

# The Effects of Corporate Income Tax on Corporate Capital Structure---Based on the Data of Listed Companies in China

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## Abstract

In 2008, the domestic and foreign corporate income tax systems were unified in China. Based on data of the listed companies in China from 2006 to 2012 and the established model, we find that income tax rates significantly influence the capital structure of listed companies in China, and there is a positive correlation to the asset-liability ratio. When tax rate falls, the listed company will lower financial leverage, and the main method is through increasing its owners' equity, rather than to reduce debt.

**Keywords:** corporate income tax, capital structure, combination of enterprise income tax

## 1. Introduction

Modigliani and Miller (1958) pointed out that the company policy of capital structure has no influence on the company value. However, Modigliani and Miller's theory is based on a series of rigorous hypothesis.

On 16 March 2007, the new Corporate Income Tax Law of the PRC unified the tax rate of both domestic company and foreign-owned company. The new tax rate was 25% and would be implemented on 1 January 2008. Before the new law, foreign-owned companies in China enjoyed preferential tax policy which was different from the tax policy for domestic companies. Although the nominal income tax rate was 33% for all foreign-owned companies and domestic companies, foreign-owned companies in some special regions enjoyed a preferential tax rate of 15% or 24%, leading to inequity between domestic companies and their foreign-owned counterparts. China began to implement the new corporate income tax policy from 1 January 2008.

After unifying two tax rates, the tax burden level of domestic companies falls. In such context, this essay will do research on whether the MM theorem will modify its conclusion to: the corporate capital structure will vary with the change of tax burden; the fall of tax burden, which is due to the integration of two tax rates, will cause a reduction in debt financing of domestic companies.

## 2. Variables and Model

### 2.1 The Selection of Variables

The dependent variable in this essay is capital structure indicated by asset-liability ratio:  $Y = \frac{\text{Total liabilities}}{\text{Total Assets}}$

For the two type of subsamples, this essay will use  $T=0$  to represent the company whose tax rate does not change and use  $T=1$  to represent company whose tax rate changes.  $T$  is defined as a dummy variable related to the change of tax rate policy. No change of tax rate (i.e.  $T=0$ ) is supposed to be the benchmark.

In order to study whether corporate capital structure is affected by the change of corporate income tax policy, the other variables which will impose influence on capital structure should be controlled to ensure the accuracy of the test. Synthesizing relevant empirical research on factors affecting capital structure, this essay selects non-debt tax shield, company size, profitability, growth ability, asset liability and financial leverage of prior period as control variables.

### 2.2 Model

The model designed in this essay is

$$Y_{jt} = \alpha + \beta_0 T + \beta_1 INDTS_{jt} + \beta_2 SIZE_{jt} + \beta_3 ROA_{jt} + \beta_4 GROW_{jt} + \beta_5 LIQU_{jt} + \beta_6 Y_{jt-1} + \varepsilon \quad (1)$$

Table 1 shows the definition of all variables above:

Table 1. Variable definition and theoretical expectation

Variable Name	Variable Symbol	Variable Definition	Theoretical Expectation	
Dependent Variable	Capital structure	Y	Total liabilities/Total Assets	
Independent Variable	Change of income tax policy	T	T=1: company whose tax rate falls T=0: company whose tax rate does not change	+
Control Variable	Non-debt tax shield	NDTS	Depreciation/Total Assets	-
	Company size	SIZE	Ln total assets	+
	profitability	ROA	Net profit/Total average assets	-
	Growth ability	GROW	Tobin'Q	-
	Asset liquidity	LIQU	Current assets/Current liabilities	-
	Financial leverage of prior period	$Y_{t-1}$	Asset-liability ratio of last year	-

### 3. Sample Selection and Descriptive Statistics

#### 3.1 Sample Selection

The samples of this essay include two types of sub-samples: one is the domestic companies whose tax rate change after the integration of two tax rates, the other is the domestic companies whose tax rate remain unchanged after the same policy. First, the companies whose  $ETR < 0$  or  $ETR > 1$  will be excluded from 700 listed firms in China, therefore 525 valid samples are left, among which 411 companies enjoy a lower tax rate and 114 companies remain the original tax rate. As for time span, this essay selects the periods between 2006 and 2009, so that such 525 samples have strong representativeness. In addition, because the sample period is 4 years, 2100 annual data points in total can ensure the objectivity and authenticity of the final results. In the research, the data of tax rate change is obtained from the manual collection and judgement of the notes of annual financial reports, while the financial data in this essay are all derived from CSMAR database.

#### 3.2 Descriptive Statistics

Table 2 and Table 3 show the results of descriptive statistics of sample companies before and after the integration of two tax rates between 2006 and 2009. With the implementation of new tax law, the fall in tax rate also leads to a fall in tax shield of debt in those affected domestic companies. Before and after the integration of two tax rates, the value change brought by its leverage effect can be indicated by a change from  $V_L = V_U + (0.16 + 0.08 \times b) \times B$  to  $V_L = V_U + (0.06 + 0.09 \times b) \times B$ . That is to say, the reduction of company value resulted from the reduction of tax shield is  $(0.10 - 0.01 \times b) \times B$ . Since  $b$  is less than or equal to 1,  $V_L$  decreases. Accordingly, the results of descriptive statistics shows: because of the reduction in tax benefit, the average asset-liability ratio of sample companies falls from 0.1263 to 0.1032.

Table 2. The results of descriptive statistics of regression model variables (before the integration of two tax rates)

Variable	N	Mean	Median	Std Dev.	Minimum	Maximum
Y	822	0.126323	0.108792	0.796532	0.018554	0.177012
NDTS	822	0.143033	0.131452	0.174402	0.019256	0.229540
SIZE	822	21.585421	22.09190	1.076990	19.112325	24.146742
ROA	822	0.086308	0.076498	0.096124	-0.045345	0.672893
GROW	822	0.145208	0.083242	0.409835	-0.273367	1.701346
LIQU	822	1.627709	1.723067	2.028765	0.123053	32.234552
$Y_{t-1}$	822	0.552399	0.571789	0.176153	0.201253	0.859856

Table 3. The results of descriptive statistics of regression model variables (after the integration of two tax rates)

Variable	N	Mean	Median	Std Dev.	Minimum	Maximum
Y	822	0.101323	0.088342	0.820012	0.036004	0.140033
NDTS	822	0.173033	0.172088	0.237420	0.023466	0.249800
SIZE	822	22.026100	23.024423	1.063702	20.304004	25.110786
ROA	822	0.084454	0.079023	0.662207	-0.032502	0.523988
GROW	822	0.158293	0.102394	1.234800	0.092313	1.820034
LIQU	822	1.671503	1.723447	2.374200	0.120982	29.303304
$Y_{t-1}$	822	0.562309	0.559056	0.122476	0.217650	0.790834

#### 4. Linear-Regression Analysis of Capital Structure and Income Tax Policy

##### 4.1 Correlation Analysis of Selected Variables

According to Table 4, although the correlation coefficient between variable GROW and variable LIQU is the largest, it is only 0.301, which indicates a low degree of correlation. The coefficients of the rest variables are all less than 0.3, implying an even weaker correlation between coefficients. We can conclude that there is no multicollinearity between variables in this model. However, correlation coefficient does not control other influence factors. Further test will rely on the results of multiple regression analysis.

Table 4. Correlation analysis

	Y	T	NDTS	SIZE	ROA	GROW	LIQU	$Y_{t-1}$
Y	1	0.132**	-0.069	0.034***	-0.318**	0.070	-0.297**	-0.012**
T	0.132**	1	0.116*	0.012	-0.015	0.023*	-0.011	-0.054
NDTS	-0.069	0.116*	1	-0.122*	0.231*	0.177*	0.138**	0.231
SIZE	0.034***	0.012	-0.122*	1	0.060**	-0.007	0.022*	0.022
ROA	-0.318**	-0.015	0.231*	0.060**	1	0.232	0.211**	0.208
GROW	0.070	0.023*	0.177*	-0.007	0.232	1	0.301*	0.114
LIQU	-0.297**	-0.011	0.138**	0.022*	0.211**	0.301*	1	-0.012*
$Y_{t-1}$	-0.012**	-0.054	0.231	0.022	0.208	0.114	-0.012*	1

Notes. \* means when confidence coefficient (two-sided) is 0.05, the correlation is significant; \*\* means when confidence coefficient (two-sided) is 0.01, the correlation is significant.

##### 4.2 Regression Analysis

Table 5 presents the regression results of the model. The regression coefficient of the dummy variable T (i.e. -0.0368) is insignificant at 5% level, which illustrates that after two tax rates are integrated, the asset-liability ratio of sample company whose tax burden level falls will drop by an average of 3.68%. It comes to the conclusion that the change of income tax rate can influence listed companies' decision on their capital structure significantly. The reasonable explanation of this conclusion is that tax benefit gained by a company from its debt financing will decrease when tax rate decreases; therefore, the company tends to consider equity financing or internal financing so that asset-liability ratio will drop significantly. It is in line with the hypothesis of this essay: when tax rate falls, listed companies will lower their financial leverage.

As for the control variables, the coefficients of company size (SIZE), profitability (ROA), liquidity (LIQU) and financial leverage of prior period ( $Y_{t-1}$ ) are all significant. Company size is significantly positively correlated with asset-liability ratio at 1% level, indicating that large companies are able to adjust their financial leverage quickly when tax rate becomes lower. This is because larger companies have greater information transparency and can spread risk effectively when their tax rate falls. Profitability (ROA), liquidity (LIQU) and financial leverage ( $Y_{t-1}$ ) are significantly negatively correlated with asset-liability ratio at 5% level, indicating that when companies own sufficient cash flow, they tend to adjust financial leverage less. This is because companies with strong profitability and high liquidity use internal funds more, which backs up the Pecking-order Theory.

Table 5. Results of multiple regression

Variable nature	Variable	Coefficient	Std Error	t-Statistic	Prob.
Constant term	C	-0.583040	0.237149	-3.016348**	0.0030
Independent variable	T	-0.036827	0.020480	-1.654071**	0.0278
Control variable	NDTS	-0.061167	0.190115	-0.321489	0.7076
	SIZE	0.041554	0.011674	3.306998***	0.0012
	ROA	-0.213469	0.096854	-2.304412**	0.0231
	GROW	0.006800	0.004932	-1.512091	0.1297
	LIQU	-0.231712	0.190123	-2.110520**	0.0350
	$Y_{t-1}$	-0.213067	0.075807	-2.615034**	0.0102
R2	0.473022	Mean dependent var.		-0.006873	
Adjusted R2	0.419230	F-statistic		15.056371	
Durbin Watson statistic	1.914765	Prob. ( F-statistic)		0.009835	

Notes. \*\*\* means correlation is significant at 1%; \*\* and \* means correlations are significant at 5% level and at 10% level, respectively.

A company lower its financial leverage mainly by following ways: first, reduce liabilities; second, increase owners' equity (so that the proportion of liabilities in total assets will decrease); third, make combined use of the above two ways. Reducing liabilities can enhance substitute effects of other factors such as non-debt tax shield and also relieve companies' interest pressure during certain periods. However, company development demands more funds. If they just simply reduce debt and finally run out of money, their long-run development will be undermined. As a consequence, by examining the direction and the size of the change in liabilities and owner' equity, this essay is to test whether listed companies with decreased tax rate lower their financial leverage via reducing debt financing or increase owners' equity.

Table 6 illustrates sample companies' change of liabilities and owners' equity after the integration of two tax rates. Both in T-test and Wilcoxon test, the change of liabilities, the change of owners' equity and the difference between liabilities and owners' equity all appear to be statistically significant at 5% level, implying no matter companies with decreased tax rate or companies with unchanged tax rate, their liabilities and owners' equity change dramatically. In addition, the change range of owners' equity is larger than that of liabilities.

Both sample companies whose tax rate falls and companies whose tax rate remains unchanged have increased liabilities and owners' equity after the integration of two tax rate. Such change is consistent with the rapid growth of China's economy. However, according to the previous conclusion, the financial leverage of sample companies with reduced tax rate is lowered and the falling range is larger than that of sample companies whose tax rate is constant. In the situation where both liabilities and owners' equity increases, the only way to lower financial leverage is reduce the proportion of liabilities in total assets, that is, the aggregate amount increases while the relative amount decreases. According to Table 6, the rising range of owners' equity of sample companies with reduced tax rate (i.e. 0.437) is larger than that of their liabilities (i.e. 0.221). Compared to sample companies with unchanged tax rate, companies with falling tax rate show more significant growth in owners' equity and smaller difference between the change of liabilities and the change of owners' equity. All the above analysis suggest that the way for sample companies whose tax rate falls to lower their financial leverage is to increase owners' equity rather than reduce liabilities. This conclusion supports the hypothesis 3.

Table 6. The change of liabilities and owners' equity of sample companies after the integration of two tax rates

Sample companies	Liabilities and owners' equity	Mean value	T-test	Median	Wilcoxon test
Sample companies with a reduced tax rate	Change of liabilities	0.221	7.931**	0.218	7.826**
	Change of owner' equity	0.437	5.062**	0.445	5.129**
	Difference	-0.216	5.770**	-0.227	5.476
Sample companies with an unchanged tax rate	Change of liabilities	0.203	6.452**	0.224	7.421**
	Change of owners' equity	0.297	5.722**	0.315	6.803**
	Difference	-0.094	5.815**	-0.091	7.034**

Notes. \*\*\* means correlation is significant at 1%; \*\* and \* means correlations are significant at 5% level and at 10% level, respectively.

## 5. Conclusion

According to the revised MM theorem, debt has tax benefit. Therefore, the fall in the statutory tax rate, which is

due to the implementation of the new tax law, will influence company decision on capital structure and then influence company value. Under the macro background of the integration of two tax rates, this essay empirically examines the financial leverage change of two types of sample companies (those with unchanged tax rate and those with decreased tax rate) and the direction of their change by studying 2006 to 2009 data of selected samples which refer to a group of Chinese listed companies. The results of research shows that a fall of income tax rate will cause listed companies to lower their financial leverage, supporting the Capital Structure Theory. In addition, the larger the company size is, the greater the change of financial leverage will be; on the contrary, the greater the profitability and liquidity is, the smaller the change of financial leverage will be. These relations agree with the Pecking-order Theory. One more conclusion is that sample companies whose tax rate fall lower their financial leverage mainly by increasing equity rather than reducing debt.

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