Corporate Tax Planning and Debt Endogeneity: Case of American Firms

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Abstract

This paper provides a comprehensive examination of the link between corporate tax planning and debt endogeneity. Previous studies have examined relations between debt and tax planning. However, these studies are limited because they do not consider the simultaneity effect of the choice of debt policy or a tax incentive. In this paper, we propose a tax framework for studying debt endogeneity. Using a sample of S&P 500 firms, the results of a simultaneous equation demonstrate that leverage; ROA and Net Operating Loss are the main determinants of the corporate tax planning.

Keywords: *tax planning, endogeneity, debt, simultaneous equations, American firms*

1. Introduction

According to the Tax foundation's recent report, American firms consistently have among the highest effective tax rate in the world. The current statutory rate of U.S. corporate income tax stands at 35 percent and is the second highest in the world.

The most recent studies show that the average effective corporate tax rate for American corporations is approximately 27 percent. The effective average rate for new investment in the United States is roughly 29.8 percent, 7.4 points above worldwide competition (Dittmar, 2011)

American firms are known as having high tax burdens. The rise of tax rates boost firms to practice tax planning and tax avoidance in order to reduce the tax liabilities. Firms can take advantage from all opportunities for tax saving. Most companies are involved in tax avoidance extensively since the income tax expenses will reduce their profits (Noor et *al*., 2010).

Previous studies did not take into account the effect of debt endogeneity when analyzing effective tax rates. Indeed, the use of simple regressions on panel data can bring to skewed results. While prior research has largely focused on tax shelters and other tax avoidance strategies as simply devices to limit payments to tax authority, more recent research contends that effective tax avoidance strategies require limiting the flow of firm specific information. In particular, Desai and Dharmapala (2008) argue that tax avoidance "demands complexity and obfuscation to prevent detection."

Since, tax planning is becoming the main concern of firms, comprehending the consequences of tax planning are the most important thing in the line of researches on corporate taxation (Wang, 2010). One of the most debatable features of tax planning is the debt substitution (Graham and Tucker, 2006; Lim, 2010).

Prior research has suggested that the determinants of tax planning remain unclear, while the benefits of this tax practice are diverse. (Hanlon and Heitzman, 2009). In the context of the trade-off theory, a firm with an overall general tax planning strategy may more highly value the tax benefits of debt, and therefore is expected to use more debt to achieve and maintain a lower cash effective tax rate.

This paper explores the relationship between debt policy and corporate tax planning; by tax planning, we mean the extent to which firms undertake tax planning strategies to limit legally income tax payments.

The contribution of this paper is to examine the relationship between tax planning and capital structure in the framework of dynamic trade-off theory. Prior studies failed to find consistent tax effects on capital structure. Bradley et *al*. (1984), Titman and Wessels (1988). The study of the links between tax planning and capital structure is still relatively unexplored.

The remainder of the paper is composed of four sections. In section two, we present tax endogeneity. Section three describes our theoretical framework. In section four, we present our sample and the descriptive statistics. Section five presents our empirical results and inferences. Concluding remarks are presented in section six.

2. Tax Endogeneity

The tax rates are endogenous with the debt policy even if they are correctly measured. This phenomenon of endogeneity affects research in taxation (Graham, 2003).

The theorem of Modigliani and Miller (1958) constituted a theoretical reference for the capital structure theories. In 1963, these authors introduced an extension of their seminal works by taking into account the effect of taxation on the corporate capital structure.

Modigliani and Miller (1963), under the assumption of absence of taxes, suggested that corporate tax rates affect the capital structure. The tax deductibility of interest creates an incentive for corporations to increase their use of debt policy. This advantage increases with the rise of the corporate income tax rate. The effect of debt is not neutral, it induces tax saving, thus firms may find it beneficial to be financed at 100% by debt.

If a firm contracts debts, this reduces its taxable income which can in its turn reduce the tax rate. The more important the debts are, the more the reduction of the marginal rate of imposition will be remarkable.

Erickon and Wang (2000) supported that firms do not consider the level of the marginal tax rate at the time of making incremental decisions. The authors showed that firms which hold a tax rate under the optimum are those which use more debts. This action should reduce the marginal tax rate in an endogenous way and indeed bring it closer towards the optimal rate.

In presence of a positive influence of the tax on each progressive financing decision, the sum of these progressive decisions should reveal an endogenous negative effect on tax rates caused by the cumulative use of debts. Graham et *al.*, (1998) measured before financing tax rates, these rates are based on the benefit before the deductibility of the interests.

3. Trade-off Theory: Theoretical Framework of Endogeneity

Theoretically, Jensen and Meckling (1976) suggest that the corporate optimal capital structure will involve the trade-off among the effects of corporate and personal taxes, bankruptcy costs and agency costs. Trade-Off theory states that capital structure decisions of firms should consider a reasonable debt ratio and tries to achieve this optimum in a long term.

The use of debts offer the advantage of Tax saving. However, the cost of financial distress is considered as a disadvantage of excessive use of debt. The trade- off theory suggests a trade-off between the tax benefit and the financial distress.

Kraus and Litzenberger (1973) recognize the existence of an optimal debt ratio within the financial structures of firms. This ratio is resulting from arbitration between tax incentives of debt (tax deductibility of the interests related to debts) and bankruptcy costs. According to Myers (1984), within the framework of trade-off theory, the firm is supposed to establish a target debt ratio. Thus, the firm moves gradually towards this target ratio which represents a balance between the tax incentives of the debt and the bankruptcy costs.

The Myers' definition of the target debt ratio is not always valid since the target ratio is not directly observable. The characteristics of the tax code are complex; the ratio will be given according to the tax aspects included in this code. Another aspect which conditions the performance of the target debt ratio relates to the bankruptcy costs.

The issues related to the nature of bankruptcy costs (fixed or variable) have allowed the reconsideration of the trade-off theory in two prospects static and dynamic.

The dynamic trade-off theory suggests that firms identify a target capital structure, but allow leverage to deviate from the target due to financing frictions (Fischer, Heinkel, & Zechner, 1989; Leary & Roberts, 2005; Strebulaev, 2007). Adjustments to capital structure are infrequent where firms rebalance capital structure only if the expected benefits exceed the adjustment costs.

4. Sample and Data Description

We estimate the interactions between the effective income tax rate and the corporate characteristics in the American context. Our sample is composed of 300 large firms (S&P) 500. Our Database includes information extracted from financial statements over the period 1996-2009.

4.1. Variables

Dependent Variable

ETR_{it}: It is the average effective tax rate, it is a proxy variable of tax planning. Studies show that the most significant objective of the departments which are interested in the corporation taxes is the reduction of the corporate effective tax rate.   Phillip*s* (2003) employs the ETR as a measure of tax planning effectiveness in his study.

Although there are several types of effective tax rates, our study is undertaken with average effective tax rates since the latter are adapted in the case of the corporate fiscal burdens studies. However, the marginal tax rates are more adequate for the analyses of the new investments' advantages. (Gupta and Newberry, 1997)

Independent Variables

SIZ_{it}: The firm size, measured by the natural Log of the book value of the total assets. The majority of studies which treated the relation between effective tax rates and the firm size use this variable (Richardson and Lanis, 2007; Gupta and Newberry, 1997; Wu and Yue, 2006). We applied a log transformation to this variable to reduce the weight conferred on certain extreme values during parameter estimation of the model.

LEV_{it}: The ratio of the long term debts on the total assets, this variable is included to control differences at the level of effective tax rates connected to the financing by debt. Several measures were proposed in the literature; these measurements imply the total debts and not only the long term debts. The choice of our measurement is justified by the fact that the long term debts generate interests which will be deduced before the tax.

Our working hypothesis stipulates that the effective tax rate decreases when debts and interests increase.

ROA_{it}: This variable measures the profitability level of a firm, measured by the relationship between the net income and the total assets. Gupta and Newberry (1997) and Richardson and Lanis (2007) used another indicator to measure the profitability of the company. They used the relationship between the income before tax and the total assets. According to our theoretical framework (pecking order theory and signal theory), effective tax rates are connected to the net book income, which justifies the measurement employed in our study.

$PP\&E_{it}$: It is the capital intensity, measured by the ratio of the net fixed tangible assets on the total assets. This ratio expresses the capital intensity of the activities led by firms. Stickney and Mc Gee (1982); Gupta and Newberry (1997); Richardson and Lanis (2007) used this measure in their studies. Millets et *al*., (1998) support the idea that firms with intensive capital have several ways of tax planning.

We suppose a negative relation between the effective tax rate and the capital intensive intensity.

Control Variables

NTI_{it}**:** Negative taxable income, a binary variable which takes the value 1 if the taxable income is negative. Wang (1991) demonstrated that the inclusion of this variable remains necessary at the time of studying the relations between the tax rates and the firm size.

NOL$_{it}$: Net operating loss, it is a binary variable which takes the value 1 if the firm has a tax loss carry forward on the future exercises, Rego (2003); Chen el *al*., (2010) employed this variable as proxy which reflects the need of firms to minimize the income taxes.

In the next part, we carry out a descriptive analysis of our data. This analysis aims at presenting specificities of each sector. We present the descriptive statistics relative to each variable, which will enable us to better determine the characteristics of our sample. Initially, we are interested in the dependent variable (ETR). In a second time, we describe the trends of variation of the independent variables retained within our framework.

4.2. Descriptive Statistics

Table 1 presents descriptive statistics for the effective tax rates (ETR). The averages of ETR of various sectors are lower than the statutory rate of the United States (35%) except for the discretionary consumption sector. The sector information technology presents the lowest average (0.28), we also note that the telecommunications services sector approaches considerably this average. Concerning the other sectors, their averages vary from 0.30 to 0.34. The values of the standard deviations show that the effective tax rates vary considerably from one company to another**.**

According to the results of table 1, we notice that the applied statutory rates do not reflect perfectly the payment of the American fiscal burdens. An ETR lower than the statutory rate implies than the firm uses tax management tools in order to realize a tax optimization.

By applying a more detailed examination to the data of our study, we justified the variation of the ETR towards different values from those presented for the totality of the sample. Our justifications are based on firm specificities.

The maximum value of the effective tax rate of the information technology sector is equal to 543%, this rate is largely higher than the statutory rate, this is explained by the fact that certain firms profit from several tax incentives which extend to their international subsidiaries in order to encourage investment or employment. Several tax incentives granted to firms require to be renewed by the responsible authorities with various time intervals.

The granting of tax incentives is conditioned by thresholds of investments and employment carried out by firms. Thus, the value of taxes can increase in the case of non- renewal of incentives after their expiration. If the firm is becoming unable to satisfy the totality or part of conditions required by authorities, it can lose the tax incentives and will be in the obligation to refund the value of the tax incentives carried out in the past. Consequently, the effective tax rate rises remarkably compared to that calculated if the tax incentives were maintained. The minimal value of information technonlogy(- 368%) results from several tax allowances granted to the firm.

The industrial sector records a maximum value of 151%, this rise compared to the other values of the tax rates is explained by the rise in the value of the non deductible burdens and the reduction from the tax incentives. The minimal value of (- 33%) is due mainly to the reversal of tax incentives accumulation related to the deduction at source following a favourable recent decision of authorities.

The negative minimal value of the effective tax rate (- 39.75%) of the energy sector can be explained by the adoption of the concerned firm (Consol Energy) of new methods of accounting of employee

compensation. This choice is justified by the Medicare Prescription Drug, Improvement and Modernization Act of 2003 which involved the accumulation of the tax incentives. The maximum value of 1.3 can be justified by the sensitivity of the corporate tax rate to the annual changes of profitability; the amount of deduction resulting from the tax considerations does not make it possible to lead to a major reduction in the effective tax rate.

Concerning the materials sector, we note that the effective tax rate varies between 24% up to 200%. The maximum value is higher than the statutory rate. This rise is generated by a significant decrease of the corporate income.

By observing the relative values of the effective tax rate of the Health sector, we notice that this rate records its maximum with 551%. The importance of this value rises from the increase in the non deductible tax burdens of the firm.

The non-respect of tax declaration or the conditions to which the tax incentives are subordinated induces the increases of penalty payment. Consequently, the fiscal burdens of the firm increase and lead to very high effective tax rates such as the value recorded on the level of the discretionary consumption sector (135%). The value of the standard deviation is important (0.68), which shows that the values are much dispersed compared to the average and vary largely through the different sectors.

The descriptive statistics of the basic sectors: consumer staples, finances, utilities and telecommunications services present moderated values compared to the other sectors of our sample. The maximum value of the ETR does not exceed the value (1.00), we note also a minimal value of (-1.82). The values are not much dispersed compared to the average.

Table 1. Descriptive Statistics of the variable ETR

Sectors	Observations	Mean	Standard Deviation	Minimum	Maximum
Information technology	675	0.28	0.47	-3.68	5.43
Industry	588	0.34	0.16	-0.33	1.51
Energy	390	0.34	0.23	-0.39	1.30
Materials	364	0.31	0.25	-0.25	2.00
Health	473	0.32	0.33	-1.79	5.51
Consumer Discretionnary	688	0.38	0.68	-2.17	13.5
Consumer Staples	374	0.33	0.16	-1.82	0.88
Finance	362	0.30	0.16	-0.53	0.95
Utilities	283	0.33	0.12	-0.32	1.00
Telecommunications services	97	0.29	0.17	-0.24	0.78

The average of debt varies between (0.13) and (0.31), the values are not dispersed compared to the average except for the Health sector. The debt rate of companies belonging to the utilities and

telecommunications services sectors is high. By comparing the descriptive results of the variable debt and ETR, we announce that the most involved in debt have the lowest effective tax rates.

Table 2. Descriptive Statistics of the variable LEV

Sectors	Observations	Mean	Standard Deviation	Minimum	Maximum
Information technology	678	0.13	0.17	0	1.93
Industrials	588	0.19	0.10	0	0.80
Energy	390	0.24	0.11	0	5.63
Materials	368	0.21	0.13	0	0.91
Health care	477	0.17	0.26	0	3.92
Consumer Discretionary	719	0.20	0.16	0	1.31
Consumer Staples	373	0.23	0.13	0	0.74
Financials	371	0.15	0.17	0	1.20
Utilities	284	0.31	0.13	0	1.51
Telecommunications services	98	0.31	0.07	0	0.69

5. Empirical Estimation

We intend to check the nature of the existing relations between the effective tax rate and the characteristics of the company. The negligence of the effect of the endogeneity of tax planning and the debt involves skewed results. Our empirical methodology is divided into two parts. We initially estimate the equation of our model. In the second time, we interpret the empirical results.

In order to improve our estimates and avoid the problems of endogeneity, we adopt the model of simultaneous equations used by Lim (2010). In the case of this study, we will estimate the model of Lim (2010) and we introduce certain modification according to our context.

The basic model:

$$\text{Tax planning}_{it} = \alpha_0 + \alpha_1 \text{Debt}_{it} + \sum \alpha_k X_{kit} + \varepsilon_{it}$$

$$\text{Debt}_{it} = \lambda_0 + \lambda_1 \text{Tax planning}_{it} + \sum \lambda_k Z_{kit} + \upsilon_{it}$$

After having modified the model of Lim (2010), our model of estimation is the following:

$$\text{Tax planning }_{it} = \alpha_0 + \alpha_1 LEV_{it} + \alpha_2 SIZ_{it} + \alpha_3 ROA_{it} + \alpha_4 INT_{it} +$$

$$\alpha_5 NOL_{it} + NTI\alpha_{6it} + \varepsilon_{it} \qquad (1)$$

$$LEV_{it} = \lambda_0 + \lambda_1 ETR_{it} + \lambda_2 SIZ_{it} + \lambda_3 ROA_{it} + \lambda_4 INT_{it} + \lambda_5 NOL_{it}$$

$$+ \lambda_6 NTI_{it} + \upsilon_{it} \qquad (2)$$

Indices **i** and **t** represent respectively the firms and the year of study (1996-2009) with εit and υit the terms of error.

The tax planning is used in a first time as dependent variable in the equation (1). In a second time, it is integrated as independent variable (equation 2).

In a preliminary stage of the estimation of the simultaneous equation, we control the correlation of the variables of our study. The correlation matrix (Annexe1) of the explanatory variables shows that the correlation of the variables is moderate; we note the absence of strong correlations which can skew our results. We also checked the degree of correlation between the two variables SIZE and Net Operating Loss because a strong correlation between these two variables can influence the nature of the relation between the effective tax rate and the firm size. (Wang, 1991)

According to the results of the estimation of the equation (1) of table (1.8), we note that only the signs of (LEV), (ROA) and (NOL) are in conformity with the signs predicted by theory. These coefficients are significant with various thresholds. Thus, the financial leverage, the level of profitability, the net operating loss of firms are regarded as being determinants of the effective tax rates.

The coefficient of LEV is negative, this demonstrates that when firm is involved in debt, it can profits from the tax incentives and minimizes its effective tax rate. The negative variability of the effective tax rate confirms the theoretical assumption applied by the capital structure theories and corroborates the former results of Gupta and Newberry, 1997; Richardson and Lanis (2007). Consequently, firms can support their tax planning by adopting a debt strategy to benefit from the tax incentives.

With regard to the variable ROA, its sign is positive; this result is confirmed by the works of Richardson and Lanis (2007); Gupta and Newberry (1997). The variability of this variable confirms our theoretical predictions. The most profitable companies face the highest effective tax rates.

Concerning the firm size, our results show the absence of significativity of this variable. The results of prior empirical work are non conclusive, the sign of the coefficient of this variable is different and depends on the sample of the study.

The results of the estimation of the equation (2) demonstrate that firms with high effective tax rates do not contract debts. This result confirms the conclusions of the estimation of the equation (1). The simultaneous study of the effect of tax planning and the debt makes it possible to reinforce the empirical results.

Our results corroborate the conclusions of Graham and Tucker (2006) which showed a substitution effect between tax planning and the recourse to the use of debts. This effect appears through a negative

relation between debt and tax planning. Thus, the sign of the ETR of the equation (2) confirms the postulates of the trade-off theory.

With regard to the variable SIZE of equation (2), it presents a negative and significant sign. Thus, we can conclude that the debt of firms of our sample weakens with the increase of their size. The firms tend to be covered against the overloads of debts.

Table 3. Simultaneous Equations

Exogenous Variables	Dependent Variable: ETR	
	Coef.	Sig.
LEVit	-0,1574	0,000
SIZit	-0,0029	0,432
PP&Eit	0,0617	0,004
ROAit	0,0674	0,046
NOLit	-0,0172	0,014
NTI it	-0,0606	0,002
Constant	0,3755	0,000
Wald chi2	52,53	0,000
Exogenous Variables	Dependent Variable : Debt LEV	
	Coef.	Sig.
ETR$_{it}$	-0.0337	0,000
SIZ$_{it}$	-0.0103	0,000
PP&E$_{it}$	0,1921	0,000
ROA$_{it}$	-0.0842	0,000
NOL$_{it}$	-0.0023	0,644
NTI $_{it}$	0.0248	0,006
Constant	0.2479	0,000
Wald chi2	507,68	0,000

6. Conclusion

The extensive debates of the tax planning during the last decade have emphasized the behaviour of tax payers and the economic aspect of this issue. Our paper attempts to clarify the new oversights of corporate taxation with a focus on firm characteristics. We examine the relation between tax planning strategies and firm's debt.

The results of the empirical analysis carried out in the American context reveal that the financing based on debt and the existence of the net operating losses and a negative taxable income appear to be significant determinants of the corporate tax planning. However, the ROA does not play a favourable part in the reduction in the effective tax rates.

We showed that the firm characteristics determine the variation of the effective tax rates. Thus, the firms can optimize their strategy of tax payment by adopting suitable choices of debt and investment structure. We showed, also, that the size and profitability influence partially the variation of the effective tax rates.

We suggest that the firm characteristics do not constitute the totality of the factors which determine tax planning. This tax practice is a policy which could integrate several actors that condition its success.

The future research in the field of corporate tax planning will concentrate on the additional factors that interfere in the variation of tax rates. Corporate tax governance is a new fertile research domain.

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