



## Tax policies for high-tech companies and tax avoidance in China

Sung Man Yoon<sup>1</sup>

En Lu Jiang<sup>2</sup>

Ying Cui<sup>3\*</sup>

<sup>1</sup>Department of Business Administration, Seoul National University of Science and Technology, South Korea.

Email: [ysm6123@seoultech.ac.kr](mailto:ysm6123@seoultech.ac.kr)

<sup>2</sup>Department of Accounting, School of Economics and Management, Yancheng Institute of Technology, China.

Email: [jiangenlu123@gmail.com](mailto:jiangenlu123@gmail.com)

<sup>3</sup>Department of Humanities Management, The Graduate School, Seoul National University of Science and Technology, South Korea.

Email: [cying0330@seoultech.ac.kr](mailto:cying0330@seoultech.ac.kr)

### Licensed:

This work is licensed under a Creative Commons Attribution 4.0 License.

### Keywords:

Differential taxation  
High-tech company certification  
Corporate tax cut  
High-tech  
Tax avoidance.

### JEL Classification:

C87; E62; L25; M41.

Received: 13 March 2023

Revised: 17 April 2023

Accepted: 15 May 2023

Published: 22 May 2023

(\* Corresponding Author)

**Funding:** This study received no specific financial support.

**Competing Interests:** The authors declare that they have no competing interests.

## 1. Introduction

China unified its existing complex corporate income taxation system by enacting the New Enterprise Income Tax Law (NEITL) in 2008. The 33% tax rate was collectively decreased to 25% with the passage of the NEITL, and preferential tax measures between foreign- and domestic-invested enterprises were transformed to preferential tax measures by industry regionally. (Yoo & Park, 2008). Therefore, a tax rate of 25% is applied to general companies, whereas a tax rate of 15% is applied to high-tech companies that meet certain certification requirements, with differential taxation between general companies and high-tech companies.

In order to make an efficient tax plan, the tax burden can be minimized by shifting taxable income into a tax-free organization in a situation where both taxable and tax-free organizations exist at the same time (Yoon & Kim, 2010). In particular, companies defer revenues or recognize expenses early after tax rate cuts to minimize their tax burden, and at this time, both tax and non-tax costs are considered simultaneously (Scholes, Wilson, & Wolfson, 1992). In particular, if the tax cut provides an incentive for management to execute a strategy that minimizes the tax burden, management has an incentive to minimize as much of the tax burden as possible by changing the period of taxable income. According to current corporate income tax law in China, differential taxation between general and high-tech companies exists, and the incentives for tax avoidance

between high-tech and general companies in the year immediately preceding the tax rate cut to which such differential taxation is applied may differ. In other words, high-tech businesses are considerably more motivated to lower their tax obligations immediately before tax rate reductions than regular businesses are. On the other hand, government-owned interests are predominantly asserted in previous studies and are regarded as an important factor in corporate governance. In a centralized socialist economy, the government's monitoring and monitoring functions are more absolute and such governments are in the dominant position with regard to management decisions (Xiao & Cooke, 2020). Therefore, the level of the government's monitoring and verification functions for companies have different effects on the level of tax avoidance by companies. In addition, for Chinese government-owned enterprises, the political costs are relatively high; accordingly, rather than reducing the unconditional tax burden, they implement an efficient tax plan that considers non-tax costs together (Zhang & Han, 2008).

Therefore, the purpose of this study is to investigate whether the level of tax avoidance by high-tech companies was higher than that by general companies just before the 2008 tax rate cut in China and to determine how ownership by the Chinese government affects the tendency of such high-tech companies to avoid tax.

This study is organized as follows. In Section 2, as a theoretical background, the contents of the 2008 enactment of the NEITL and the certification procedures and preferential tax measures for high-tech companies are reviewed, then the research hypotheses is developed after a review of related prior studies. In Section 3, the research model is designed to analyze the impact of the tax avoidance behavior of high-tech enterprises and ownership by the Chinese government. The process of measuring variables and extracting research samples is also explained. Section 4 describes the results of descriptive statistics, correlations, and a regression analysis as empirical analysis results, and Section 5 summarizes the analysis and proposes conclusions.

## **2. Theoretical Background and Research Hypothesis**

### *2.1. Review of Previous Studies and Research Hypotheses*

China's tenth National People's Congress' fifth session, held on March 16, 2007, decided to pass a bill that would have instituted the New Enterprise Income Tax Act. The existing foreign investment and income tax laws and domestic corporate income tax law are unified into one law, NETTL. In addition, the current corporate income tax law consists of total eight chapters and 60 articles, and it has been in force since January 1, 2008.

However, taking into account the tax burden on both domestic and foreign businesses, as well as the trend towards global tax reform, the NEITL abolishes preferential tax regulations for each region in principle and sets a tax rate of 25%. Preferential taxation by industry, such as promotion policies for technological innovations, scientific and technological developments and basic construction, agricultural development and environmental protection, energy conservation, safe production, the promotion of public service projects, subsidy policies for vulnerable groups, and tax reductions and exemptions for natural disaster areas were also introduced (Yoo & Park, 2008).

The corporate income tax law was enacted on the principle that a single tax rate should be applied to all taxpayers. Preferential tax measures have also been added.

As such, the current preferential regulations have been drastically reduced and reorganized, and companies subject to the existing 15% or 24% reduction or exemption rate and the "two sides three reductions" from the year of profit acquisition are exempt from corporate income tax for two years, meaning a reduction of 50% for three years or exemption from corporate income taxes for five years along with a 50% reduction for five years.

The existing tax rates were applied for five years after the current NEITL was enforced. During the five-year grace period, the tax rate was gradually increased and adjusted so that a 25% tax rate could be applied after five years after the grace period expired.

On the other hand, under the NEITL, preferential tax measures for high-tech companies can be largely classified into standard tax reductions, tax rate reductions, tax reductions, an extended period of carry-over deficit, and industrial benefits.

First, tax reductions and exemptions are further subdivided into additional deductions, accelerated amortization, and carryover deductions. If the investments made during the process of discovering and developing new technologies do not meet the capital return standards, the additional deductions are 50% of Research and Development (R&D) expenses. If the criteria for capital reduction are satisfied, recognition of an amount equal to 150% of the cost of intangible assets is made. Second, the tax rate reduction is a 15% tax rate applied to high-tech companies that require intensive support from the government. Third, the tax reduction applies to the collection of corporate income tax when the technology transfer income to a domestic company does not exceed five million yuan during the business year, and 50% of the corporate income tax is exempted when this category exceeds five million yuan. Additionally, if the investment period is longer than two years for startup-invested businesses that invest in small and medium-sized high-tech businesses but are not listed on the stock investment, 70% of the investment amount will be subtracted from the taxable income in the

fiscal year during which the stock holding period is longer than two years. Fourth, the benefit of extending the carryover deficit period can be extended to the subsequent business year and preserved if the relevant high-tech enterprise or a high-tech small and medium-sized company has not been able to compensate for the deficit for five years prior to the business year in which the qualification was acquired. The term is a benefit that allows extension from five to ten years. Lastly, the industrial benefit is to deduct the labor and education and training expenses of software producers from their income tax according to the actual accrued amount, and the Value Added Tax (VAT) on the goods used by the software producer to research development, expand, and reproduce software is subject to corporate income taxes.

In the income tax benefit policy for high-tech enterprises, the State Tax Administration of China stipulates the period of preferential tax benefits for high-tech enterprises as three years. In other words, it has a three-year validity period, as opposed to the certificate's stated expiration date for the high-tech corporation.

The certification requirements for high-tech companies in China are based on the High-Tech Enterprise Certification Management Act enacted in 2008, which was revised drastically in 2016 to support China's high-tech development and related industries. In summary, the high-tech company certification requirements should be currently a resident enterprise that conducts production and business activities in China, and the company's R&D and development field corresponds to the state-supported high-tech field specified by the state. At the same time, it must be a company that generates profits by acquiring independent intellectual property rights of the company's own core technology through continuous R&D and innovation activities. Therefore, under the NEITL in China, high-tech companies have high preferential tax benefits and therefore it must meet strict certification requirements in order to receive these benefits.

## *2.2. Review of the Literature and Research Hypotheses*

This study analyzes whether there is a difference in the level of tax avoidance given the situation where differential tax rates are applied between general corporations and high-tech companies under the corporate income tax law in China. Therefore, previous studies related to tax avoidance efforts and tax strategies of companies following tax rate cut are reviewed.

First, prior studies related to tax avoidance generally do not distinguish between legal and illegal activities, defining the act of lowering the explicit tax as tax avoidance (Dyreg, Hanlon, & Maydew, 2008; Hanlon & Heitzman, 2010; Koh & Paik, 2010). This implicitly assumes that an act that can reduce explicit taxes by reflecting a real economic effect is an act of tax avoidance. Accordingly, companies with a low level of tax burden over the long term are defined as companies that avoid tax, although some studies have argued that this type of tax avoidance has a negative effect on the value of the firm (Hanlon & Slemrod, 2009). There is evidence from several studies that corporate tax evasion practices increase firm value. (Koh, Kim, & Choi, 2007).

Mills and Sansing (2000) found that the greater the Book-Tax Difference (BTD), the greater the likelihood of a tax audit, meaning that the possibility of tax avoidance is high. In addition, Desai and Dharmapala (2009) developed a tax avoidance measure using a regression analysis of BTD and total accruals to remove the effect of earnings management; this measure has been subsequently used in many recent studies. Frank, Lynch, and Rego (2009) also measured the discretionary part of the permanent difference as tax avoidance, and Hanlon and Heitzman (2010) increased the profits and relative tax burden by using pre-tax net income as the denominator for calculating the effective tax rate. In order to overcome the problem of inconsistent financial reported income and taxable income, a model that measures the effective tax rate using operating cash flows from which accruals were removed as the denominator was suggested (Badertscher, Burks, & Easton, 2012).

On the other hand, Phillips, Pincus, and Rego (2003) used deferred tax expenses as a substitute for BTD according to the methodologies of Burgstahler and Dichev (1997) arguing that it was more useful to use deferred tax expenses than the Jones model to detect earnings management efforts to avoid tax.

Siegfried (1974) claimed that the effective tax rate was more helpful than the statutory tax rate since the real tax rate may differ from the nominal tax rate (or statutory tax rate) due to the existence of tax incentives, tax refunds, and tax adjustments. Wilkie (1988) constructed a tax preference hypothesis based on previous studies and analyzed the phenomenon by which the effective tax rate is lower than the statutory tax rate.

In previous studies focusing on China, Wang (1999) argued that the ETR of listed companies in Shenzhen and Shanghai is much lower than the statutory tax rate, and Wu and Li (2007) measured the level of the corporate income tax burden with the ETR, finding that the tax benefit is for companies. He contended that after looking at the effects on income taxes, there was no statistically significant difference in the amount of taxes paid by enterprises with substantial tax benefits against those without.

In addition, according to Zhang and Han (2008) the effective tax rate of privately listed companies is significantly lower than that of state-owned companies, as the two types of companies have different incentives for controlling shareholders in different ownership structures. With efficient tax planning, with higher financial reporting costs, more conservative tax planning behavior is preferred. Cao and Zhang (2008) analyzed the relevance of changes in effective tax rate (ETR) and tax policies, arguing that profitability and the equity structure influence the ETR, while changes in tax policies control this effect. In other words, when

the tax benefits of a company are large, profitability and the equity structure have a statistically significant positive (+) effect on the ETR.

In addition, [Liu, Liu, and Deng \(2009\)](#) found that the difference in tax burden levels between industries and regions decreased after the enactment of the NEITL. They argued that the reduction in the tax burden level of the comprehensive economic zone in the inland region is considerable. In addition, [Yang and Rao \(2009\)](#) studied the level of tax avoidance prevention of Chinese enterprises after the promulgation of special tax adjustment rules by the State Tax Administration of China, raising the need for improvement measures. Their study placed a strong emphasis on improving the capability of the tax workforce to support and prevent tax avoidance.

On the other hand, previous studies have also studied the effects of financial characteristics of a company ([Gupta & Newberry, 1997](#); [Rego, 2003](#)) the ownership structure ([Chen, Chen, Cheng, & Shevlin, 2010](#)) corporate governance and managerial compensation ([Desai & Dharmapala, 2006](#); [Phillips et al., 2003](#); [Rego & Wilson, 2012](#)) trade unions as external stakeholders ([Chyz, Leung, Li, & Rui, 2013](#)) and external auditors as external stakeholders ([McGuire, Neuman, & Omer, 2013](#)). [Zimmerman \(1983\)](#) investigated the relationship between firm size and the effective tax rate as a component of the political costs of firms, finding that firm scale was consistent with the political cost hypothesis by showing a positive (+) relationship with the effective tax rate. [Desai and Dharmapala \(2006\)](#) found a negative (-) relationship between incentive compensation for managers and tax avoidance.

The following reviews about previous studies on corporate tax strategies or tax avoidance following tax rate cuts. Managers stated that the business could try to reduce the tax burden by cutting its profits in the year prior to the corporation tax drop. ([Guenther, 1994](#); [Kim & Park, 2003](#); [Lopez, Regier, & Lee, 1998](#); [Sims & Sunley, 1992](#)).

In relation to this, [Sims and Sunley \(1992\)](#) and [Guenther \(1994\)](#) found that managers used a tax strategy to minimize their corporate tax by deferring the profits generated in the year just before TRA86 was implemented to the next year or by lowering their profits. Additionally, [Kim, Lee, and Choi \(2014\)](#) conducted an empirical analysis of Korean listed companies from 2003 to 2011 considering the year of a corporate tax rate cut. It was argued that the sensitivity was increased; these results were interpreted as meaning that managers who intentionally lowered profits in the year prior to the corporate tax rate cut would receive relatively high compensation for the same performance.

[Paek and Choi \(1999\)](#) analyzed earnings management efforts to minimize corporate tax, reporting that earnings were reduced not only by contract-related incentives but also by incentives to minimize corporate tax. Firms that are expected to have a large tax burden make earnings management decisions that lower their profits. In particular, it is argued that firms with high corporate tax burdens lower their earnings to lower their corporate tax burden regardless of the possibility of violating debt contracts. [Son, Yoon, and Choi \(2010\)](#) investigated the trade-offs between tax costs and non-tax costs, which are reduced due to earnings deferrals, as well as management's earnings behavior in response to a corporate tax rate cut. They argued that the tax rate cut would lead to reductions in earnings in the scheduled year.

Summarizing the arguments of the previous studies reviewed above, companies' tax avoidance behaviors arise due to changes in tax incentives or tax policies. Therefore, this study aims to investigate the phenomenon of tax avoidance, focusing on the tax rate cut in China and differential taxation measures for high-tech companies enacted in 2008.

This study has several differences from previous studies. First, China's 2008 NEITL is characterized by a tax rate change and a differential tax rate change at the same time as a preferential tax treatment (15% tax rate) for high-tech companies while reducing the tax rate of all companies. Second, research on tax avoidance behavior of companies due to differential tax benefits along with such changes in the 2008 tax rate, including China, has not been actively conducted.

In order to minimize their tax burdens, companies defer revenues or recognize costs early after tax rate cuts, taking into account both tax and non-tax costs ([Scholes et al., 1992](#)). In short, managers have a tendency to minimize taxes by lowering their reported earnings in the year that immediately precedes the tax rate cut.

When the NEITL was enacted in China in 2008, the tax rate of companies was reduced from 33% to 25%. However, the 15% tax rate, which is the preferential tax rate, is imposed when a business is recognized as a specific high-tech firm. In other words, since 2008, corporate tax rates have been cut overall, but a differential tax rate has been applied between high-tech companies and general companies. This tax policy presents an incentive for companies to recognize expenses in the next year early for the purpose of making deductible expenses as large as possible in the year immediately preceding the tax rate cut. In addition, high-tech companies with large tax benefits have a greater incentive to minimize their tax burden in the year immediately preceding the tax rate cut compared to companies with relatively small tax benefits.

On the other hand, according to [Sims and Sunley \(1992\)](#) guide to efficient tax planning, when taxable and tax-free economic entities exist at the same time, taxable income is converted from taxable income to a tax-free entity, thereby minimizing the tax burden ([Yoon & Kim, 2010](#)). In particular, high-tech companies will be relatively incentivized to recognize these expenses in the next year as the year immediately preceding the tax rate cut. Therefore, hypothesis 1 is set as follows.

*Hypothesis 1: Chinese high-tech companies will have a higher level of tax avoidance in the year just before the tax rate cut compared to other companies.*

State-owned enterprises in China are socialist enterprises, with all assets owned by the state. However, a private enterprise is a type of entity that continues to increase after market opening and is established and operated by private management personnel and capital (Xiao & Cooke, 2020). That is, even for private companies, the concentration of government equity and ownership is still high.

For the purpose of improving industrial and national competitiveness, the Chinese government has granted high management autonomy to private companies, but the Chinese government still holds shares in privatized companies, and there is a problem of agents between the government and managers. In particular, the Chinese government has had a significant influence on managers' decision-making activities (Liu, Lee, Min, & Yoo, 2020).

On the other hand, the opinion that government-owned interest is an important factor in corporate governance is dominant. In a centralized socialist economy, the government is in a position to dominate management decisions because the government's supervisory and monitoring functions are absolutely essential (Xiao & Cooke, 2020). Therefore, the level of government supervision and monitoring on companies will have different effects on the level of tax avoidance by companies, and the government's sanctions on tax avoidance behavior by companies will be clearly different from those in other countries.

In addition, with regard to Chinese government-owned enterprises (state-owned enterprises), political costs are relatively high, meaning that they are more likely to implement efficient tax planning as opposed to unconditionally reducing the tax burden (Zhang & Han, 2008). Therefore, it is expected that the tax avoidance behavior of companies before and after the lowering of the tax rate due to the enactment of the NEITL in China is expected to be mitigated as the government's ownership interest increases.

*Hypothesis 2: A higher Chinese government ownership rate is correlated with a lower tax avoidance level of high-tech enterprises in the year just before the tax rate cut.*

### 3. Research Models and Data

#### 3.1. Research Models

As mentioned above, the purpose of this study is to investigate the level of tax avoidance by high-tech companies due to the 2008 tax rate cut in China. Especially, this study focuses on whether ownership by the Chinese government lowers the tax avoidance level of high-tech company subject to a low tax rate (15%) due to preferential tax measures. In Equations 1 to 3, the dependent variable is defined as the tax avoidance measure of Desai and Dharmapala (2006) and BTD, and the main variable of interest, *High Tech*, is 1 if the company is a high-tech company and 0 otherwise. The year just before the tax rate cut (*PRE*) is defined as 1 for 2006-2007, before the enactment of the NEITL, and 0 for 2008 and later. This also encompasses the Chinese government's ownership ratio (*GOV*).

If high-tech companies have a higher level of tax avoidance than general companies, the coefficient of  $\beta_1$  in Equations 1 to 3 shows a positive (+) sign, and sample companies (including general companies and high-tech companies) reduce their tax rates. If tax avoidance is performed immediately before,  $\beta_2$  in Equations 1 to 3 shows a positive (+) coefficient. In particular, if the tax avoidance level of high-tech companies is higher in the year just before the tax rate cut compared to other companies (research hypothesis 1), the coefficient of  $\beta_3$  in Equation 1 shows a positive (+) sign. Moreover, if the Chinese government's ownership interest rate lowers the tax avoidance level of enterprises just before the tax rate cut, the coefficient of  $\beta_3$  in Equation 2 presents a negative (-) sign. In the hypothesis 2,  $\beta_7$  in Equation 3 has a negative coefficient.

$$TaxAvoidance_{i,t} = \beta_0 + \beta_1 HighTech_{i,t} + \beta_2 PRE_{i,t} + \beta_3 HighTech_{i,t} \times PRE_{i,t} + \beta_4 GOV_{i,t} + \beta_5 SIZE_{i,t} + \beta_6 LEV_{i,t} + \beta_7 ROA_{i,t} + \beta_8 CFO_{i,t} + \beta_9 OPN_{i,t} + \beta \sum IND + \varepsilon_{i,t} \tag{1}$$

$$TaxAvoidance_{i,t} = \beta_0 + \beta_1 PRE_{i,t} + \beta_2 GOV_{i,t} + \beta_3 PRE_{i,t} \times GOV_{i,t} + \beta_4 SIZE_{i,t} + \beta_5 LEV_{i,t} + \beta_6 ROA_{i,t} + \beta_7 CFO_{i,t} + \beta_8 OPN_{i,t} + \beta \sum IND + \varepsilon_{i,t} \tag{2}$$

$$TaxAvoidance_{i,t} = \beta_0 + \beta_1 HighTech_{i,t} + \beta_2 PRE_{i,t} + \beta_3 GOV_{i,t} + \beta_4 HighTech_{i,t} \times PRE_{i,t} + \beta_5 HighTech_{i,t} \times GOV_{i,t} + \beta_6 PRE_{i,t} \times GOV_{i,t} + \beta_7 HighTech_{i,t} \times PRE_{i,t} \times GOV_{i,t} + \beta_8 SIZE_{i,t} + \beta_9 LEV_{i,t} + \beta_{10} ROA_{i,t} + \beta_{11} CFO_{i,t} + \beta_{12} OPN_{i,t} + \beta \sum IND + \varepsilon_{i,t} \tag{3}$$

Where,

TaxAvoidance = tax avoidance measure Desai and Dharmapala (2006) (hereinafter referred to as "DD") and BTD.

HighTech: 1 for high-tech companies, 0 for general companies.

GOV = Share ratio owned by the Chinese government.

PRE = 1 for 2006-2007 before the enactment of the NEITL, and 0 after or 2008.

SIZE= natural logarithm of the beginning total assets as the firm size.  
 LEV = total liabilities as a ratio of liabilities ÷ the beginning of total assets.  
 ROA = net income as return on asset ratio ÷ the beginning of total assets.  
 CFO = cash flow from operating activities ÷ the beginning of total assets.  
 OPN = 1 if the opinion of the external auditor is qualified, otherwise 0.  
 ΣIND=Industry dummy.

As control variables that affect the level of tax avoidance, corporate size (*SIZE*) is related to political costs and the debt ratio (*LEV*) is related to financial expenses such as interest expenses and the debt contract hypothesis. In addition, return on assets (*ROA*) is an indicator of a company's profitability and activity, and operating cash flow (*CFO*) is expected to affect the level of tax avoidance because there is an incentive to minimize cash outflows through tax avoidance. In addition, industry dummy variables are introduced to the study model to control for the elements specific to each business because the judgements of external auditors also influence numerous accounting transactions and internal control systems.

### 3.2. Data

This study selected Chinese companies listed on the Chinese stock market from 2003 to 2017 from the China Stock Market & Accounting (CSMAR) database. The final analysis sample was composed of those companies that satisfy the following conditions:

- (1) Companies listed on the stock market.
- (2) Companies that are a non-financial business.
- (3) Companies that do not experience capital erosion.
- (4) Companies for whom it is possible to receive additional financial data needed for analysis.

Table 1 shows the distribution by industry in the final sample of 29,178 firm-years. The frequency of the manufacturing industry is 63.86%, or 18,632 firm-years. For IT firms, it is 5.62% and 1,641 firm-years, and the category of wholesale and retail trades stands at 5.55%, with 1,619 firm-years. Especially, most high-tech companies are included in the category of Information Transmission, Software and Information Technology Services, which are IT companies. In order to minimize the effect of outliers in the sample, the top and bottom 1% of all continuous variables are winsorized.

**Table 1.** Distribution of the sample by industry (Unit: Firm-years).

Industry	Freq.	Percent
Farming, forestry, animal husbandry, and fishery	473	1.62
Mining	681	2.33
Manufacturing	18,632	63.86
Production and supply of electric power, thermal power, gas and water	1,044	3.58
Construction	779	2.67
Wholesale and retail	1,619	5.55
Transport, storage and postal	1,049	3.60
Hotels and catering	138	0.47
Information transmission, software and information technology service	1,641	5.62
Real estate	1,408	4.83
Leasing and business service	316	1.08
Scientific research and technology service	177	0.61
Water, environment and public facilities management	279	0.96
Residential service, repair and other service	61	0.21
Education	11	0.04
Health and social work	40	0.14
Culture, sport & entertainment industry	258	0.88
Conglomerates	572	1.96
Total	29,178	100

## 4. Empirical Analysis Result

### 4.1. Descriptive Statistics and Correlation Analysis

Table 2 shows descriptive statistics of the major variables. Among the tax avoidance measures (*TaxAvoidance*), the average of the *DD* measures is 0.187, which ranges from -0.433 to 0.472, and that of *BTDD* is -0.095, which ranges from -0.665 to 0.149. As a variable of interest, high-tech companies (*HighTech*) showed an average of 0.238, representing 23.8% of the total analysis sample, and in the year just before the tax rate cut (*PRE*), it accounted for 8.7%. Additionally, the distribution of the Chinese government's ownership

interest rate (GOV), which averages 11.678% and ranges from 0 to 73.529, shows that state-owned firms are included in the sample.

As a control variable, the average of the company size (SIZE) is 21.811, which is distributed from 19.168 to 25.742, and the debt ratio (LEV) shows an average of 52.8%, which is distributed in the range of 4.8% to 110.8%. In addition, the average of the total return on assets (ROA) is 0.797, which is distributed in the range of -0.22 to 0.204 and which includes a sample of companies showing a negative growth rate. The average value of the operating cash flow (CFO) is 0.046, which is distributed in the range of -0.196 to 0.263, indicating that there are also samples with negative cash flows from their operating activities.

Table 2. Descriptive statistics of major variables (N=29,718).

Variable		Mean	STD	Min.	Median	Max.
TaxAvoidance	DD	0.187	0.126	-0.433	0.212	0.472
	BTD	-0.095	0.114	-0.665	-0.07	0.149
HighTech		0.238	0.426	0	0	1
PRE		0.087	0.282	0	0	1
GOV		11.678	20.863	0	0	73.529
SIZE		21.811	1.338	19.168	21.659	25.742
LEV		0.528	5.435	0.048	0.444	1.108
ROA		0.797	138.198	-0.22	0.038	0.204
CFO		0.046	0.417	-0.196	0.045	0.263
OPN		0.940	0.237	0	1	1

Note: The definition of the variables is as follows.

TaxAvoidance = Tax avoidance measure Desai and Dharmapala (2006) (hereinafter referred to as “DD”) and BTD.

HighTech: “1” for high-tech companies, “0” for general companies.

GOV = Share ratio owned by the Chinese government.

PRE = “1” for 2006-2007 before the enactment of the NEITL, and “0” after or 2008.

SIZE= Natural logarithm of the beginning total assets as the firm size.

LEV = Total liabilities as a ratio of liabilities ÷ the beginning of total assets.

ROA = Net income as return on asset ratio ÷ the beginning of total assets.

CFO = Cash flow from operating activities ÷ the beginning of total assets.

OPN = “1” if the opinion of the external auditor is qualified, otherwise “0”.

Table 3 shows the results of Pearson’s correlation analysis between the major variables. For DD, which is a measure of tax avoidance, high-tech companies (HighTech) show a coefficient of 0.082, which is significant at the 1% level, and for BTD, the result is a coefficient of 0.072, which is also significant at the 1% level, higher than that of general companies. These results indicate that the level of tax avoidance is high.

In addition, for DD and BTD, the years just before the tax rate cut (PRE) show significant outcomes of -0.108 and -0.105, respectively, at the level of 1%. In addition, for DD and BTD, the Chinese government ownership share (GOV) also shows significant coefficients of -0.057 and -0.031, respectively, at the 1% level.

Among the control variables, firm size (SIZE), total return on assets (ROA), and audit opinion (OPN) present statistically significant positive coefficients, respectively, and the debt ratio (LEV) and operating cash flow (CFO) show statistically significant negative coefficients.

Table 3. Pearson correlation analysis.

Variables	DD	BTD	HighTech	PRE	GOV
BTD	0.946***				
HighTech	0.082***	0.072***			
PRE	-0.108***	-0.105***	-0.147***		
GOV	-0.057***	-0.031***	-0.143***	0.240***	
SIZE	0.454***	0.503***	0.020***	-0.096***	0.050***
LEV	-0.086***	-0.085***	-0.012**	0.029***	0.009
ROA	0.015**	0.014**	-0.003	-0.003	-0.004
CFO	-0.068***	-0.019***	-0.001	0.001	0.021***
OPN	0.246***	0.243***	-0.069***	-0.027***	-0.016***
Variables	SIZE	LEV	ROA	CFO	
LEV	-0.068***				
ROA	-0.045***	0.071***			
CFO	0.003	0.004	0.003		
OPN	0.174***	-0.079***	-0.026***	0.047***	

Note: \*\*, and \*\*\* indicate significance at 10% and 5% levels, respectively. Refer to the note in Table 2 for the definitions of the variables.

## 4.2. Regression Results

Table 4 shows the analysis results after defining the dependent variable as a measure of tax avoidance according to Desai and Dharmapala (2006). In Model 1, *HighTech* shows a significant positive (+) coefficient at the 1% level, which means that high-tech companies have a stronger tendency to avoid taxes compared to general companies. This shows a coefficient of  $-0.0172$  ( $-0.0247$  in Model 3), which means that the level of tax avoidance in 2006–2007 before the tax rate cut was lower.

In addition, *HighTech*×*PRE* presents a statistically significant coefficient of  $0.0251$  ( $p < 0.05$ ), a result that supports research hypothesis 1 that the level of tax avoidance of high-tech companies will be higher than that of general companies before the tax rate cut. Although the overall tax rate is lowered, it is interpreted that this result arose because high-tech companies that are subjected to low tax rates due to preferential tax measures have a greater incentive to avoid taxes compared to general companies. In other words, this outcome is consistent with earlier research that revealed economic entities that were significantly impacted by a tax decrease had incentives to reduce their tax liability in the year before the tax rate cut.

As a control variable, the Chinese government's ownership interest rate (*GOV*) is statistically significant  $-0.0006$  ( $p < 0.01$ ). This means that the incentive for managers to engage in opportunistic behaviours like tax dodging is generally low because the government's management and monitoring of businesses increase as the Chinese government's ownership portion increases.

Meanwhile, as a result of analyzing the effect of the Chinese government's ownership ratio (*GOV*) on the tax avoidance behavior of high-tech companies, in Model 3, *HighTech*×*GOV* has statistically significant coefficient of  $-0.0002$  ( $p < 0.1$ ), signifying that the ownership share of the Chinese government has a positive effect on mitigating tax avoidance behavior by high-tech companies.

On the other hand, *PRE*×*GOV* of Model 2 shows a positive (+) coefficient significant at the 1% level. In Model 3, which analyzed the effect of the Chinese government's ownership interest ratio (*GOV*) on the tax avoidance behavior of high-tech companies in the year just before the tax rate cut, *HighTech*×*PRE*×*GOV* is statistically significant at  $0.0011$  ( $p < 0.05$ ). This is a result that signals the rejection of research hypothesis 2, which states that ownership by the Chinese government reduces the level of tax avoidance of high-tech companies in the year just before the tax rate cut. In other words, this finding indicates that high-tech companies engage in more tax evasion than general companies do in the year before a tax rate cut and that the government's oversight and monitoring mechanisms are ineffective at stopping such opportunistic managerial actions. Therefore, even if the Chinese government's level of supervision and monitoring of enterprises is high due to the high ownership ratio of the Chinese government, it is not able to control even the opportunistic actions of managers, such as tax avoidance. Another factor that contributes to this outcome is that high-tech firms with significant government ownership interests are granted more management latitude than general companies, which is necessary to maintain China's global competitiveness and support future growth engine industries. Among the controlled variables, firm size (*SIZE*), total return on assets (*ROA*), and auditor opinions (*OPN*) all present statistically significant positive (+) coefficients. The level of tax avoidance is higher for companies that received qualified opinions. In addition, the debt ratio (*LEV*) and operating cash flow (*CFO*) also show a statistically negative (−) relationship, which means that the higher the debt ratio or the larger the operating cash flow, the lower the level of tax avoidance.

Table 4. Results of the OLS regression.

Dependent variable=DD	Model 1		Model 2		Model 3	
	Coef.	t-stat.	Coef.	t-stat.	Coef.	t-stat.
_const	-0.8938	-67.92***	0.9024	-69.04***	-0.8897	-67.32***
<i>HighTech</i>	0.0056	3.23***	–	–	0.0057	3.11***
<i>PRE</i>	-0.0172	-7.16***	-0.0258	-7.13***	-0.0247	-6.64***
<i>HighTech</i> × <i>PRE</i>	0.0251	1.98**	–	–	0.0013	0.07
<i>GOV</i>	-0.0006	-8.12***	-0.0004	-9.27***	-0.0003	-7.80***
<i>HighTech</i> × <i>GOV</i>	–	–	–	–	-0.0002	-1.68*
<i>PRE</i> × <i>GOV</i>	–	–	0.0005	5.12***	0.0005	4.38***
<i>HighTech</i> × <i>PRE</i> × <i>GOV</i>	–	–	–	–	0.0011	2.10**
<i>SIZE</i>	0.0447	78.39***	0.0451	79.38***	0.0447	78.22***
<i>LEV</i>	-0.0028	-6.79***	-0.0028	-6.83***	-0.0028	-6.72***
<i>ROA</i>	0.0001	11.07***	0.0001	11.11***	0.0001	11.01***
<i>CFO</i>	-0.0196	-12.35***	-0.0194	-12.23***	-0.0194	-12.22***
<i>OPN</i>	0.1058	30.26***	0.1061	30.36***	0.1056	30.24***
<i>ΣIND</i>	Included		Included		Included	
F-stat.	127.22***		127.86***		122.93***	
Adj.R <sup>2</sup>	0.2976		0.2987		0.3002	

Note: \*, \*\*, and \*\*\* indicate significance at 10%, 5% and 1% levels, respectively.

Refer to the note in Table 2 for the definitions of the variables.

Source: Desai and Dharmapala (2006).



Table 5 shows the results of the analysis of the research hypothesis by measuring the measure of tax avoidance as the difference between accounting earnings and taxable income (*BTD*). These results are similar to those of Desai and Dharmapala (2006). In other words, in Models 1 and 3, *HighTech* shows statistically significant coefficients of 0.0040 ( $p < 0.01$ ) and 0.0048 ( $p < 0.01$ ), respectively. However, in Models 1 and 3, *PRE* shows significant corresponding outcomes of  $-0.0136$  ( $p < 0.01$ ),  $-0.0228$  ( $p < 0.01$ ), and  $-0.0215$  ( $p < 0.01$ ), indicating that, there was a tax rate cut due to the enactment of the NEITL in China, the level of tax avoidance decreased in the year immediately preceding the tax rate cut.

In Model 1, *HighTech* × *PRE* indicates a statistically significant outcome of 0.0152 ( $p < 0.1$ ) and, although it is not statistically significant, a coefficient of 0.0063 in Model 3. This means that compared to general companies, high-tech companies have stronger incentives to avoid taxes in the year just before the rate cut. Therefore, this is a result that supports Research Hypothesis 1.

On the other hand, the Chinese government's ownership ratio (*GOV*) shows a statistically significant value of  $-0.0003$  ( $p < 0.01$ ) to  $-0.0002$  ( $p < 0.01$ ) in Models 1 to 3, which shows that the higher the government-owned share is, the lower the level of tax avoidance becomes. Particularly, in Models 2 and 3, the *GOV* has a significant coefficient of  $-0.0002$  ( $p < 0.01$ ), which reduces the propensity of high-tech companies to evade tax due to the high level of government supervision and monitoring given the high Chinese government ownership, indicating a positive effect of government ownership.

In Model 3, *HighTech* × *PRE* × *GOV* presents a statistically significant coefficient of 0.0011 ( $p < 0.05$ ). This result allows rejection of hypothesis 2, which states that the Chinese government's ownership lowers the level of tax avoidance of high-tech companies in the year just before the tax rate cut. This shows that the Chinese government gave more discretion to management of high-tech companies in order to secure national competitiveness by cultivating new growth engines or that the government's supervision and control functions for high-tech companies do not function properly.

Table 5. Results of OLS regression: *BTD*.

Dependent variable= <i>BTD</i>	Model 1		Model 2		Model 3	
	Coef.	t-stat.	Coef.	t-stat.	Coef.	t-stat.
_const	-1.1631	-100.33***	-1.1718	-101.73***	-1.1605	-99.63***
<i>HighTech</i>	0.0040	2.64***	–	–	0.0048	2.98***
<i>PRE</i>	-0.0136	-6.44***	-0.0228	-7.13***	-0.0215	-6.56***
<i>HighTech</i> × <i>PRE</i>	0.0152	1.76*	–	–	0.0063	1.38
<i>GOV</i>	-0.0003	-5.37***	-0.0002	-7.08***	-0.0002	-5.47***
<i>HighTech</i> × <i>GOV</i>	–	–	–	–	-0.0002	-2.56***
<i>PRE</i> × <i>GOV</i>	–	–	0.0005	5.17***	0.0004	4.30***
<i>HighTech</i> × <i>PRE</i> × <i>GOV</i>	–	–	–	–	0.0011	2.27**
<i>SIZE</i>	0.0447	89.01***	0.0451	90.05***	0.0448	88.82***
<i>LEV</i>	-0.0022	-6.10***	-0.0022	-6.13***	-0.0022	-6.01***
<i>ROA</i>	0.0001	11.15***	0.0001	11.20***	0.0001	11.10***
<i>CFO</i>	-0.0052	-3.72***	-0.0051	-3.64***	-0.0051	-3.62***
<i>OPN</i>	0.0875	28.43***	0.0877	28.48***	0.0873	28.37***
<i>ΣIND</i>	Included		Included		Included	
F-stat.	149.40***		149.59***		143.70***	
Adj.R <sup>2</sup>	0.3325		0.3328		0.3342	

Note: \*, \*\*, and \*\*\* indicate significance at 10%, 5% and 1% levels, respectively.

Refer to the note in Table 2 for the definitions of the variables.

## 5. Conclusions

China enacted the NEITL in 2008 to unify the existing foreign-invested enterprises and foreign enterprises income tax laws and the Chinese corporate income tax code into one law (NEITL). According to the Income Tax Act on foreign-invested and foreign-invested companies, the corporate income tax rate of domestic and foreign-invested companies was, in principle, 33%. However, taking into account the tax burdens of both domestic and international businesses as well as the trend of global tax reform, the NEITL gradually repealed the pre-existing preferential tax regulations for each region and in general set a tax rate of 25%. That is, preferential tax regulations for each industry were introduced, such as tax cuts and exemptions for technology innovation and development promotion policies.

Therefore, the NEITL was enacted in principle to apply a single tax rate to all taxpayers, but it stipulates a preferential tax measure that applies a 15% reduction in the tax rate to high-tech companies that require the state's support and fostering policies. Preferential tax measures for high-tech companies are largely classified into standard tax reductions, tax rate reductions, tax credits, extensions of carry-forward loss periods, and various benefits under the NEITL.

As such, differential taxation exists between general companies and high-tech companies under the NEITL, and this study sought to determine whether the incentives for tax avoidance differ between high-tech companies and general companies in the year just before the tax rate cut, just before this differential taxation was applied. Therefore, the study looked at whether high-tech companies were engaging in a lot of tax avoidance prior to the tax rate reduction. In addition, the effect of ownership by the Chinese government on the tax avoidance behavior of high-tech companies was analyzed, as it was expected that the level of government supervision and monitoring would have different effects on the level of tax avoidance by companies.

The analysis results of this study are as follows. First off, high-tech enterprises avoided taxes to a greater extent than regular companies prior to China's tax rate reduction in 2008. This occurred because, although the tax rate applied to all companies has been reduced overall, high-tech companies that are subject to a low 15% tax rate due to preferential tax measures have a greater incentive to engage in tax avoidance strategies than general companies. Therefore, this result supports previous studies which found that an economic entity with a relatively large effect of the tax rate cut has a strong incentive to minimize their tax burden in the year immediately preceding the tax rate cut.

Second, the level of tax evasion decreases as the proportion of Chinese government ownership increases. This demonstrates the positive effect of ownership by the Chinese government, which lowers the tendency of all companies to avoid taxes because the level of supervision and monitoring by the Chinese government is stronger. Third, in contrast to the findings of the second research, it was discovered that the Chinese government's ownership ratio increased high-tech businesses' tax evasion practices in the year before to the tax rate reduction. In other words, just before the tax rate cut, high-tech companies were more likely to avoid taxes than general companies, and ownership by the Chinese government was found to reinforce the tax avoidance efforts of high-tech companies.

Therefore, this result can be interpreted as follows. First, despite the fact that the Chinese government's level of supervision and monitoring of enterprises is high due to the government's high ownership interest rate, it is not possible to control even opportunistic behaviors of managers, such as tax avoidance by their high-tech companies. Second, the Chinese government allows high-tech enterprises with a high ownership ratio relative to ordinary companies more management discretion in order to maintain China's national competitiveness and support future development engine industries.

## References

- Badertscher, B. A., Burks, J. J., & Easton, P. D. (2012). A convenient scapegoat: Fair value accounting by commercial banks during the financial crisis. *The Accounting Review*, 87(1), 59-90. <https://doi.org/10.2308/accr-10166>
- Burgstahler, D., & Dichev, I. (1997). Earnings management to avoid earnings decreases and losses. *Journal of Accounting and Economics*, 24(1), 99-126. [https://doi.org/10.1016/s0165-4101\(97\)00017-7](https://doi.org/10.1016/s0165-4101(97)00017-7)
- Cao, S. J., & Zhang, W. J. (2008). Determinants of the variability of corporate effective tax rates-evidence of listed companies in China. *Collected Essays on Finance and Economics*, 6, 30-36.
- Chen, S., Chen, X., Cheng, Q., & Shevlin, T. (2010). Are family firms more tax aggressive than non-family firms? *Journal of Financial Economics*, 95(1), 41-61. <https://doi.org/10.1016/j.jfineco.2009.02.003>
- Chyz, J. A., Leung, W. S. C., Li, O. Z., & Rui, O. M. (2013). Labor unions and tax aggressiveness. *Journal of Financial Economics*, 108(3), 675-698. <https://doi.org/10.1016/j.jfineco.2013.01.012>
- Desai, M. A., & Dharmapala, D. (2006). Corporate tax avoidance and high-powered incentives. *Journal of Financial Economics*, 79(1), 145-179. <https://doi.org/10.1016/j.jfineco.2005.02.002>
- Desai, M. A., & Dharmapala, D. (2009). Corporate tax avoidance and firm value. *The Review of Economics and Statistics*, 91(3), 537-546. <https://doi.org/10.1162/rest.91.3.537>
- Dyregang, S. D., Hanlon, M., & Maydew, E. L. (2008). Long-run corporate tax avoidance. *The Accounting Review*, 83(1), 61-82. <https://doi.org/10.2308/accr.2008.83.1.61>
- Frank, M. M., Lynch, L. J., & Rego, S. O. (2009). Tax reporting aggressiveness and its relation to aggressive financial reporting. *The Accounting Review*, 84(2), 467-496. <https://doi.org/10.2308/accr.2009.84.2.467>
- Guenther, D. A. (1994). Earnings management in response to corporate tax rate changes: Evidence from the 1986 Tax Reform Act. *The Accounting Review*, 69(1), 230-243.
- Gupta, S., & Newberry, K. (1997). Determinants of the variability in corporate effective tax rates: Evidence from longitudinal data. *Journal of Accounting and Public Policy*, 16(1), 1-34.
- Hanlon, M., & Heitzman, S. (2010). A review of tax research. *Journal of Accounting and Economics*, 50(2-3), 127-178. <https://doi.org/10.1016/j.jaccoco.2010.09.002>
- Hanlon, M., & Slemrod, J. (2009). What does tax aggressiveness signal? Evidence from stock price reactions to news about tax shelter involvement. *Journal of Public Economics*, 93(1-2), 126-141. <https://doi.org/10.1016/j.jpubeco.2008.09.004>
- Kim, K.-H., & Park, J.-I. (2003). Earnings management patterns in response to tax rate reductions. *Korean Accounting Review*, 28(3), 85-120.
- Kim, K. H., Lee, G., & Choi, K. S. (2014). Income-decreasing earnings management due to tax rate reduction and CEO compensation. *Korean Journal of Management Accounting Research*, 14(2), 119-138.
- Koh, Y. S., Kim, J.-H., & Choi, W.-W. (2007). A study on corporate tax avoidance. *Korean Journal of Taxation Research*, 24(4), 9-40.

- Koh, Y. S., & Paik, H. W. (2010). Family firms and corporate tax avoidance. *Korean Journal of Taxation Research*, 27(2), 49–76.
- Liu, J. M., Liu, Y. B., & Deng, R. (2009). The comparative analysis of tax impact in the hi-tech enterprises listed companies due to the new enterprise income tax law. *Journal of Hunan University Social Sciences*, 23(6), 53–56.
- Liu, Y. H., Lee, E. H., Min, J. H., & Yoo, J. W. (2020). The effect of chinese government subsidy on R&D investment of high-tech companies: Focusing on moderating effect of the equity ratio of internal- and external-investors. *Productivity Research: An International Interdisciplinary Journal*, 34(4), 37–63. <https://doi.org/10.15843/kpapr.34.4.2020.12.37>
- Lopez, T. J., Regier, P. R., & Lee, T. (1998). Identifying tax-induced earnings management around TRA 86 as a function of prior tax-aggressive behavior. *The Journal of the American Taxation Association*, 20(2), 37–56.
- McGuire, S. T., Neuman, S. S., & Omer, T. C. (2013). Sustainable tax strategies and earnings persistence. Available at SSRN 1950378.
- Mills, L. F., & Sansing, R. C. (2000). Strategic tax and financial reporting decisions: Theory and evidence. *Contemporary Accounting Research*, 17(1), 85–106. <https://doi.org/10.1111/j.1911-3846.2000.tb00912.x>
- Paek, W. S., & Choi, K. (1999). Earnings management and incentive for minimizing corporate income taxes. *Korean Accounting Review*, 24(1), 115–140.
- Phillips, J., Pincus, M., & Rego, S. O. (2003). Earnings management: New evidence based on deferred tax expense. *The Accounting Review*, 78(2), 491–521. <https://doi.org/10.2308/accr.2003.78.2.491>
- Rego, S., & Wilson, R. (2012). Executive compensation, equity risk incentives, and corporate tax aggressiveness. *Journal of Accounting Research*, 50(3), 775–810. <https://doi.org/10.1111/j.1475-679X.2012.00438.x>
- Rego, S. O. (2003). Tax-avoidance activities of US multinational corporations. *Contemporary Accounting Research*, 20(4), 805–833. <https://doi.org/10.1506/VANN-B7UB-GMFA-9E6W>
- Scholes, M. S., Wilson, G. P., & Wolfson, M. A. (1992). *Firms' responses to anticipated reductions in tax rates: The tax reform act of 1986*. Retrieved from NBER Working Paper Series No. 4171.
- Siegfried, J. J. (1974). Effective average US corporation income tax rates. *National Tax Journal*, 27(2), 245–259. <https://doi.org/10.1086/NTJ41861946>
- Sims, T. S., & Sunley, E. M. (1992). *Taxes and business strategy: A planning approach*. Retrieved from <https://www.jstor.org/stable/41788986>
- Son, K. G., Yoon, S. M., & Choi, W. S. (2010). An empirical study on the effect of tax rate reduction and financial reporting costs on earnings management. *Journal of Taxation and Accounting*, 11(3), 261–286.
- Wang, F. (1999). On income tax burden of listed companies in China. *Economic Research Journal*, 1999(5), 49–54.
- Wilkie, P. (1988). Corporate average effective tax rates and inferences about relative tax preferences. *The Journal of the American Taxation Association*, 10(1), 75–88.
- Wu, L. S., & Li, C. (2007). Tax refunds, the corporate tax burden and the effectiveness of tax policy. *Social Sciences in China*, 2007(4), 61–73.
- Xiao, Q., & Cooke, F. L. (2020). Towards a hybrid model? A systematic review of human resource management research on Chinese state-owned enterprises (1993–2017). *The International Journal of Human Resource Management*, 31(1), 47–89. <https://doi.org/10.1080/09585192.2019.1682030>
- Yang, G. S., & Rao, G. J. (2009). Perfecting the administration of contemporaneous documentation for enhancing the level of anti-tax-avoidance: An interpretation of 'administration of contemporaneous documentation' in the implementation rules for special tax adjustments (Interim). *International Taxation in China*, 2009(5), 30–33.
- Yoo, H. L., & Park, I. L. (2008). An analysis on the effective corporation tax rate in China. *The Journal of Korean Public Policy*, 10(2), 121–147.
- Yoon, S. M., & Kim, N. C. (2010). Studies on the tax motivated cost-shifting from tax-exempt to taxable department of non-for-profit organization: Social welfare organization. *Journal of Tax Studies*, 10(2), 275–302.
- Zhang, H., & Han, M. (2008). Tax planning analysis based on listed company with different ownership structure-the empirical evidence from State-owned listed company and private listed company in China. *China Soft Science*, 2008(9), 122–131.
- Zimmerman, J. L. (1983). Taxes and firm size. *Journal of Accounting and Economics*, 5, 119–149. [https://doi.org/10.1016/0165-4101\(83\)90008-3](https://doi.org/10.1016/0165-4101(83)90008-3)