International Journal of Applied Economics, Finance and Accounting
ISSN 2577-767X
Vol. 18, No. 1, pp. 120-129
2024
DOI: 10.33094/ijaefa.v18i1.1334

The effect of adoption of an electronic filing system in corporate tax on tax avoidance: A case of Mongolian firms

Jae Ryong Lee[1]
Myagmardorj Ochirtulga[2]
Ying Cui[3*]

[1,3]*Department of Humanities Management, The Graduate School, Seoul National University of Science and Technology, South Korea.*
[1]*Email: jrlee@kamco.or.kr*
[3]*Email: cying0330@seoultech.ac.kr*
[2]*Department of Business Administration, The Graduate School, Seoul National University of Science and Technology, South Korea.*
[2]*Email: miga419@yahoo.com*

Keywords:
Corporate tax avoidance
Electronic filing system
Government ownership
Manufacturing sector
Mongolia.

JEL Classification:
H26; O33.

Received: *15 August 2023*
Revised: *20 October 2023*
Accepted: *27 December 2023*
Published: *11 January 2024*
(Corresponding Author)*

Abstract

This study seeks to analyze the effects of the electronic filing system implemented in Mongolia since 2014 on corporate tax evasion. Furthermore, it investigates if tax evasion tendencies differ based on government ownership status and whether there are variations in such conduct between the manufacturing and non-manufacturing sectors in Mongolia. To attain the objective, a sample of 1,971 Mongolian listed companies from the Osiris database was constructed for the period of 2011 to 2019. The empirical results indicate that the implementation of the electronic filing system has had a statistically significant adverse impact on tax avoidance. This data indicates that the mandate for electronic invoicing and transmission to tax officials reduced the issuance of fraudulent tax invoices by companies, resulting in a significant decrease in their tax avoidance. Additionally, the correlation between the implementation of e-filing and corporate tax avoidance remained consistent regardless of government ownership status. Thirdly, the introduction of the electronic filing system had varying effects on corporate tax avoidance, depending on the manufacturing status of the companies. Manufacturing companies showed a greater decrease in their tendencies to avoid taxes after the implementation of the electronic filing system, which suggests a significant enhancement of transaction transparency for these companies. This study is significant in empirically analyzing the efficacy of Mongolia's electronic filing system. It may serve as empirical evidence for assessing current tax systems, measuring the impact of the electronic filing system, and developing new policies.

Funding: This study received no specific financial support.
Institutional Review Board Statement: Not applicable.
Transparency: The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.
Data Availability Statement: The corresponding author may provide study data upon reasonable request.
Competing Interests: The authors declare that they have no competing interests.
Authors' Contributions: All authors contributed equally to the conception and design of the study. All authors have read and agreed to the published version of the manuscript.

1. Introduction

Robben, Webley, Elffers, and Hessing (1990) and Webley (2004) argue that tax avoidance involves both intentional tax evasion and unintentional failure to comply with tax payment, resulting from mistakes in tax calculation and a lack of comprehension and implementation of tax legislation. In contrast, the OECD (2009) classifies compliance into administrative and technical domains. Adhering to tax reporting procedures and regulatory frameworks constitutes administrative compliance, while adhering to technical instructions for tax payment falls under technical compliance.

Taxpayers encounter tax law interpretation or calculation discrepancies during the process of calculating their taxes, resulting in relatively high levels of tax avoidance. However, regardless of how the e-tax filing

system is utilized, subjective evaluations need to be excluded as they can introduce uncertainty into tax law (Nellen, 2003). The language used will remain clear, objective, and value-neutral, avoiding any biased, emotional, figurative, or ornamental language. All citations will follow consistent formatting guidelines. A logical flow of information with causal connections between statements will be presented while striving for balanced viewpoints, precision in vocabulary, and grammatical correctness. The objective of this study is to examine the level of tax avoidance by companies prior to and following the implementation of the Mongolian government's e-tax filing system. This investigation will include an explanation of technical term abbreviations upon first usage, use simple sentences to convey clear and concise information, and adhere to conventional academic sections and formatting. Furthermore, this study will conform to a formal linguistic style by avoiding colloquialism, casual phrases, and needless scientific terms while also holding a passive voice.

The Mongolian government has made significant efforts to establish an e-government that utilizes information technology to offer administrative services and public information. In 2007, the National Tax Service of Mongolia initiated an e-tax filing system that permits taxpayers to report their corporate tax, value-added tax, and personal income tax online. In addition, tax reports have started being received through electronic signatures and security systems since the introduction of a new electronic reporting system in 2014.

Mongolia's e-filing system serves various functions, including taxpayer registration, provision of tax-related information and services, electronic tax payment, and tax report automation. It also reduces tax cooperation costs and increases the productivity and transparency of taxation. The implementation of this e-filing system is expected to impact corporate tax avoidance by reducing intentional cost overstatement by businesses. Therefore, this study analyzes the effect of Mongolia's recently implemented e-filing system on corporate tax avoidance since 2014. Additionally, we investigate whether the inclination towards tax avoidance differs based on state-owned company status and whether there are variations in tax avoidance levels between Mongolian manufacturing and non-manufacturing enterprises. Data were obtained from Mongolian corporations available on the Osiris database.

In Mongolia, research on e-filing systems is scarce, with recent studies mainly focusing on the status and improvement of such systems, as well as the quality of information regarding electronic signatures and security systems. However, there is a dearth of research analyzing the correlation between e-filing systems and corporate tax avoidance. Therefore, this study holds both policy and practical significance as it provides empirical validation of the effectiveness of Mongolia's e-filing system. Additionally, it can be employed as empirical evidence for analyzing existing tax systems, evaluating the effects of the e-filing system, and formulating new policies.

The study's structure is organized as follows: In Chapter 2, we review Mongolia's e-filing system, previous studies relating to corporate tax evasion, and design the research hypotheses. In Chapter 3, the research model, variable measurement, and sample selection of this study will be explained. Empirical analysis results will be presented in Chapter 4, and Chapter 5 will provide a summary of the research and conclusions.

2. Literature Review and Research Hypotheses

2.1. Examination of Mongolia's E-filing System

Mongolia's e-filing system comprises information systems, user management, and system management settings. The e-filing information system entails five core processes: tax report receipt and transmission, tax calculation, tax payment, payment tax registration, and taxpayer registration. Technical term abbreviations will be explained when first used. The text adheres to standard language with consistent technical terms and conventional structure. Additionally, the e-filing information system manages data supplied by tax offices, such as surveys, advertisements, questions, and answers. The system additionally manages user administration, including the oversight of both tax office users and taxpayers. Meanwhile, system management settings encompass the management of tax forms, attachment file formats, and staff (Unurjargal, 2017).

Users in Mongolia can engage with the e-filing information system to verify and send tax declarations, issue various certificates, request documents (reports, registrations, payments, tax-related payments, etc.), review request resolution processes, access and print tax assessment notices, and check payment and tax payment history. Furthermore, individuals can register on the website of Mongolia's e-filing information system to gain access to and download any documents pertaining to taxpayers. This platform also facilitates communication with system administrators for the purposes of problem resolution. Table 1 presents in-depth information about the essential services offered by the e-filing system.

2.2. Literature Review and Research Hypotheses

Previous studies have primarily focused on theoretical research about the current status and enhancement strategies of the electronic filing system, along with its usefulness. Yoon and Woo (2007) identified the limitations of the electronic filing and payment system and suggested ways to increase its effectiveness. According to their findings, the electronic tax filing system must progress in a direction that promotes greater convenience efficiency in the tax environment for both taxpayers and tax offices. Ji (2012) similarly explored the electronic tax administration in Korea and suggested actionable measures for enhancing the system. These measures included the implementation of a complete electronic filing system, the simplification of electronic

filing forms, the expansion of filing scope, an increased limit for tax payment via credit cards, a reduction in card agency fees, and the provision of electronic filing options for taxpayers without internet access.

Table 1. Basic services offered by Mongolia's E-filing information system.

Service	Description
Basic information	This section displays the registration information of taxpayers, as well as information about authorized representatives or chief accountants who have been delegated with taxpayer's rights.
Certificates	Certificates that can be issued include business certificates (Including tax payment, tax balance, and reports related to the business) and bid certificates (Submitted as evidence of tax calculation and payment for bidding purposes).
Documents	All documents related to the taxpayer can be accessed and downloaded through the system.
Tax reports	This section displays a list of taxpayers' tax reports, showing the submission dates and statuses of tax reports. Additionally, it allows viewing late-stage reports not submitted during the tax reporting period, as well as previously submitted report history by date.
Document requests	Taxpayers can request various documents (Reports, registrations, payments, and tax-related payments) from tax offices through the information system. They can also track the process of request resolution. The results of these resolutions can be checked in the request history sub-menu of the information system.
Tax calculation	Taxpayers can review and examine the final surplus or deficit of their tax calculation account. The tax calculation balance information is updated in the information system whenever transactions are performed.
Payment	Taxpayers can view, print, and directly pay tax assessment notices, which include tax types and amounts to be paid. They can also check their tax payment history. Additionally, if there are no outstanding taxes, taxpayers can make advance tax payments.

In their study on the factors that influence the adoption of the e-filing system, Tahar, Riyadh, Sofyani, and Purnomo (2020) analyzed the impact of perceived ease of use and perceived security, which were found to have a significant positive influence. However, perceived usefulness was found to have no significant impact. In another study, Hwang and Lee (2016) explored the factors that affect tax compliance and user satisfaction with the implementation of the electronic tax system. Transaction transparency, operational efficiency, and lower cooperation costs positively influenced user satisfaction and tax compliance. A study conducted by Night and Bananuka (2020) investigated the mediating effect of electronic tax invoice system adoption on the correlation between attitude towards electronic tax systems and tax compliance behavior in a developing country. The findings suggest that adopting the electronic tax system partially mediates the connection between taxpayers' attitudes towards the system and tax compliance. This can result in a favorable change in taxpayers' attitudes towards the system, leading to enhanced acceptance and ultimately improved tax compliance. Furthermore, Sifile, Kotsai, Mabvure, and Chavunduka (2018) discovered that the electronic tax filing system had a direct impact on tax compliance based on face-to-face interviews with employees, management of the Zimbabwe Revenue Authority (ZIMRA), and large and medium-sized corporate clients. The study confirmed that electronic filing significantly eased doing business and that client viewed electronic filing positively.

In the field of tax avoidance research, there has been a move away from survey-based studies in the past to current empirical analyses that employ corporate financial information to assess tax avoidance propensities. Notably, Desai and Dharmapala (2006) made a significant contribution with their computed tax avoidance metrics, which have been used in subsequent research.

Dyreng, Hanlon, and Maydew (2010) identified corporate characteristics and decision-making attributes of managers responsible for tax compliance as factors affecting corporate tax avoidance. The empirical analysis uncovered differences in tax avoidance levels before and after managerial changes. In a study conducted by Park (2021), the empirical analysis examined the impact of the financial characteristics of companies involved in corporate social responsibility on tax avoidance. The study found that profitability and company size had a significant positive effect on the level of tax avoidance, while the ratio of tangible assets and capital intensity had a significant negative impact on tax avoidance tendencies. Koh and Lee (2008) investigated potential disparities in corporate tax avoidance among listed companies across various industries. Their findings suggest that tax evasion is least prevalent in the construction, manufacturing, service, and distribution sectors; in that order, Mcguire, Omer, and Wang (2012) contend that firms enlisting tax-expert auditors engage in greater tax avoidance practices than those who do not. Dakhli (2022) conducted a study on the relationship between institutional ownership (INST) and corporate tax avoidance using agency theory. The findings revealed a significant negative correlation between the INST percentage and tax avoidance. Institutional owners prioritize gaining benefits while avoiding potential tax authority costs (Alkurdi & Mardini, 2020). The

concentration of ownership was found to significantly decrease tax avoidance and increase the sustainability of tax burdens (Yang, 2022).

The primary methods of tax avoidance consist of 1) manipulating sales to decrease reported income, 2) overstating expenses, and 3) reclassifying costs to treat capital expenses as current expenses. Among these, issuing false tax invoices to overstate expenses is a typical method of tax avoidance (Shin & Cha, 2015). Lee (2016) investigated the effects of enhanced taxation policies on corporate tax avoidance. The polices encompass many operations, such cash receipts, buyer-issued tax invoices, and the utilization of an electronic tax invoicing system. The empirical analysis demonstrated that all three procedures were successful in decreasing corporate tax evasion. Additionally, the sectoral analysis indicated a notable decrease in tax evasion for particular industries like retail, transportation, and construction following the implementation of improved taxation standard policies. Research by Shin and Cha (2015) on the impact of the electronic tax invoice system demonstrated a significant reduction in corporate tax avoidance after its implementation. This reduction was more pronounced among non-publicly listed companies compared to publicly listed companies. Adeniyi and Adesunloro (2017) assessed the effectiveness of electronic taxation in curbing tax evasion in Lagos State, Nigeria. They found a significant correlation between electronic taxation and tax evasion in Lagos State. The implementation of the electronic tax system in Lagos State in 2008 has increased revenue generation and reduced tax evasion among taxpayers. This indicates that the introduction of electronic filing systems can assist in mitigating the exaggeration of illegal expenses, ultimately resulting in a decrease in corporate tax evasion.

This study aims to conduct an empirical analysis of the influence of the electronic filing system on corporate tax avoidance tendencies. Additionally, the study will investigate whether there are divergences in tax avoidance tendencies based on government ownership and if there are differences in tax avoidance levels between manufacturing and non-manufacturing companies. To achieve this, the following hypotheses have been formulated:

Hypothesis$_1$. The implementation of an electronic filing system will result in diminished proclivities towards corporate tax avoidance.

Hypothesis$_2$. The influence of electronic filing system implementation on corporate tax avoidance tendencies will fluctuate depending on whether a company is privately owned or state-owned.

Hypothesis$_3$. The impact of electronic filing system adoption on corporate tax avoidance tendencies will diverge based on the industry sector of the company (manufacturing vs. non-manufacturing).

3. Materials and Methods

3.1. Research Model

In this study, the researchers present the following research models to analyze how the implementation of the electronic filing system affects corporate tax avoidance.

$$TAXAVOID_{i,t} = \alpha_0 + \beta_1 EFS_{i,t} + \beta_2 GOWN_{i,t} + \beta_3 INDUS_{i,t} + \beta_4 SIZE_{i,t} + \beta_5 LEV_{i,t} + \beta_6 CFO_{i,t} + \beta_7 ROA_{i,t} + \beta_8 CAP_{i,t} + \sum YD + \varepsilon_{i,t} \quad (1)$$

$$TAXAVOID_{i,t} = \alpha_0 + \beta_1 EFS_{i,t} + \beta_2 GOWN_{i,t} + \beta_3 EFS_{i,t} \times GOWN_{i,t} + \beta_4 SIZE_{i,t} + \beta_5 LEV_{i,t} + \beta_6 CFO_{i,t} + \beta_7 ROA_{i,t} + \beta_8 CAP_{i,t} + \sum YD + \sum IND + \varepsilon_{i,t} \quad (2)$$

$$TAXAVOID_{i,t} = \alpha_0 + \beta_1 EFS_{i,t} + \beta_2 EFS_{i,t} \times INDUS_{i,t} + \beta_3 GOWN_{i,t} + \beta_4 SIZE_{i,t} + \beta_5 LEV_{i,t} + \beta_6 CFO_{i,t} + \beta_7 ROA_{i,t} + \beta_8 CAP_{i,t} + \sum YD + \varepsilon_{i,t} \quad (3)$$

Here,

TAXAVOID: Measure of tax avoidance.

EFS: Dummy Variable with a value of 1 if it is after the introduction of the electronic filing system (2014), and 0 if it is before.

GOWN: Dummy variable with a value of 1 if the company is state-owned, and 0 otherwise.

INDUS: Dummy variable with a value of 1 for manufacturing companies and 0 for non-manufacturing companies.

SIZE: Firm size = logarithm of total assets.

LEV: Debt ratio = Total debt / Total assets.

CFO: Cash flow from operations = Cash flow from operating activities / Total assets.

ROA: Return on assets = Net income / Total assets.

CAP: Tangible assets ratio = Tangible assets / Total assets.

$\sum YD$: Year dummy.

$\sum IND$: Industry dummy.

3.2. Measurement of Variables

3.2.1. Dependent Variable: Tax Avoidance

In this study, we implement a research model based on Desai and Dharmapala (2006) methodology. The Book Tax Difference (BTD), which represents the difference between accounting income and taxable income, is explained by the total accruals (TA) that cannot be accounted for. We estimate the unexplained portion as a measure of tax avoidance for our research.

Desai and Dharmapala (2006) proposed that factors beyond tax avoidance contribute to the discrepancy between accounting income and taxable income. The authors placed particular emphasis on the major impact of earnings management on the variations observed in report financial earnings. By removing this factor, they argued that a more accurate measurement of tax avoidance could be achieved (Ko, 2017). Therefore, we utilize the residual (ε) estimated through Equation 4 as the metric for tax avoidance (*TAXAVOID*).

$$BTD_{i,t} = \beta_1 TA_{i,t} + \varepsilon_{i,t} \quad (4)$$

Here,

BTD: Difference between accounting profit and taxable income = (Earnings before tax expense - estimated taxable income) / Total assets.

TA: Total accruals = (Earnings before income tax – Cash flow from operating activities) / Total assets.

ε: Residual, discretionary BTD, i.e. Tax avoidance measure (*TAXAVOID*).

The financial statement data is used to determine the pre-tax profit and total assets for calculating the Book Tax Difference (BTD), which measures the difference between the accounting-reported profit and taxable income. The taxable income is calculated by dividing the corporate tax burden[1] of the year by the corporate tax rate[2] applicable for that year, based on Mongolia's tax base. The Total Accruals (TA) were calculated by subtracting the cash flow generated from operating activities from the net income.

3.2.2. Independent Variable

EFS is a crucial variable in this study to determine whether the electronic filing system was implemented. It is a binary variable that equals 1 when the company began receiving end-of-year tax reports via electronic signature and security systems after 2014, and 0 beforehand.

GOWN is also a binary variable, signifying 1 if the company is state-owned in Mongolia or 0 if not. This study analyzes the different effects of the implementation of an electronic filing system on tax avoidance among state-owned and non-state-owned companies. A dummy variable, *INDUS*, was utilized to distinguish manufacturing companies (with a value of 1) from non-manufacturing ones (with a value of 0). The research investigates the varying impact of the electronic filing system on tax avoidance in manufacturing and non-manufacturing companies.

3.2.3. Control Variable

To control for factors that can influence corporate tax avoidance behavior, the research model included the following control variables: firm size (*SIZE*), which was computed as the logarithm of total assets. Larger companies tend to have more resources available for tax planning, and there is a possibility that tax avoidance practices decrease as they establish tax strategies and utilize experts to reduce tax costs. The debt ratio (*LEV*) is calculated as the ratio of total debt to total assets. Based on previous research (Lee & Kim, 2015), companies with high levels of debt experience reduced taxable income because of debt-related deductions, leading to lower levels of tax avoidance. This is why it was selected as a control variable. Cash flow from operations (*CFO*) resulting from operating activities represents the value obtained by dividing operating cash flow by total assets. Tax expenses lead to cash outflows for companies, creating a strong relationship between tax avoidance and cash flow. Return on assets (*ROA*) is calculated by dividing net income by total assets. Since taxes are determined based on a company's earnings, managers may utilize tax avoidance strategies as earnings increase to alleviate the higher tax liability that comes with higher profits (Lee, 2014). Additionally, as per the research conducted by Park, Ko, and Kim (2014), the procurement of tangible assets could impact corporate tax liabilities via depreciation and investment tax deductions, which could offer diverse tax avoidance avenues. In order for this to be considered, the tangible assets ratio (*CAP*) was integrated, and it is measured as the percentage of tangible assets compared to the total assets. Finally, in order to account for the impact of year effects and industry characteristics on corporate tax avoidance, we included year dummy variables ($\sum YD$) and industry dummy variables ($\sum IND$) as control variables.

[1]Corporate tax burden = Corporate tax expense + (term-end deferred corporate tax assets - beginning deferred corporate tax assets) - (term-end deferred corporate tax liabilities - beginning deferred corporate tax liabilities).

[2]The study conducted by Park, Jang, Jeung, and Bae (2006) aimed at determining he corporate tax rate in Mongolia. The study's findings provide insights int o Mongolia's tax policy, particularly regarding corporate taxation. Companies with a tax base of less than 3 billion togriks were subjected to a10% corporate t ax rate, whereas those with a tax base that exceeded 3 billion togriks faced a higher corporate tax rate of 25%.

3.3. Sample Selection

In this study, we selected a sample of non-financial listed companies in Mongolia from the Osiris database, covering the period from 2011 to 2019. A total of 1,971 sets of company data were used for empirical analysis. Table 2 presents the distribution of the sample by industry. Industries were classified according to the Global Industry Classification Standard (GICS).

Table 2. Industry-wise sample distribution.

Industry	Freq.	Percent
Energy	108	5.74
Materials	180	9.57
Capital goods	360	19.14
Commercial & professional services	36	1.91
Transportation	117	6.22
Consumer durables & apparel	198	10.53
Consumer services	72	3.83
Retailing	72	3.83
Food & staples retailing	63	3.35
Food, beverage & tobacco	477	25.36
Software & services	18	0.96
Telecommunication services	9	0.48
Utilities	171	9.09
Total	1,971	100.00

4. Results

4.1. Descriptive Statistics and Univariate Analysis

Table 3 displays the descriptive statistics of the key variables employed in the empirical analysis prior to regression analysis. As depicted in the table, the dependent variable, *TAXAVOID*, that gauges the degree of corporate tax avoidance behavior, exhibits an average of 0.000 and a median of 0.604. It is discernible that there are more instances with positive discretionary BTD values as opposed to negative ones.

With an approximate mean of 0.667 and a standard deviation of 0.472, the study's major variable, EFS, indicates that almost 67% of the sample enterprises have implemented the electronic filing system since its launch. The binary variable *GOWN*, which has a value of 1 for state-owned businesses and 0 for others, has an average of 0.11, with state-owned firms comprising 11% of the overall sample. The variable *INDUS*, which reflects whether a company is in the manufacturing industry, has an average of 0.354. This means that 35.4% of the total sample firms are in the manufacturing industry.

Among the control variables, *SIZE* has an average of 21.322 (standard deviation: 2.628), and *LEV* has an average of 21.909 (standard deviation: 561.067). The average value for *CFO* is -0.542, and *ROA* has an average of -1.350 with a median of 0.000. The average *CAP* is 17.104, and it ranges in distribution from 0.000 to 19193.902.

Table 3. Descriptive statistics of major variables (N=1,971).

Variable	Mean	Std. dev.	Min.	Median	Max.
TAXAVOID	0.000	16.074	-440.805	0.604	164.199
EFS	0.667	0.472	0	1	1
GOWN	0.110	0.312	0	0	1
INDUS	0.354	0.478	0	0	1
SIZE	21.322	2.628	10.564	21.512	27.536
LEV	21.909	561.067	-0.058	0.281	19376.201
CFO	-0.542	15.326	-530.768	0.000	1.793
ROA	-1.350	31.243	-877.379	0.000	90.387
CAP	17.104	548.809	0.000	0.451	19193.902

Note: The definitions of the variables are as follows in Equation 1~3.

Table 4 presents the Pearson correlation coefficients for the key variables. The correlation between the variable of interest, *EFS*, and the measure of tax avoidance (*TAXAVOID*) is -0.040, which is not statistically significant. The binary variable *GOWN*, indicating state ownership, and the binary variable *INDUS*, indicating participation in the manufacturing industry, both exhibit a positive correlation with the tax avoidance metric (*TAXAVOID*). However, these correlations are not statistically significant.

The control variables and tax avoidance measure (*TAXAVOID*) are found to be statistically significantly positively correlated at 1% significance level. These variables are the debt ratio (*LEV*), the cash flow from operations (CFO), the return on assets (ROA), and tangible assets ratio (CAP). However, firm size (*SIZE*) does not show a statistically significant correlation with the tax avoidance measure (*TAXAVOID*). This indicates that increased levels of debt ratio (*LEV*), cash flow from operations (*CFO*), return on assets (*ROA*), and tangible assets ratio (*CAP*) are connected to elevated levels of corporate tax avoidance.

It's important to note that these findings are solely based on basic correlations and do not factor in the influence of other variables. Therefore, it is imperative to perform regression analysis while also controlling for multiple factors to validate the research hypotheses.

Table 4. Pearson correlation analysis.

Variables	TAXAVOID	EFS	GOWN	INDUS	
TAXAVOID	1.000				
EFS	-0.040	1.000			
GOWN	0.014	0.000	1.000		
INDUS	0.028	0.000	0.007	1.000	
SIZE	0.010	0.021	0.405**	0.229***	
LEV	0.168***	-0.047*	-0.014	0.032	
CFO	0.851***	-0.021	0.015	0.022	
ROA	0.427***	0.013	0.016	-0.006	
CAP	0.272***	-0.049*	-0.011	0.036	
Variables	SIZE	LEV	CFO	ROA	CAP
SIZE	1.000				
LEV	-0.013	1.000			
CFO	0.045	-0.102***	1.000		
ROA	0.065**	-0.645***	0.790***	1.000	
CAP	-0.007	0.991***	-0.008	-0.583***	1.000

Note: *, **, and *** indicate significance at 10%, 5%, and 1% levels, respectively.
Refer to the note in Table 3 for the definitions of the variables.

4.2. Regression Analysis

Table 5 displays the regression analysis results for Hypothesis 1 testing. The analysis reveals a statistically significant goodness-of-fit F-value of 2866.097 for the research model at the 1% level. The explanatory power of the research model is also high, as evident from the adjusted R-squared value of 0.977.

Additionally, *TAXAVOID* and *EFS* show a statistically significant negative correlation at the 1% level. These results show that corporate tax avoidance levels have decreased among companies since the mandatory implementation of the electronic filing system in 2014. This decrease could be attributed to a reduction in illegal tax invoice issuance by companies as a result of mandatory issuance and electronic submission of tax documents, resulting in a decrease in corporate tax avoidance.

Table 5. Results of the OLS regression.

TAXAVOID	Coef.	t-value
Intercept	-1.310	-1.52
EFS	-1.563***	-3.51
GOWN	-0.432	-1.55
INDUS	-0.441**	-2.49
SIZE	0.141***	3.86
LEV	-0.036***	-22.66
CFO	2.221***	96.33
ROA	-0.906***	-72.06
CAP	0.015***	8.36
∑YD	Included	
F-stat.	2866.097***	
Adj. R^2	0.977	

Note: **, and *** indicate significance at 10% and 5%levels, respectively.
The definitions of the variables are as follows in Equation 1~3.

Table 6 displays the outcomes of a regression analysis assessing whether the impact of introducing the electronic filing system on corporate tax avoidance differs depending on government ownership. The interaction variable *EFS*×*GOWN*, which represents the interaction between *EFS* and the dummy variable *GOWN* indicating government ownership, revealed a beneficial relationship with the tax avoidance metric *TAXAVOID*. Nevertheless, this correlation lacks statistical significance. This suggests that the government ownership status has no significant impact on the tax avoidance behavior of companies in response to the implementation of the electronic filing system.

Table 6. Results of the OLS regression: based on government ownership status.

TAXAVOID	Coef.	t-value
Intercept	-1.391	-1.40
EFS	-1.553***	-3.41
GOWN	-0.571	-0.79
EFS × GOWN	0.081	0.11

TAXAVOID	Coef.	t-value
SIZE	0.131***	3.42
LEV	-0.036***	-22.47
CFO	2.219***	95.70
ROA	-0.905***	-71.48
CAP	0.015***	8.28
∑YD & ∑IND	Included	
F-stat.	1575.963***	
Adj. R^2	0.977	

Note: *** indicate significance at 5% levels, respectively.
Refer to the note in Table 5 for the definitions of the variables.
∑*IND*: Industry dummy.

Table 7 shows the results of the analysis conducted to investigate the impact of the implementation of the electronic filing system on corporate tax avoidance in the manufacturing sector. After examining the results of the regression analysis, the F-value, which indicates the goodness of fit of the research model, is statistically significant at the 1% level, and the adjusted R-squared value is 97.7%.

The coefficient for the *EFS×INDUS* is -0.419, and there is statistical significance at the 5% level. This demonstrates that there is a negative association, which is further supported by the manufacturing industry's standing, between the degree of corporate tax evasion and the use of the electronic filing system.

Table 7. Results of the OLS regression: Based on whether is manufacturing company.

TAXAVOID	Coef.	t-value
Intercept	-1.404	-1.60
EFS	-1.367***	-3.02
EFS × INDUS	-0.419**	-2.13
GOWN	-0.391	-1.41
SIZE	0.136***	3.74
LEV	-0.036***	-22.59
CFO	2.221***	96.21
ROA	-0.906***	-71.98
CAP	0.015***	8.30
∑YD	Included	
F-stat.	2861.349***	
Adj. R^2	0.977	

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

4.3. Additional Analysis

In Table 8, additional regression analysis results are presented that use the discretionary Book Tax Difference (BTD) as the dependent variable in order to examine how the introduction of the electronic filing system affects corporate tax avoidance for different government and manufacturing industry statuses. This analysis was conducted to verify the robustness of the findings.

The analysis results indicate that *EFS×GOWN* has a non-significant positive coefficient, while *EFS×INDUS* has a significant coefficient of -0.368 ($p<0.05$), consistent with the findings in Table 6 and Table 7. This suggests that despite utilizing the Book Tax Difference (BTD) as a measure of tax avoidance, the manufacturing industry's status still affects the correlation between the electronic filing system's implementation and corporate tax avoidance behaviors.

Table 8. Results of the OLS regression: BTD.

BTD	(2)		(3)	
	Coef.	t-value	Coef.	t-value
Intercept	-1.761**	-2.02	-1.775**	-2.31
EFS	-1.361***	-3.41	-1.198***	-3.02
GOWN	-0.487	-0.77	-0.339	-2.13
EFS × GOWN	0.069	0.11		
EFS × INDUS			-0.368**	-1.40
SIZE	0.115***	3.43	0.12***	3.76
LEV	-0.032***	-22.47	-0.032***	-22.59

BTD	(2)		(3)	
	Coef.	t-value	Coef.	t-value
CFO	0.843***	41.46	0.845***	41.73
ROA	0.433***	38.96	0.431***	39.06
CAP	0.013***	8.28	0.013***	8.30
∑YD	Included		Included	
∑IND	Included		Excluded	
F-stat.	7948.949***		14434.455***	
Adj. R^2	0.995		0.995	

Note: **, and *** indicate significance at 10% and 5% levels, respectively.
Refer to the note in Table 5 for the definitions of the variables.
BTD: Book tax difference, the difference between accounting reported income and taxable income.
∑*IND*: Industry dummy.

5. Conclusions

This study analyzes the effect of the electronic filing system, which was introduced in Mongolia in 2014, on corporate tax avoidance. The study also examines whether government ownership status affects the tendency towards tax avoidance and whether there are variations in tax avoidance levels between Mongolian manufacturing and non-manufacturing companies. Empirical analysis was conducted on non-financial Mongolian listed companies between 2011 and 2019 to achieve this. The analysis produced the following results:

Firstly, since 2014, the introduction of the electronic filing system has had a statistically significant negative impact on tax avoidance. This suggests that the requirement for tax papers to be issued and submitted electronically under the electronic filing system resulted in a significant decrease in the unauthorized issue of tax invoices by businesses. Consequently, this has led to a significant decrease in corporate tax avoidance.

Secondly, there were no significant changes observed in the relationship between the introduction of the electronic filing system and corporate tax avoidance based on government ownership status.

Thirdly, the analysis revealed a significant interaction between the introduction of the electronic filing system and the status of the manufacturing industry with respect to corporate tax avoidance. For manufacturing companies, the implementation of the electronic filing system led to a further reduction in their tax avoidance tendencies, indicating an improvement in transaction transparency for these companies.

This study has several important implications. First, it empirically demonstrates that the introduction of Mongolia's electronic filing system has significantly reduced corporate tax avoidance levels by enhancing transaction transparency among companies. Secondly, the study's empirical findings highlight that the implementation of the electronic filing system leads to a significant reduction in corporate tax avoidance, especially in the manufacturing industry. This provides crucial insights for tax authorities seeking to implement similar systems. Thirdly, the study contributes to the evaluation of the electronic filing system's efficiency in Mongolia. The empirical findings provide significant evidence to evaluate the current tax regime and electronic filing system.

Nevertheless, this study has certain limitations. First, the restricted number of companies analyzed for the electronic filing system's effects imposes a constraint. Additionally, this study conducted empirical analysis utilizing data from listed companies in Mongolia. Further research is required to broaden the scope by incorporating expansive data from non-listed companies and additional industries.

References

Adeniyi, S. I., & Adesunloro, B. R. (2017). Electronic taxation and tax evasion in Nigeria: A study of Lagos State. *Journal of Academic Research in Economics*, *9*(1), 122-129.

Alkurdi, A., & Mardini, G. H. (2020). The impact of ownership structure and the board of directors' composition on tax avoidance strategies: Empirical evidence from Jordan. *Journal of Financial Reporting and Accounting*, *18*(4), 795-812. https://doi.org/10.1108/JFRA-01-2020-0001

Dakhli, A. (2022). The impact of ownership structure on corporate tax avoidance with corporate social responsibility as mediating variable. *Journal of Financial Crime*, *29*(3), 836-852. https://doi.org/10.1108/JFC-07-2021-0152

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

Dyreng, S. D., Hanlon, M., & Maydew, E. L. (2010). The effects of executives on corporate tax avoidance. *The Accounting Review*, *85*(4), 1163-1189. https://doi.org/10.2308/accr.2010.85.4.1163

Hwang, J. M., & Lee, C. D. (2016). The introducing of electronic tax invoice system as a factor to user satisfaction and tax payment compliance. *Journal of CEO and Management Studies*, *19*(2), 267-288.

Ji, B. G. (2012). A study on the current status and improvement plan of electronic tax administration in Korea. *Yonsei Journal of Medical and Science Technology Law*, *3*(1), 85-144.

Ko, S. Y. (2017). The effect of K-IFRS adoption on tax avoidance. *Journal of Tax Studies*, *17*(2), 247-269.
Koh, Y. S., & Lee, J. W. (2008). An analysis of tax avoidance using industry data. *Journal of Industrial Economics and Business*, *21*(6), 2823-2848.
Lee, N. (2016). The effect of tax systems for broadening the tax base on tax avoidance. *Korea Industrial Economic Research*, *29*(2), 647-669.
Lee, S. C. (2014). *A study on the corporate characteristics factors influencing long-term and short-term tax avoidance of KOSDAQ listed companies*. Ph.D. Dissertation. Gachon University, Seongnam, Korea.
Lee, S. C., & Kim, S. G. (2015). Correlation between financial factor and prolonged tax avoidance. *Review of Industry and Management*, *28*(1), 149-174.
Mcguire, S. T., Omer, T. C., & Wang, D. (2012). Tax avoidance: Does tax-specific industry expertise make a difference? *The Accounting Review*, *87*(3), 975-1003. https://doi.org/10.2308/accr-10215
Nellen, A. (2003). *Overview to e-commerce taxation – guide to understanding the current discussions and debates*. San José State University: College of Business.
Night, S., & Bananuka, J. (2020). The mediating role of adoption of an electronic tax system in the relationship between attitude towards electronic tax system and tax compliance. *Journal of Economics, Finance and Administrative Science*, *25*(49), 73-88. https://doi.org/10.1108/jefas-07-2018-0066
OECD. (2009). *Tax administration in OECD and selected non-OECD countries: Comparative information series (2008). Centre for tax policy and administration*. Paris: OECD Publihing.
Park, J. R. (2021). The effect of corporate social responsibility on the tax avoidance. *Journal of Industrial Studies*, *45*(1), 23-36. https://doi.org/10.22915/rifi.2021.45.1.002
Park, S. S., Jang, J. I., Jeung, G. C., & Bae, S. T. (2006). Corporate governance and earnings management. *Accounting Information Review*, *24*(1), 213-241.
Park, S. W., Ko, J. K., & Kim, Y. C. (2014). Financial constraints and tax avoidance. *Korean Accounting Journal*, *23*(4), 339-382.
Robben, H. S., Webley, P., Elffers, H., & Hessing, D. J. (1990). Decision frames, opportunity and tax evasion: An experimental approach. *Journal of Economic Behavior & Organization*, *14*(3), 353-361. https://doi.org/10.1016/0167-2681(90)90063-j
Shin, S. H., & Cha, S. M. (2015). The effect of electronic tax invoice system on corporate tax avoidance. *Accounting Information Review*, *33*(2), 21-40.
Sifile, O., Kotsai, R., Mabvure, J. T., & Chavunduka, D. (2018). Effect of e-tax filing on tax compliance: A case of clients in Harare, Zimbabwe. *African Journal of Business Management*, *12*(11), 338-342. https://doi.org/10.5897/AJBM2018.8515
Tahar, A., Riyadh, H. A., Sofyani, H., & Purnomo, W. E. (2020). Perceived ease of use, perceived usefulness, perceived security and intention to use e-filing: The role of technology readiness. *The Journal of Asian Finance, Economics and Business*, *7*(9), 537-547. https://doi.org/10.13106/jafeb.2020.vol7.no9.537
Unurjargal, B. (2017). *A study on the information quality factors of the Mongolian electronic tax invoice system affecting the continuous usage*. Master's Degree Thesis. Soongsil University, Seoul, Korea.
Webley, P. (2004). Tax compliance by businesses. *New Perspectives on Economic Crime*, 95-126. https://doi.org/10.4337/9781843769835.00012
Yang, E. J. (2022). Corporate governance and tax avoidance. *Journal of Finance and Accounting Information*, *22*(3), 89-125. https://doi.org/10.29189/KAIAJFAI.22.3.5
Yoon, B. S., & Woo, S. D. (2007). A study on ways of stimulation of the home tax service, an electronic tax report system. *Korean International Accounting Review*, *20*, 149-180. https://doi.org/10.21073/kiar.2007..20.008