is equal to zero. Under this theory, the marginal tax rate is very eloquent because it considered the effect of the amount of tax deduction on losses of previous years.

Graham (1996) proposed a method of calculation by using profit marginal tax rate, which is showing that the profit marginal tax rate is the best proxy variable of tax factors. However, it is too hard to calculate, and hard to get data, I prefer not to use this way.

The result, the corporate income tax should be one of factors influence the capital structure, of cause, few scholars believe there is no relationship between corporate income tax and capital structure or negative correlation between corporate income tax and capital structure. However, those different results are based on the different proxy variables.

2.2 Empirical researches on capital structure

Solomon found that in the different industries of the enterprise group, there are significant differences in debt ratio, and industry groups in the average use of financial leverage has time stability. Schultz and Aronson show the concept of the optimal capital structure on their paper. Find out that companies in the same industry have similar capital structure while companies in different industries do have the different capital structure.

Baxter and Cragg have used 129 industrial enterprises securities issuance data during 1950-1965 to exam the financing tool of enterprises. They found that the enterprises with larger size are more likely to finance with corporate bond (including convertible bond and preferred shares) and the one with higher debt ratio are less likely to issue bond. Sheehan and Dunlop (1984) has reached the same conclusion that a smaller firm are less rely on external financing.

Taggart (1977) organize the data from Federal Reserve Board, Domestic tax bureau and Securities exchange and Management Committee with least square method and come to the conclusion that the market value of long-term debt and equity is an important factor to decide the issue of securities. In another word, the target market value of a firm as a significant impact

on its long term debt. He also mentioned that public good manufacture company and Manufacturing industry have different choice on long term financing tool.

Sheridan Titman and Robert Wessels started their analysis with data from United States Bureau of Labor Statistics. By conducting a statistical test for 469 firms in 1974-1982, they find that capital structure has a negative relationship with scale, profitability, non-debt tax shield and volatility and a positive relationship with collateral value of assets and growth.

Taub analyzed the impact of 6 variable inputs (including the expected earnings and interest differentials, the future earnings uncertainty, the scale, the tax rate, the time length of the debt servicing capacity and the debt equity ratio) on capital structure using the data of 172 security issuance. But he failed to come to a clear conclusion. "Obviously, my research is not successful in explaining how firms determine their D/E ratio"

Marsh (1982) also point out that the earlier research including Taub's actually either not able to reach out to a clear conclusion or has an obvious defect. "It's hard to explain unless we can get confirmation and evidence showing stability and prediction ability of the exported model. There is no satisfactory research in this area." With this in mind, Marsh himself chose 748 firms with stock or bond issuance in cash as his sample and started his research. He found: (1) Market condition and historical situation have a significant effect on firms' choice of financing tool. (2) Seems like there is a pre-determined Debt/equity ratio by the firm when they chose the financing tool. (3) The pre-determined Debt/equity ratio (Target D/E ratio) can be

seen as a function of firms scale, bankruptcy risk and asset. Berger and Vdell also find out that smaller, younger firms rely more on internal equity financing. (1998)

Rajam and Zomgalas(1995) conducted a capital structure analysis for 7 western counties. Including both endogenous factors and social system difference, they point out that enterprises in different countries face many different system constraints and economic environment. This will lead to a variety of relative financing cost in different countries. They further point out that the medium debt-equity ratio for American firms is 27%, while that 0f UK is 18%. The reason for low debt-equity ratio for UK despite their huge external financing is a large percentage of their external financing is equity financing other than debt financing. Scholars like Browne (1994) and Rajan (1995) deem that capital structure is not only an issue within firms themselves but also should be an issue related to external factors such as a country's stage of economic development, financial system and corporate governance mechanism.

2.3 Tax and Capital Structure Correlation

Research on tax attracted scholars and policy maker's interests for a long time, which focused on three issues: 1, whether tax has a role or not 2, if not, why? 3, if tax has effects, to what extent?

Although tax research has a long history in the economic and financial field, and many accounting pioneer also specializes in tax planning and compliance, accounting academics treat tax as an important area of research until very late.

A long-standing problem in corporate finance is that enterprises are more inclined to the extent of how much debt financing with the help of the interest tax deduction. Research on this issue, modern scholars refers to the MM theory proposed by Modigliani and Miller in 1958. That is to say, in the absence of taxes, agency costs, bankruptcy costs and asymmetric information problem, the choice of debt financing or equity financing will not affect corporate value. This means that if the capital structure does affect corporate value, it must be reason that debt financing affects the tax burden, the agency problem, the possibility of bankruptcy, and the symmetry of information.

In 1963, Modigliani and Miller suggested that the deductible interest will encourage companies to use debt financing. But in 1977, Miller considered that the increase in personal income tax and generated by interest income and tax deductibility of available debt financing cancel each other out. Although taking into account the corporate income tax and personal income tax, the ideal capital structure does not exist in a particular company. Miller insists that income from tax deductibility of interest costs will be completely offset each other. However, DeAngelo and Masulis (1980) considered that when a company uses their entire available interest tax shield. The deduction of personal income tax credits is limited. Therefore, a particular company has the best capital structure.

The basic framework of this discussion of debt and tax correlation extended a series of theoretical predictions. From the vertical, the debt financing improves the corporate tax rate, but reduced investors' relative tax costs. The horizontal, the companies who are expected to

apply to high corporate income tax rate with fewer non-debt tax shields should take higher financial leverage.

Based on Auerbach(2002)and Graham (2008)'s empirical studies on complex tax and capital structure choice, they concluded that the capital structure related decision-making reflects the corporate tax saving motive However, this conclusion does not reach to a broad consensus, particularly in the tax-motivated question. Graham pointed out that some of the papers advocate "tax saving motive is the third most important problem in the company's financial management hierarchy." A number of combined factors can explain the weakness of this argument. For example, existing theories can guide limited empirical tests. Since these theories are only focussing on qualitative predictions. Moreover, tax benefits produced by company's financial leverage can be offset by debt investors' unfavorable tax (personal income tax), and these tax effects are difficult to solve. Finally, the debt issue has been clarified, so the neglected expected marginal tax rate is very critical.

In order to understand the relationship between debt and corporate income tax rates, the measurement and financial reporting issues need to be taken into consideration, which is currently the main concern about research capital structure. Empirical studies suggest that capital structure decisions reliance on accounting data for the marginal tax revenue, but this measure is still not sufficient. In addition, accounting standards, the freedom of management and financial innovation will make different reporting purpose leading to unfair treatments for financial issues and content. Some uncovered items may affect the accuracy of corporate financial leverage.

Income tax credit generated by increased interest deduction depends on the company's marginal tax rate. Marginal rate refers to the company's $ 1 increase in income or loss and pay corporate income tax (Scholes et al., 2009). Companies with high debt deductible income are more likely to choose higher financial leverage. And vice versa. Early studies admitted the exits of non-debt tax shields, such as depreciation, investment tax credits, deferred back net operating losses(e.g., Bradley et al., 1984; MacKie-Mason, 1990; Dhaliwal et al., 1992) to estimate income tax deductible. This view is considered as a substitute assumption, which is the company likes to use debt tax shield and NDTS alternative, while those with a large number of non-debt tax shield are not tending to take financial leverage.

However, Seoul, Bradley et al. (1984) discovers that the financial leverage and non-debt tax shield are a positive correlation. This finding is not surprising, because the companies who have high depreciation and investment tax credit products usually have a lot of physical assets and less development options, and they prefer to use debt financing. In order, to solve these problems, MacKie-Mason (1990) and Dhaliwal et al. (1992) take increasing leverage and income tax-range consumption methods. In addition, Ayers et al. (2001) confirmed there is alternative hypothesis in any debt owner taxable organization and any non-owner of debt organization.

The most accurate measure of the marginal tax rate in recent studies is based on the company's historical financial information to predict taxable income, calculated by fitting step (Shevlin, 1990; Graham, 1996a). Established on the net operating loss forecast, investment tax information and selectable minimum tax, this method calculated for each additional dollar of

taxable income, the taxable value of its representatives, which decide the marginal tax rate. Most studies using fitting marginal tax rate as proxy variables, have found the relevant evidence about the company's tax status and using debt financing, which means that corporate tax credits resulting from the interests have impact on company's capital structure. The evidence also shows that fitting marginal tax rate is better than the static method which based on the absolute variable or the effective tax rate to measure tax. However, there are some problems of this method. (Shevlin, 1990; Graham, 1996b; Plesko, 2003; Graham and Mills, 2008)

3. DATA AND METHODOLOGY

Through the above theoretical analysis, it is easy to include that the income tax has the power to influence a company's capital structure theoretically. However, empirical research is still waiting to be done. Earlier literature reviews have been pointed out that the current empirical researches have continuous improvement on selection of different proxy variables of company's income tax. This paper preferred to start with the empirical research on the selection of proxy variables. Using data analysis to proof which proxy variable is the best variable for study of influence on the company's capital structure. Afterwards. Using the chosen proxy variable to conduct an empirical study on the relationship between companies' income taxes and capital structure.

3.1 Variable Selection

3.1.1 Explained variable selection

This study, mainly used two variables to reflect the company's capital structure. The first variable is the total liability to total asset ratio, asset-liability ratio is the percentage of total liabilities divided by total assets, which are the ratio between total liabilities and total assets. Asset-liability ratio reflects how much the proportion is financed by debt in total assets.

Total liabilities in the formula include not only long-term debt, but also short-term liabilities. This is because short-term debt as a whole, always occupied by business cycles so it can be seen as part of long-term sources of capital. Throughout the study on the capital structure of the past, most researchers regard the asset-liability ratio as the dependent variable.

However, some scholars proposed testing whether assets and liabilities include deferred tax assets and deferred tax liabilities would affect the representative of the capital structure and might draw the wrong conclusions. Assuming a high marginal tax rate of the company, if it gets the benefits of the tax deductibility of by increasing liabilities' interest expenses, such facts would result in the rate increase and liabilities the negative correlations between liability-asset ratio and tax rate, and will lead wrong conclusion since the explained and explanatory variable has co-linear problems. The reason that increasing the company's debt will reduce the company's marginal tax rate is because the interest can be tax deductible, increasing of long-term debt will increase company's interest expense, and reduce the taxable income, thus making the company a lower tax rate applicable to stall; or such taxable income is less than 0,

then the company does not need to pay taxes. Thus, we can conclude that high marginal tax rates tend to correspond to the low debt. Low marginal tax rates corresponding to high debt. The recent study often used debt-asset rate and the tax rate to conduct data analysis. It will draw a negative correlation coefficient. (Graham, 1996)

Mackie a Mason (1990) study on financing decisions used the dummy variable of increasing the debt of select regarded as o, select equity increase seen 1, and found that the tax will affect the capital structure. Givoly, Hahn, Ofer and Sarig (1992) used the change of the debt as the dependent variable, with income tax and taxable income as independent variables to measure the level of taxes, their conclusion indicates a change in the level of taxes and liabilities are positively correlated. Graham (1996) also chose change of the liability as the independent variable and found that the company's marginal tax rate has a positive correlation with the change of debts.

This article used two capital structure ratios to test the relationship between capital structure and the corporate income tax rate. The first ratio is the total debt to total asset ratio. The second one is the short term debt to total debt ratio. The first ratio represents the influence on the method of financing. The money is from debt or from equity issued; the second ratio distinguishes the short-term debt financing and long-term debt financing. Although short term financing is still a method of debt financing, it is more related to company's operating activities than the financing activities. To test the influence on the tax rate on the capital structure, it is necessary to make a distinction between these two ways of financing.

3.1.2 Explanatory variable selection

Explanatory variable used in this study is the marginal tax rate.

Marginal tax rate is defined as: Adding each additional dollar of taxable income, the dollar increase in the present value of taxes.

Compared to the company which has low marginal tax rates, companies with high marginal tax rates have a greater incentive to increase debt with the intention of obtaining the benefits of tax-deductible interest. This means that the company's marginal tax rate and debt-asset ratios have positive correlations.

Since the "True" marginal tax rate is not available from the former company's financial data, studies on marginal taxes need to pick up an alternative proxy variable to represent the marginal tax rate.

There are several kinds of proxy variables of marginal tax rate used in former studies:

1. The statutory tax rate: the Company's statutory tax rate after calculating the net operating loss for the taxable income.

2. Taxable income dummy variables: If the taxable income is positive, variable equals to the statutory tax rate; if taxable income is negative, set the variable to equal to 0.

3. net non-operating loss of dummy variables: if the company has net operating loss for deferred tax the variable will be 0; otherwise it will be the highest income tax rate (Thomas,

1988; Seholes, Wilson and Wolfson1990) using this variable. This is the alternative variable of the "real" marginal tax rate the past studies frequently used.

4. The Trichotomous variable:

(1) If the company's taxable income is positive, and there is no makeup of net operating losses, the proxy variable is the statutory tax rate of the company;

(2) If the taxable income is negative, or have net operating loss to offset the taxable income, the proxy of marginal tax rate is half the statutory rate;

(3) If the company taxable income is negative, and a net operating loss remedy, the proxy of the marginal tax rate will be 0. (Shevlni, 1990)

5. The proxy variable which Manzon (1994) has proposed: the discounted tax rate of n years of maximum statutory tax rate (n is the number of years of deferred net operating losses).

6. The proxy variable Stickney and McGee (1982) has proposed: (tax expense - deferred taxes) / (taxable income + Contingent items). Omer, Molloy and Ziebart (1991) research indicates that this variable's treatment of deferred taxes actually consistent with companies' actual status.

7. The effective tax rate: Tax Expense /Income taxable income.

8. The average tax rate: Taxes / (taxable income + Contingent items). The average tax rate used by Fullerton (1954), BarClay and Smith (1995) and many other studies.

9. Zimmerman (1983) proposed a proxy tax rate of Zimmerman rate :(tax rate changes + investment tax credit) / (sales revenue - sales costs).

10. Simulate tax rates: Using historical data to forecast future taxable incomes. Shevlni (1990) model uses this method the model assumes that the company's taxable income to meet changes in the random walk.

Plesko (1999) made a comparison of the first eight alternatives for the marginal tax rate. He used real tax data to calculate the taxable income for each company, using the statutory tax rate of the taxable income as the company's "real" marginal tax rates, and set the marginal tax rate to 0 for those who reported net profit loss although losses can be backward and forward deferred. He concluded that the binary variable captures the vast majority of the marginal tax rate changes.

Graham (1996) compared all proxy tax variables for the real marginal tax rate. Although simulated tax rate by the Shevlin (1990) is difficult to calculate, the study suggests it the better alternatives of the "real" marginal tax rates. If the simulated tax rate is difficult to obtain, the trichotomy variable or statutory marginal tax rate (seize the major changes in tax rates) also can be used instead.

According to the above, we find trichotomy variable is a better proxy of real marginal tax rates, and the calculation is simple. Therefore, this study was collected trichotomy variable, the variable is defined as follows:

(1) If the company's taxable income is positive, and there is no operating loss carry back or carry-forward, the marginal tax rate for the effective tax rate of the company;

(2) If the taxable income is negative, or have operating loss carry back or carry-forward, the marginal tax rate is half the effective tax rates;

(3) If the company's taxable income is negative, and there are operating loss carries back or carry-forward, the marginal tax rate is zero.

Graham (1996) points out the marginal tax rate reflects the future tax avoidance the motivation. Scholes, Wilson and Wolfson (1990) pointed out that the data of the explanatory tax rate variables should be the current marginal tax rate when making financing decisions when testing the debt financing, because marginal tax rates already reflect the impact of financing decisions. For example, increasing debt is likely to reduce the company's marginal tax rate due to the interest tax deductibility reducing the company's taxable income, so that the company faces a lower tax rate, or the company's taxable income amounted to negative. Taking into account of these effects, this article uses the effective tax rate as the proxy variable of the marginal tax rate as an independent variable.

3.1.3 Control Variable Selection

In the real world, not companies make capital structure decisions only by considering the tax factors. Therefore, adding control variables of other effects on capital structure is necessary. Thus, ensuring the influence from proxy marginal tax rate does not cover by other factors. And

ensuring the accuracy of the study. This study picked three major factors on capital structure rather than tax effect as control variables:

Company size: companies' diversification and expansion allow companies effectively disperse risks effectively. Therefore, large companies tend to have higher debt capacity, while smaller companies tend to use short-term debt financing. Empirical studies in the past found that many companies financing policies are related to the company's size. So the impact from the scale should be separates from the tax impact (Zimmerman, 1983; Moer, Molly and Ziebart, 1993). Baxter and Cragg used data during the year period 1950 and 1965 within 129 industrial companies in the issuance of securities to verify the companies' financing choice. They found that the larger the company the more likely financing by issuing bonds (or by preference shares, convertible securities and bonds etc.); and the less likely the higher the debt ratio of company with the issuance of bonds (Baxterand Cragg, 1970).

The variable chosen for representing the company's size in this study is a logarithmic scale of the company's total assets.

SIZE = ln (total assets)

2. Profitability: A company's profitability is often a guarantee of its debt capacity. A company which has higher profitability enjoys a high reputation among creditors, higher profitability companies are considered of with high ability of solvency, while the debt from companies with lower profitability is treated as riskier. Myers and Majluf (1984 using pecking

order theory suggests that highly profitable firms tend to lower the debt ratio. In past studies, representative variable which reflects the profitability can be ROE, ROA and net profit margins.

This study chooses the ROA (Return on Assets) as the variable to represent the profitability of a company. This decision will ensure the profitability calculations unrelated to the company's liabilities.

3. The company's growth: high-growth companies have more choice of future development than low-growth enterprises. Wald (1999) found that the companies with both rapid growth rate and high debt ratio may choose not to implement a positive net-present-value investment opportunity. This is Myers (1977) said underinvestment problem. Myers believes that a company with a huge growing change will be reluctant to issue long-term bonds, in order to avoid creditors from sharing future potential investment profits, only if the growth opportunity were not available, the company would tend to issue long-term bonds.

The academics had been a heated debate about the definition of growth. Modigliani and Miller (1975) indeed represented growth by asset growth ratio. But the academic still have disagreement with it. On the complexity of the problem, Miller and Modigliani had an explanation: "As far as we know, the measurement of growth this important, but it cannot be directly observed, this most complex and vexing variable still remain discussing, no one can provide a completely satisfactory solution."(Miller and Modigliani, 1967) .This article uses operating income growth to express the growth rate. The reason is based on the traditional concept of sustainable growth. A sustainable growth rate equals to the companies' profit

margin times total asset turnover times financial leverage ratio times retained ratio. The first two ratios seize the growth opportunity from operating process. Other two major financial ratios describe the growth opportunities from companies' dividend policy and financial leverage policy (Higgins, 1998).

This study uses 5 years average growth rate of primary business income as the variable of growth.

Other factors: a huge and contingent change in business operating income increased business risks, and correspondingly debt capacity reduced. The company's future investment opportunities will affect the company's capital structure, it is generally believed that more investment opportunities, company will reduce debt financing in order to ensure that there are sufficient funds for future investment. When a company is in bankruptcy, the production company will be unique special products for the higher costs incurred at the time of liquidation, a company was liquidated their workers with special skills and special assets, the company's suppliers and customers will be difficult to find the new service quickly. The degree of perfection of the capital market will also affect the capital structure. For example, financing costs, corporate alternative financing, the degree of protection for creditors are all significant factor of capital structure. There are other considerations like corporate control. The company's strategy will affect capital structure. Because of these factors is difficult to measure or data difficult to obtain, this studies exclude these factors.

3.2 Data selection

This article picked up all listed companies from TSX (Toronto Stock Exchange) in the year 2014. Because the companies from financial industries used different type of method to proceed asset and liabilities, this studies exclude all companies from financial industry.

There are 799 companies in TSX 2014 exclude financial industry companies. After analyzing data from these companies, this article has a pre-process procedure to drop all the unavailable and contingent data. After this procedure, there are still 210 companies' data remained.   The regression will be conducted from the data of these 210 companies.

4. REGRESSION MODEL AND ANALYSIS

4.1 Regression Model

From the analysis above, six variables have chosen for the regression. Two are the explained variables, one is the explanatory variable and the other three are control variables. The regression model will be:

DA=β0+β1TR+β2LTD+β3SIZE+β4ROA+β5Growth

And

LTD=β0+β1TR+β2LTD+β3SIZE+β4ROA+β5Growth

Which TR stands for the proxy variable of marginal tax rate; DA stands for total debt to asset ratio; LTD stands for long-term debt to total debt ratio; SIZE stands for the logarithmic scale of the company's total assets; ROA stands for return on asset; Growth stands for 5 years' average sales growth ratio.

4.2 descriptive statistic of variables

Table 1:   Summary of descriptive statistic of variables

Variable	Obs	Mean	Std. Dev.	Min	Max
TR	216	26.35203	10.95312	1.402125	92.8197
DA	216	27.25174	15.28197	.205901	82.69691
LTD	216	81.78461	26.28141	.7262665	100
size	216	20.94598	1.805918	16.22372	25.11348
ROA	216	5.35634	3.853877	-5.880911	18.08106
growth	216	14.54278	17.27485	-14.41827	96.79977

The descriptive statistic of variables shows the first impression of the variables. The mean of the tax rate is 46.53% and the average level of total debt to total asset ratio is 27.2%,

and average long-term debt to total debt ratio is 82.3%. Average size factor is 20.95, average

ROA is 5.36% and the growth rate average is 14.5%.

The correlation matrix of these variables are in Table 2:

Table 2 : correlation matrix of these variables

```
                TR        DA       LTD      size      ROA     growth
    TR       1.0000
    DA      -0.0573    1.0000
    LTD     -0.0394    0.1155    1.0000
    size    -0.0081    0.1935    0.3452    1.0000
    ROA     -0.1116   -0.3455   -0.0278   -0.0534    1.0000
 growth      0.0297   -0.0105   -0.0592   -0.0502    0.0501    1.0000
```

Only size and long-term debt ratio has a larger correlation (0.3452). That has the same

result of previous analysis.

4.3 Regression Result

Regression result of the first model:

DA=β0+β1TR+β2LTD+β3SIZE+β4ROA+β5Growth is:

Table 3: Regression result of Model 1

DA	Coefficient	T statistic	P value
TR	-0.1328455	-2.50	0.044
SIZE	1.1143494	2.77	0.198
ROA	-1.4287149	-5.46	0.039
Growth	0.0221899	0.29	0.609
_cons	29.25936	8.58	0.001

Table 4 : Regression result of Model 2

LTD	Coefficient	T statistic	P value
TR	-0.880119	-0.56	0.153
SIZE	4.980667	5.29	0.000
ROA	-0.0792517	-0.18	0.848
Growth	-0.0614271	-0.62	0.533
_cons	-18.90322	-0.91	0.361

From the first regression's result, it is obvious that the tax rate variable has a negative coefficient from the model. That suggests the marginal tax rate has a negative influence on the long-term debt financing. The p value suggests only the coefficients of TR and ROA are significant, which means that for the influence on the total debt to total asset ratio, only the model's explanatory variables TR and SIZE has significant influence, and other control variables of SIZE and Growth are not significant, cannot be simply decided by this model.

From the second regression's result, it not significant that the tax rate variable has a negative or positive coefficient from the model. The p value indicates that coefficient of the tax rate is not significant. Only coefficients of the variables SIZE are significant. This result indicated that the relationship between long term debt ratio and the marginal tax rate is not significant statistically.

5. CONCLUSION

Based on the regression model, the results suggest that the effective tax rate, which is the proxy variable of the marginal tax rate, has negative impact on the total debt to asset ratio. However, the impact on long term debt to total debt ratio is not significant, which indicates that the marginal tax rate has impact on the capital structure but the impact cannot last long. If a company faced a higher marginal tax rate, the company tends to reduce current liability to compensate the influence of larger tax amount. Nonetheless, there is no evidence that the company will raise long term debt on the purpose of getting higher tax shield amount.

This fact gives a new clue about the determinant of capital structure. Most listed company changes its capital structure when they faced an alternative marginal tax rate. However, there is no simple relationship between the marginal tax rate and long term debt to total debt ratio. So the decision about long term debt faced on changing marginal tax rate is still uncertain.

The conclusion is simple for the model, but not easy to explain. When a company faced higher tax rate, basically the company will obtain lower cash flow from operating activities. It is easy to assume a company will increase short term liability to compensate the diminishing impact on the cash flow. However, the model indicates that the short term liability will decrease when a company faced higher marginal tax rate, but the long term debt has no proportional change. There are two possible explanations about that: first. A company which has a larger business scale tends to face a higher tax rate and tends to use less short-term borrowing. Instead,

large company can raise long term debt or equity financing. Another possible explanation is that when facing higher marginal tax rate, company tends to hide net income by reducing short term liabilities on the purpose of tax savings. It needs further research to reveal the real reason.

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