ARE FINANCIAL INSTITUTIONS TAX AGGRESSIVE? EVIDENCE FROM CORPORATE TAX RETURN DATA

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ABSTRACT

This study examines how financial firms' tax aggressiveness differs from their peers in other sectors. Using confidential tax return data of the 5,968 largest Indonesian firms from 2009 to 2017, our study finds financial firms to have lower tax burdens relative to their non-financial counterparts, suggesting more opportunities for tax avoidance. Further, we document simultaneous use of tax shelters and temporary and permanent differences between accounting standards and tax laws, indicating a tendency to use the most sophisticated and less costly techniques in minimising tax burdens. These findings suggest tax aggressiveness may be one important unintended consequence of the government's conventional prudential policy.

I. INTRODUCTION

Corporate tax avoidance has attracted heightened attention from policymakers, popular media, and academia.[1] As reviewed by Shackelford and Shevlin (2001), Hanlon and Heitzman (2010), and Wilde and Wilson (2018), extensive empirical research has examined the determinants and consequences of corporate tax avoidance. However, these earlier studies have mainly focused on firms listed on stock exchanges with publicly-available data, as well as emphasising non-financial firms. Thus, tax avoidance by firms operating in financial sectors is a largely ignored phenomenon.[2]

It is widely acknowledged that financial institutions play a critical role in the functioning of the economy (Baily and Elliott, 2013). They serve the economy by providing credit, liquidity, and risk management services. Well-managed and prudent financial institutions are capable of smoothly supporting economic activities and ensuring the robustness of the financial system. While it is always important to monitor financial institutions from their prudential and intermediary aspects, there are also growing concerns regarding their tax compliance, especially when such institutions engage in complex financial transactions that enable them to avoid their tax obligations (OECD, 2009). Furthermore, tax paid by financial institutions, particularly banks, might decrease their available cash, thereby weakening their reserves and curbing their lending activities. The prudential regulation environment, therefore, enhances any existing financial motivation of the institutions, especially banks, to be more tax aggressive compared to their non-bank counterparts (Gawehn and Müller, 2019).

As the largest economy in Southeast Asia and the 16th largest globally, Indonesia provides an interesting setting for examining financial firms' tax aggressiveness. First, the institutional environment in Indonesia tends to be weak (Anginer *et al*., 2018), particularly in the areas of tax policy and compliance (Inasius *et al*., 2020). Given such a weak institutional environment, firms are more likely to engage in tax avoidance activities than in better regulated economies. Second, Indonesia's tax-to-GDP ratio is considerably low at around 11 per cent – this is lower than some of its Southeast Asian neighbors (Inasius *et al*., 2020). Third, as pointed out by the United Nations Conference on Trade and Development/UNCTAD (2015), tax enforcement capabilities in Indonesia, and other developing economies, tend to be constrained. Thus, when financial firms engage in increasingly complex financial transactions and choose to avoid their tax obligations, such behaviour might go undetected and unpunished.

Examining a sample of 5,968 unique firms (33,098 firm-year observations) as well as multiple tax avoidance measures, our study finds evidence consistent with financial firms being more aggressive than their non-financial counterparts. This finding sheds some light on the need for improving tax monitoring for Indonesian

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[1] Examining popular media coverages on corporate taxes from 1993 to 2015, Chen *et al*. (2019) find that 46 per cent of their income tax article samples cover international tax avoidance scandals, especially income shifting, tax havens, and corporate inversions.

[2] Existing tax aggressiveness literature generally excludes financial firms from their sample due to differences in business models, accounting standards, and regulatory requirements that affect their tax compliance behaviours. In their review of tax research, Hanlon and Heitzman (2010) call for more studies investigating the tax implications of financial institutions and financial instruments.

financial firms. Further, we document the simultaneous use of tax shelters, temporary differences, and permanent differences by these firms, indicating that financial firms favour more sophisticated and less costly techniques to minimise their tax burdens. Our additional analysis reveals that multinational financial firms tend to be less aggressive, suggesting that the degree of tax compliance depends on financial firms' ownership structure.

This study offers at least two important contributions to the corporate tax avoidance literature. Firstly, we add to the rare evidence of financial firms being more tax aggressive than their non-financial counterparts. While prior studies tend to be heavily focused on non-financial listed companies with publicly-available data, we examine a large set of annual income tax return data obtained from the tax authority. The data covers listed companies and private entities, enabling us to capture a more complete picture of tax avoidance practices and to perform more internally valid investigations. To the best of our knowledge, ours is the first empirical study that examines an extensive data set of financial firms' tax returns. Secondly, our study provides important insights into specific tax avoidance methods used by financial firms. This adds to the debates in the literature on particular strategies that companies adopt in tax planning. Additionally, it highlights specific techniques which are perhaps due more scrutiny from the tax authority.

This paper is structured as follows. Section II reviews the literature and formulates the hypothesis. This is followed by Section III, which describes the research design. Sections IV and V discusses sample selection and empirical results, respectively. Some sensitivity analyses are presented in Section VI. Finally, Section VII provides concluding remarks.

II. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

A. Financial Firms and Tax Aggressiveness

Financial firms, mainly banks, are exposed to a wide range of opportunities to avoid tax. For example, such firms have relatively easier opportunities to shift profits to low-tax jurisdictions (Demirgüç-Kunt and Huizinga, 2001; Langenmayr and Reiter, 2020; Schandlbauer, 2017). Additionally, modern banks are massively involved in off-balance sheet activities like financial derivatives, which could facilitate tax avoidance (Merz and Overesch, 2016).

Furthermore, international organisations such as the OECD and the IMF have also focused on financial firms' tax aggressiveness. In its report, the OECD (2009) states that financial firms, particularly banks, possess several essential features that allow them to develop the so-called complex structured financing transactions. Some of the features are easier access to capital, wider global reach, and the use of financial instruments, including derivatives. Such complex financial arrangements might be used to facilitate tax avoidance and, given their difficult-to-comprehend nature, attract substantial concerns from tax authorities. Thus, it could be increasingly difficult to detect once a firm uses these complex financial arrangements for tax avoidance. These phenomenons motivate our first research question: Are financial firms more tax aggressive than non-financial firms?

Finally, in terms of specific techniques employed to avoid tax, financial firms tend to be selective in utilising available methods. For example, Desai (2003) provides evidence that the relationship between book income and tax income has broken down over the 1990s, consistent with increasing levels of tax sheltering during that period. Putting emphasis on inter-jurisdictional income shifting, Bartelsman and Beetsma (2003) suggest that stricter enforcement of transfer pricing regulations in countries with high taxes leads to the shifting of real activities to countries with lower taxes or looser enforcement. Further, Dyreng and Lindsey (2009) provide evidence on income shifting to tax havens by US MNCs. They show that firms with operations in at least one tax haven country have a lower tax burden than those without such operations. Lastly, Haufler and Runkel (2012) find that lower-tax countries may adopt looser thin capitalisation rules, facilitating tax avoidance for multinational firms. Altogether, these findings suggest that firms use sophisticated and less costly methods to effectively avoid their tax obligations. This leads us to the second research question: What are specific techniques frequently used by financial firms in their tax planning activities?

The existing, limited studies in the tax avoidance literature have provided persistent empirical evidence that financial firms, especially banks, are likely to be tax aggressive (Demirgüç-Kunt and Huizinga, 2001; Langenmayr and Reiter, 2020; Schandlbauer, 2017). Additionally, an interesting finding is offered by Gallemore *et al*. (2019), who reveal that banks tend to promote tax avoidance among their customers. They found that a firm's tax aggressiveness increases substantially after it establishes a relationship with a tax planning-intermediary bank.

On the other hand, it could also be argued that financial firms are less inclined to be tax aggressive. Financial firms are more heavily regulated compared to other industries. They also become subject to simultaneous supervision from multiple authorities, including the financial regulator, the deposit insurance corporation, and the tax authority. Additionally, aggressive tax planning could lead to unbearable reputation risks for business entities (Austin and Wilson, 2017; Gallemore *et al,*, 2014; Hanlon and Slemrod, 2009; Zimmerman, 1983). Given such heavy scrutiny, financial firms might be less motivated to pursue a higher level of tax aggressiveness.

Taking into account the above opposing possibilities, we conjecture that financial firms have a higher level of tax avoidance than their non-financial counterparts. We base this prediction on the abovementioned features of financial firms, which would lead them to a wide range of opportunities for tax avoidance. Furthermore, any aggressive tax planning among financial firms will be exacerbated by any capacity limitations of the domestic tax authority. As highlighted by the UNCTAD (2015), firms in developing countries are more likely to engage in tax avoidance, as the revenue bodies' enforcement and technical capabilities are relatively limited.

With regards to the Indonesian institutional environment, it is acknowledged that the country's tax compliance is considerably low, standing at about 11 percent (Inasius *et al*., 2020; Iraman *et al*., 2021). Further, given the country's relatively weaker institutional landscape, we predict that financial firms operating in Indonesia are exposed to relatively more opportunities to 'benefit' from such an environment, leading them to pursuing aggressive tax planning activities. As such, we formulate the first hypothesis as:

H1: Financial firms are more tax aggressive than non-financial firms.

Taylor and Richardson (2012), using a sample of Australian firms, are among the very few to investigate concurrently the effects of multiple tax planning techniques on tax avoidance. They examine five methods, namely thin capitalisation, transfer pricing, income shifting, multinationality, and tax haven utilisation, finding that all are significant in explaining tax avoidance. Additionally, Taylor *et al.* (2015) demonstrate that US companies intensify their international transfer pricing aggressiveness through the combined effects of intangible assets, multinationality, and tax havens.

Given the wide range of tax avoidance methods available, firms might face the necessity of carefully weighing the costs and benefits of each method. They would be expected to choose the least costly methods while attempting to ensure that such arrangements would be hard to detect by tax authorities (Amiram *et al.*, 2019; Hanlon and Slemrod, 2009). Further, it is essential to note that prior studies are usually conducted using a sample of non-financial firms. Again, to the best of our knowledge, examinations on the concurrent effects of tax planning methods on tax avoidance among financial firms are still absent in the existing literature.

Considering our jurisdictional setting where the institutional environment tends to be weaker, we conjecture that financial firms would choose to, concurrently, employ several tax avoidance techniques. Such methods might be chosen as the least costly methods and potentially difficult to observe by the tax authority. Thus, this leads to our additional hypothesis:

H2: Financial firms tend to use more sophisticated and less costly tax avoidance methods

III. RESEARCH DESIGN

This section describes our methodological approaches in investigating the outlined hypotheses. The methods begin with constructing our primary proxy for tax burdens, *TOTAL_ETR,* followed by examining its disparity between financial firms and their non-financial counterparts (*Hypothesis*$_1$). We then outline the method to test empirical associations of *TOTAL_ETR* with the identified tax avoidance methods (*Hypothesis*$_2$) used in financial firms' tax planning.

A. Measuring Corporate Income Tax Burdens

Consistent with prior research (e.g. Dyreng *et al.*, 2008; Hanlon and Heitzman, 2010), this study infers firms' tax aggressiveness from the systematic reductions of their explicit tax burdens. Considering Indonesia's dual income tax system and to fully capture financial and non-financial firms' tax burdens, we construct the primary tax aggressiveness measure, *TOTAL_ETR,* by accumulating a firm's corporate income tax paid under the comprehensive tax system and final income tax paid conforming to the *schedular* tax system, and divide it by pre-tax income as follows:[3]

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[3] Indonesia's income tax administration uses a combination of comprehensive (i.e. a single tax rate is imposed on all types of income) and *schedular* (i.e. different tax rates are imposed on different income categories) tax systems. See Efendi (2020) for further explanations of Indonesia's dual income tax system.

$$TOTAL\_ETR_{it} = \frac{Corporate\ income\ tax\ paid_{it} + Final\ income\ tax\ paid_{it}}{Pretax\ income_{it}} \tag{1}$$

Our measure is theoretically a variant of Effective Tax Rates (ETRs) as commonly used in the existing accounting and tax studies.[4] Accordingly, we interpret a near-zero *TOTAL_ETR* as a firm implementing aggressive tax planning while a close to one *TOTAL_ETR* as a tax-compliant firm.

B. Tax Aggressiveness of Financial and Non-financial Firms

To examine the differing extent of tax aggressiveness between financial firms and their non-financial peers, our study employs a difference-in-differences estimation by assigning financial firms as the treatment group and non-financial firms as the control group. Thus, we assign *TOTAL_ETR* as the dependent variable and an indicator variable, *FIN*, as the explanatory variable in the following regression equation:

$$TOTAL\_ETR_{it} = \alpha + \beta FIN_{it} + \Sigma \delta_k CONTROLS_{it} + \Sigma \theta_n YEAR_{nt} + \varepsilon_{it} \tag{2}$$

TOTAL_ETR is a firm's total income tax burdens as previously defined. The variable of interest is *FIN*, a dummy variable coded one if a firm operates in financial industries and zero otherwise. In identifying financial industries, we follow Indonesia's standard industry classification issued by the Central Bureau of Statistics (2015). Accordingly, a financial firm in our study operates in at least one financial subsector: banking; broker, dealer, and financial securities; insurance services; equity financing; trust financing; and stock exchange and settlements. Consistent with the main hypothesis, we predict financial firms are more tax aggressive relative to non-financial firms; therefore, estimated β is expected to be negative and statistically significant.

C. The Use of Specific Tax Avoidance Methods in Financial Firms' Tax Planning

Further, to investigate the application of particular tax avoidance methods in financial firms' tax planning, we use financial firms' subsample and partially replicate estimation methods employed in Efendi *et al.* (2021a, 2021b) by regressing individual tax avoidance methods to *TOTAL_ETR* in the following equation:

$$
\begin{aligned}
TOTAL\_ETR_{it} \\
= \alpha + \beta_1 NON\_ROUTINE_{it} + \beta_2 SHELTER_{it} + \beta_3 LOSS_{it} \\
+ \beta_4 TREATY_{it} + \beta_5 HAVEN_{it} + \beta_6 PERMDIFF_{it} \\
+ \beta_7 TBTD_{it} + \beta_8 CONFORM_{it} + \beta_9 LEV_{it} \\
+ \Sigma \delta_k CONTROLS_{it} + \Sigma \delta_m SUBSECTOR_{mt} \\
+ \Sigma \theta_n YEAR_{nt} + \varepsilon_{it}
\end{aligned}
\tag{3}
$$

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[4] See Omer *et al.* (1991) and Callihan (1994) for reviews of the alternative constructions and applications of ETR. Full definitions of *TOTAL_ETR* and other variables are presented in Appendix A.

TOTAL_ETR is a financial firm's total income tax burdens as previously defined. Consistent with Efendi *et al*. (2021a, 2021b), individual tax avoidance methods are *NON_ROUTINE*, a proxy for aggressive transfer pricing techniques, measured as total non-routine intra-group transactions scaled by total net sales; *SHELTER*, a quantitative probability of tax sheltering as suggested by Wilson (2009); *LOSS*, a dummy variable for loss carryover and shift-to-loss techniques suggested by De Simone *et al*. (2017) and Hopland *et al*. (2018), coded one if a firm reports fiscal losses and zero otherwise; *TREATY*, a proxy for treaty-shopping, measured as total internal transactions with affiliates domiciled in Indonesia's tax treaty-partners scaled by total net sales[5]; *HAVEN*, a proxy for income shifting to tax havens, measured as total intra-group transactions with affiliates located in tax havens scaled by total net sales[6]; *PERMDIFF*, permanent difference to proxy for permanent non-conforming tax avoidance method consistent with Frank *et al*. (2009), measured as total permanent fiscal adjustments scaled by total assets; *TBTD*, temporary components of a financial firm's book-tax differences to proxy for temporal non-conforming tax avoidance method, measured as total temporary fiscal adjustments scaled by total assets; *CONFORM*, a proxy for conforming tax avoidance techniques as suggested by Badertscher *et al*. (2019); and *LEV*, financial leverage as a proxy for thin capitalisation, measured as total long-term debts scaled by total assets. Accordingly, by estimating Equation (3), our study assumes financial firms have the ability to exploit multiple tax avoidance methods; therefore, the coefficients of individual methods in the regression results of estimating Equation (3) will reflect the efficacy of specific techniques in lowering financial firms' tax burdens conditional to other methods.

Our variables of interest are *SHELTER, PERMDIFF*, and *TBTD*. If financial firms have tendencies to use the most sophisticated and less costly tax avoidance methods in lowering their tax burdens, we anticipate negative and significant coefficients of these particular tax avoidance methods in the result of estimating Equation (3). Accordingly, the costlier techniques to implement are expected to be insignificant. However, if these sophisticated and less costly methods are irrelevant in financial firms' tax planning, the coefficients should be insignificant.

D. Control Variables
Control variables in both regression equations are various firms' internal characteristics associated with corporate tax avoidance suggested by earlier studies: *SIZE* to control for the economy of scale and political cost effects of tax avoidance as proposed by Zimmerman (1983) and Gupta and Newberry (1997); *ROA*, return on assets, to control for firms' profitability as suggested by Gupta

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[5] Consistent with Efendi *et al.* (2021a, 2021b), *TREATY* is a crude measure of treaty-shopping since it captures the magnitude of a firm's intra-group transactions with affiliates domiciled in treaty-partner countries, yet it fails to segregate the tax-motivated transactions from those that commercially justified.

[6] Following Efendi *et al*. (2021b), our study classifies a country or jurisdiction as a tax haven if it is listed in the noncooperative jurisdictions for tax purposes proposed by OECD (2000), Dharmapala and Hines (2009), the European Union (2021), or the US Senate (2011). See Appendix B of Efendi *et al*. (2021b) for a complete list of the tax haven countries.

and Newberry (1997); *FOREIGN* to control for firms' international operations as suggested by Rego (2003) and Lisowsky (2010); *CAPITAL*, capital intensity, also *INVEN*, inventory intensity, collectively, to control for firms' investment choices as suggested by Gupta and Newberry (1997); and year fixed effects since time-specific enforcement policies are likely to influence firms' tax avoidance behaviours. Additionally, Equation (2) controls for financial leverage (*LEV*), fiscal loss (*LOSS*), and changes in loss compensation (*ΔLOSS*), as previously defined, while Equation (3) controls for financial subsector fixed effects using two-digit of Indonesia's standard industry classification. The measurement of individual control variables is presented in Appendix A.

IV. SAMPLE SELECTION AND DESCRIPTIVES

Our study examines an unbalanced set of micro-level tax return data of the largest financial and non-financial firms operating in Indonesia administered by the Indonesian tax authority (i.e. the Directorate General of Taxes/DGT).[7] Income tax payment information is collected from the main files, while detailed intra-group transactions information to calculate *NON_ROUTINE*, *TREATY*, and *HAVEN* are gathered from special attachment 3A/3B. Similarly, financial performance data are compiled from the firm's non-consolidated financial statements attached to the respective tax return. All documents are officially provided to the first author by the Director of Dissemination, Services, and Public Relations of the DGT. Nevertheless, due to tax information secrecy provisions, all data are provided anonymously; therefore, the authors cannot match specific tax liability and financial information with the corresponding firm. This necessary anonymity does not affect our ability to perform the analysis.

In selecting the sample group, we begin with all financial and non-financial firms administered by the DGT during the 2009 to 2017 fiscal years. Initially, 7,452 firms (53,573 firm-years) are considered the sample for our study. However, considering differences in statutory corporate income tax rates, we exclude 138 coal and mineral mining firms; 812 oil, gas, and geothermal firms; and 1,587 small firms from the sample. Similarly, we remove 10,299 loss-making firms with negative *TOTAL_ETR* because their *ETR* is difficult to interpret; 6,636 firms with excessive income tax payments (i.e. *TOTAL_ETR* of more than one) are also excluded. Finally, 193 firms that apply incorrect statutory tax rates are removed from the sample. Our final sample consists of an unbalanced panel of 5,968 unique firms and permanent establishments (33,908 firm-years), which are subject to the 25% statutory corporate income tax rate. Among the final sample, 419 firms (2,571 firm-years) operate in financial industries as our main subsample of interest. Overall, within nine years span of observation, we observe each firm for 5.68 years on average.

In terms of financial industries subsample's distribution, a substantial proportion of the subsample is clustered in broker, dealer, and financial securities

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[7]   Like most tax authorities (e.g. the Australian Taxation Office, the US Internal Revenue Service, the Japan National Tax Agency), DGT administrates corporate taxpayers based on their scale of economy. See Efendi (2020) for further descriptions of DGT's administration system.

(5.02 per cent) and banking (1.82 per cent), while others are evenly distributed across insurance services, equity financing, trust financing, and stock exchange and settlements which indicates a relatively low risk of subsector bias.[8] Panel A of Table 1 summarises our sample selection criteria and Panel B presents the detailed financial industries distribution.

Table 1.
Sample Composition

Industry classification follows standard industry classification developed by Indonesia's Central Bureau of Statistics (2015). Other industries are various category of manufacturing, trading, and service sectors.

Sample Selection Criteria	Firm-years (2009-2017)
Panel A: Sample Selection Summary	
All financial and non-financial firms	53,573
Less:	
Loss-making firms (*TOTAL_ETR<0*)	(10,299)
Firms with excessive income tax payments (*TOTAL_ETR>1*)	(6,636)
Small firms	(1,587)
Coal and mineral mining firms which sign their contract of works before 2009	(138)
Oil and gas firms which sign their production sharing contracts before 2009	(696)
Geothermal firms	(116)
Firms which apply incorrect statutory corporate income tax rates	(193)
Final sample	33,908

Industry Description	Frequency (%)	Number of Firms	Firm-years (2009-2017)
Panel B: Industry Classification			
Financial services:			
Banking	1.82	83	617
Broker, dealer, and financial securities	5.02	290	1,703
Insurance services	0.29	14	98
Equity financing (holding companies)	0.36	28	121
Trust financing	0.02	1	7
Stock exchange and settlements	0.07	3	25
Others	92.42	5,549	31,337
Total	100.00	5,968	33,908

Our study investigates the differing extent of tax aggressiveness between financial and non-financial firms also specific tax avoidance methods used in financial firms' tax planning. Panel A of Table 2 presents descriptive statistics of total income tax burdens and the individual tax avoidance methods employed

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[8] We control for subsector fixed effects when examining specific tax avoidance methods used by financial firms.

in the analysis. It shows that, among others, the mean (median) of *TOTAL_ETR* is 0.2323 (0.2495), marginally lower than the statutory corporate income tax rate of 25%. Comparing *TOTAL_ETR* between financial firms and their non-financial counterparts. Panel B of Table 2 reveals the mean and median of *TOTAL_ETR* of financial firms are substantially lower than those of non-financial firms indicating financial firms are more aggressive relative to non-financial firms during observation periods. Moreover, compared to the mean annual *TOTAL_ETR*, means of aggregated ETRs (i.e. *TOTAL_ETR3*, *TOTAL_ETR5*) for the total sample are marginally higher but still lower than the statutory corporate income tax rate suggesting some firms are able to maintain their low tax burdens over a long-run period consistent with continual tax avoidance reported by Dyreng *et al*. (2008) and Efendi (2020). Consistently, financial firms have materially lower mean and median of aggregated ETRs relative to their non-financial peers, indicating a higher intensity of tax aggressiveness in the financial industries over time.

Table 2.
Descriptive Statistics

This table reports descriptive statistics of variables used in this study. *SHELTER_RESID* is the residuals of regressing *SIZE* to *SHELTER* to lessen multicollinearity problems, while other variables are as defined in Appendix A. *TBTD* and *PERMDIFF* are scaled by lagged total assets. *ROA, FOREIGN, TBTD, LEV,* and *PERMDIFF* are censored to –1 and 1. Similarly, *TOTAL_ETR, TOTAL_ETR3, TOTAL_ETR5, NON_ROUTINE, TREATY, HAVEN, CAPITAL,* and *INVEN* are censored to 0 and 1. Differences between means are tested using t-tests, while differences in medians are tested using Wilcoxon rank-sum (Mann-Whitney) tests. Lastly, * indicates that the differences are significantly different than zero at the 1% level of confidence.

Variable	N	Mean	SD	Min.	p.25	Median	p.75	Max.
			Panel A: Descriptive Statistics					
TOTAL_ETR	33,908	0.2323	0.1854	0.0000	0.0679	0.2495	0.3088	1.0000
TOTAL_ETR3	17,710	0.2356	0.1333	0.0000	0.1643	0.2563	0.2995	0.9996
TOTAL_ETR5	9,283	0.2451	0.1146	0.0000	0.1988	0.2603	0.2973	0.9806
NON_ROUTINE	29,808	0.0305	0.1264	0.0000	0.0000	0.0000	0.0000	1.0000
SHELTER	20,417	14.1229	1.892	0.1099	12.9586	14.0475	15.2857	24.5307
SHELTER_RESID	20,417	0.0000	0.7245	–7.0168	–0.3484	0.0699	0.3727	6.3701
LOSS	33,908	0.0921	0.2891	0.0000	0.0000	0.0000	0.0000	1.0000
TREATY	30,289	0.0265	0.1190	0.0000	0.0000	0.0000	0.0000	1.0000
HAVEN	30,371	0.0049	0.0523	0.0000	0.0000	0.0000	0.0000	1.0000
PERMDIFF	21,138	–0.0242	0.1442	–1.0000	–0.0392	–0.0014	0.0108	0.9871
TBTD	21,253	–0.0178	0.1022	–0.9972	–0.0181	–0.0000	–0.0000	0.9798
CONFORM	19,008	0.0001	0.0349	–0.2822	–0.0155	–0.0038	0.0090	0.9339
LEV	25,409	0.1017	0.1803	–0.9790	0.0000	0.0174	0.1178	1.0000
FIN	33,908	0.0758	0.2647	0.0000	0.0000	0.0000	0.0000	1.0000
MNC	33,908	0.6618	0.4731	0.0000	0.0000	1.0000	1.0000	1.0000
SIZE	26,000	25.0526	2.4305	0.0000	23.4862	24.9948	26.6301	34.2305
ROA	21,154	0.1050	0.1591	–0.9997	0.0295	0.0773	0.1597	0.9992
CAPITAL	25,878	0.2275	0.2321	0.0000	0.0278	0.1545	0.3645	1.0000
INVEN	25,989	0.1424	0.1776	0.0000	0.0000	0.0724	0.2313	0.9986
FOREIGN	25,991	0.0001	0.0051	–0.0001	0.0000	0.0000	0.0000	0.7304

Table 2.
Descriptive Statistics (Continued)

Tax Avoidance Method	N		Financial Firms		Other Firms		Differences	
	Financial	Others	Mean	Median	Mean	Median	Mean	Median
Panel B: Comparison of Financial Firms and Other Industries								
TOTAL_ETR	2,571	31,337	0.1813	0.1634	0.2365	0.2505	0.0551*	0.0871*
TOTAL_ETR3	1,326	16,384	0.1826	0.2075	0.2399	0.2582	0.0329	0.0507*
TOTAL_ETR5	693	8,590	0.2049	0.2338	0.2483	0.2619	0.0435*	0.0281*
NON_ROUTINE	2,039	27,769	0.0936	0.0000	0.0259	0.0000	–0.0678*	0.0000*
SHELTER	1,929	18,488	15.7101	15.5743	13.9573	13.8705	–1.7528*	–1.7038*
SHELTER_RESID	1,929	18,488	0.4879	0.4581	–0.0509	0.0172	–0.5389*	–0.4409*
LOSS	2,571	31,337	0.0688	0.0000	0.0939	0.0000	0.0251*	0.0000*
TREATY	2,244	28,045	0.0169	0.0000	0.0272	0.0000	0.0103*	0.0000*
HAVEN	2,257	28,114	0.0049	0.0000	0.0049	0.0000	–0.0000	0.0000*
PERMDIFF	1,956	19,182	–0.0102	–0.0033	–0.0256	–0.0013	–0.0154*	0.0020
TBTD	1,941	19,312	–0.0027	0.0000	–0.0193	–0.0000	–0.0166*	0.0000*
CONFORM	1,928	17,080	–0.0000	–0.0027	0.0001	–0.0035	0.0001	–0.0008*
LEV	2,357	23,052	0.0365	0.0005	0.1084	0.0222	0.0719*	0.0217*

In terms of individual tax avoidance methods, the mean (median) of *NON_ROUTINE*, *TREATY*, and *HAVEN* is 0.0305 (0.0000), 0.0265 (0.0000), and 0.0049 (0.0000), respectively, indicating that the total sample is considerably skewed towards firms that perform less non-routine intra-group transactions as well as minimum routine and non-routine internal transactions with affiliates located in tax havens and treaty-partner countries (i.e. less transfer pricing aggressive firms). Similarly, the mean (median) of *LEV* is 0.1017 (0.0174), suggesting the sample is substantially skewed towards firms with fewer long-term debts and, thus, lower gearing ratios. Also, the mean and median of *TBTD* and *PERMDIFF* are negative, implying reduced financial reporting incentives among sample firms together with an elevated risk of various conforming tax avoidance schemes. Finally, comparing tax avoidance methods between financial firms and their non-financial counterparts, with the exception being *HAVEN*, *PERMDIFF*, and *CONFORM*, the mean and median of each tax avoidance method are significantly different between these two sample groups, as reported in Panel B of Table 2, indicating different preference of application and intensity of these methods among financial and non-financial firms.

Table 3 presents bivariate correlations between the main variables for financial firms' subsample. The table reveals positive correlations, both linearly and monotonically, among proxies of tax burdens (i.e. *TOTAL_ETR*, *TOTAL_ETR5*, and *CONFORM*) also negative correlations between these proxies with BTD-based tax avoidance methods (i.e. *TBTD* and *PERMDIFF*) consistent with aggressive financial firms facing low tax burdens. Furthermore, the table shows *TOTAL_ETR* is also weakly correlated, linearly and monotonically, with *NON_ROUTINE*, *SHELTER*, *TREATY*, *HAVEN*, *PERMDIFF*, *TBTD*, and *CONFORM*. However, *TOTAL_ETR* is only retained monotonic correlations with *LOSS* and *LEV*. Additionally, Table 3 also indicates that collinearity among individual tax avoidance methods is generally low.

Table 3.
Bivariate Correlations of the Main Variables in Financial Firms' Subsample

This table displays correlations between main variables. Spearman correlations are presented above the diagonal and Pearson correlations are presented below. The asterisk indicate correlation coefficients are statistically different from zero at the 1% confidence level. All variables are as defined in Appendix A. *TBTD* and *PERMDIFF* are scaled by lagged total assets. *ROA, FOREIGN, TBTD, LEV,* and *PERMDIFF* are censored to −1 and 1. Similarly, *TOTAL_ETR, TOTAL_ETR5, NON_ROUTINE, TREATY, HAVEN, CAPITAL,* and *INVEN* are censored to 0 and 1.

Variables	TOTAL_ETR	TOTAL_ETR5	NON_ROUTINE	SHELTER	LOSS	TREATY	HAVEN	PERMDIFF	TBTD	CONFORM	LEV
TOTAL_ETR		0.7146*	0.1047*	-0.0682*	-0.2458*	0.1677*	0.0867*	-0.1710*	-0.2524*	0.1478*	0.1102*
TOTAL_ETR5	0.6382*		0.0539*	-0.1099*	-0.1212*	0.2077*	0.0889*	-0.2519*	-0.2033*	0.1062*	0.1613*
NON_ROUTINE	0.1303*	0.0152		0.2873*	0.0122	0.3536*	0.2353*	-0.1056*	0.0248*	0.0995*	0.1666*
SHELTER	-0.1155*	-0.1333*	-0.0035		0.0610*	0.1131*	0.0687*	0.0515*	0.1224*	0.1963*	0.1070*
LOSS	-0.0367	-0.1461*	0.0632*	-0.0372		0.0130	0.0030	0.1029*	0.1144*	0.0590*	0.1134*
TREATY	0.0928*	0.0877*	0.4575*	-0.0000	0.0781*		0.4464*	-0.1040*	-0.0644*	0.1401*	0.1657*
HAVEN	0.0618*	0.0393*	0.2900*	0.0026	0.0158	0.4429*		-0.0755*	-0.0215*	0.0642*	0.0814*
PERMDIFF	-0.2157*	-0.1510*	-0.2757*	0.0460	-0.0055	-0.1114*	-0.0743*		-0.3764*	-0.0631*	-0.0458*
TBTD	-0.0734*	-0.0936*	0.0053	-0.0129	0.0848*	0.0337	-0.0049	-0.0995*		-0.0987*	-0.0420*
CONFORM	0.0831*	0.1073*	0.1685*	0.0677*	0.0103	0.0607	0.0278	-0.4321*	-0.0947*		0.0079
LEV	0.0552	0.0609*	0.0368	0.0722*	0.0437	0.0252	-0.0195	-0.0269	0.0034	-0.0251	

V. EMPIRICAL RESULTS

Our first hypothesis examines the differing extent of tax aggressiveness between financial firms and their non-financial peers. Considering their access to complex financial transactions, we predict financial firms have more opportunity and, thus, lower implementation costs of tax avoidance.[9] Consequently, they tend to be more aggressive compared to non-financial firms. In investigating this hypothesis, we regress a dummy variable for financial firms, *FIN*, to *TOTAL_ETR* by estimating Equation (2). Table 4 presents the result of this estimation. It reveals a negative and significant (p<0.01) relation between *FIN* and *TOTAL_ETR*, suggesting that financial firms have substantially lower total tax burdens than their non-financial counterparts, as expected. The coefficient of *FIN* is –0.0651, indicating a reduction of total income tax burdens by about 0.0651 percentage points if a firm operates in financial industries. Additionally, several internal characteristics (i.e. *SIZE, ROA, INVEN, LOSS,* and *ΔLOSS*) are also informative in describing variations of firms' total tax burdens.

Table 4.
Difference-in-differences Analysis of Financial Firms' Tax Aggressiveness

This table reports coefficients of the following regression equation (2):

$$TOTAL\_ETR_{it} = \alpha + \beta FIN_{it} + \Sigma \delta_k CONTROLS_{it} + \Sigma \theta_n YEAR_{nt} + \varepsilon_{it}$$

The equation includes *SIZE, ROA, LEV, CAPITAL, INVEN, FOREIGN, LOSS,* and *ΔLOSS* as control variables. In addition, we control for year-fixed effects. All variables are as defined in Appendix A. *ROA* and *ΔLOSS* are censored to –1 and 1. Similarly, *TOTAL_ETR, LEV, CAPITAL, INVEN,* and *FOREIGN* are censored to 0 and 1. Untabulated variance inflation factor (VIF) analysis shows individual VIF of the independent variables is less than two suggesting moderate correlations between independent variables and, thus, low risk of multicollinearity. Standard errors are robust and clustered by firms. R^2 is stated in percentage (%). Lastly, ***, **, and * indicate statistical significance at the 1%, 5% and 10% significance levels, respectively.

Variable	Predicted Sign	Coefficient	t-statistic
FIN	–	–0.0651	–8.09***
SIZE	+	0.0038	4.35***
ROA	+	0.0222	1.78*
LEV	–	0.0131	1.13
CAPITAL	–	–0.0057	–0.62
INVEN	+	0.0730	6.16*
FOREIGN	+	0.4086	0.73
LOSS	–	–0.1598	–28.27***
ΔLOSS	–	–0.0957	–3.43***
Constant		0.1613	7.41***
Year fixed effects		Yes	
N		20,414	
R^2		7.73	

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9   In addition to agency costs and outcome costs, implementation costs are essential components of firms' cost and benefit consideration in arranging their tax planning strategy (Wilde and Wilson, 2018).

The second hypothesis examines the use of specific tax avoidance methods in financial firms' tax planning. Because financial firms are capable of exploiting multiple tax avoidance methods, we anticipate strong tendencies to use the most sophisticated and less costly tax avoidance methods in lessening their tax burdens. In investigating this hypothesis, we begin with transforming *SHELTER* into its residual form, *SHELTER_RESID*, by regressing it to firms' size, a control variable. This orthogonalised-transformation is necessary to correct structural multicollinearity problems caused by cross-correlations between these variables (i.e. consistent with Wilson (2009), *SIZE* is one important component of *SHELTER*'s construction) and improve the model's precision (as in Guedhami and Pittman, 2008).[10] Further, we simultaneously regress *SHELTER_RESID* and other tax avoidance methods to financial firms' *TOTAL_ETR* by estimating Equation (3).

Table 5 reports the result of this estimation. It shows that *SHELTER_RESID*, *PERMDIFF*, and *TBTD* are negatively and significantly ($p<0.05$) associated with *TOTAL_ETR* suggesting tax shelters, and permanent and temporary differences between accounting standards and tax laws are jointly used in financial firms' tax planning, as predicted. Contrarily, other costlier tax avoidance methods are irrelevant in the firms' tax planning, indicating financial firms' incentive to maximise the net benefits of tax avoidance (that is, total tax saving minus the necessary costs of tax planning).

Table 5.
Multivariate Regression Analysis on the Use of Specific Tax Avoidance Methods in Financial Firms' Tax Planning

This table reports coefficients of the following regression equation (3):

$$TOTAL\_ETR_{it}$$
$$= \alpha + \beta_1 NON\_ROUTINE_{it} + \beta_2 SHELTER_{it} + \beta_3 LOSS_{it} + \beta_4 TREATY_{it} + \beta_5 HAVEN_{it} + \beta_6 PERMDIFF_{it}$$
$$+ \beta_7 TBTD_{it} + \beta_8 CONFORM_{it} + \beta_9 LEV_{it} + \Sigma\delta_k CONTROLS_{it} + \Sigma\delta_m SUBSECTOR_{mt} + \Sigma\theta_n YEAR_{nt} + \varepsilon_{it}$$

The equation includes *SIZE, ROA, CAPITAL, INVEN,* and *FOREIGN* as control variables. In addition, we control for year and subsector-fixed effects using two-digit of Indonesia's standard industry classification. *SHELTER_RESID* is the residuals (ε_{it}) of regressing *SIZE* to *SHELTER* to lessen multicollinearity problems, as follows:

$$SHELTER_{it} = \alpha + \beta_1 SIZE_{it} + \varepsilon_{it}$$

All variables are as defined in Appendix A. *TBTD, PERMDIFF,* and *ROA* are censored to –1 and 1. Similarly, *TOTAL_ETR, NON_ROUTINE, TREATY, HAVEN, LEV, CAPITAL,* and *INVEN* are censored to 0 and 1. Standard errors are robust and clustered by firms. R^2 is stated in percentage (%). Lastly, ***, **, and * indicate the statistical significance at the 1%, 5% and 10% significance levels, respectively.

Variables	Tax Avoidance Method	Predicted Sign	Coefficient	*t*-statistics
NON_ROUTINE	Inter-jurisdictional income shifting	–	0.0352	1.46
SHELTER_RESID	Tax sheltering	–	–0.0933	–7.34***
LOSS	Loss carry-over	–	–0.0027	–0.12
TREATY	Treaty-shopping	–	0.0272	0.79
HAVEN	Income shifting to tax havens	–	0.0109	0.24
PERMDIFF	Non-conforming permanent tax avoidance schemes	–	–0.2050	–2.59**
TBTD	Non-conforming temporary tax avoidance schemes	–	–0.2743	–2.60**

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[10] Guedhami and Pittman (2008) performed similar variable transformation methods on firms' credit rating when analysing the effect of IRS monitoring on bond pricing.

Table 5.
Multivariate Regression Analysis on the Use of Specific Tax Avoidance Methods in Financial Firms' Tax Planning (Continued)

Variables	Tax Avoidance Method	Predicted Sign	Coefficient	*t*-statistics
CONFORM	Conforming tax avoidance schemes	+	0.2345	0.78
LEV	Thin capitalisation	–	–0.0757	–1.64
SIZE		+	0.0026	1.01
ROA		+	–0.4188	–5.52***
CAPITAL		–	0.1806	1.06
INVEN		+	–0.0031	–0.07
FOREIGN		+	1.0823	0.55
Constant			0.1722	2.11**
Subsector fixed effects			Yes	
Year fixed effects			Yes	
N			1,713	
R^2			25.13	

VI. SENSITIVITY ANALYSIS

This section describes several additional analyses to evaluate the sensitivity of earlier findings and deepen our understanding of financial firms' tax aggressiveness. Firstly, we examine the sensitivity of the estimated association between total tax burdens and membership in financial industries by replacing *TOTAL_ETR* with aggregated ETRs (i.e. *TOTAL_ETR3, TOTAL_ETR5*). Secondly, we assess the application of specific tax avoidance methods by financial firms across *TOTAL_ETR* distribution using quantile regressions. Thirdly, we test the inclusion of particular tax avoidance methods in financial firms' tax planning over time. Finally, we examine the influence of foreign ownership on financial firms' tax aggressiveness before re-evaluating Hypothesis 1 using a propensity score approach.

A. Estimations Using Alternative Measures of Total Tax Burdens

The association between total income tax burdens and operations in financial industries reported in Table 4 may be sensitive to any transitory shocks on the annual tax avoidance measure (Dyreng *et al.*, 2008; Hanlon and Heitzman, 2010). To mitigate this potential concern, our study constructs alternative proxies of total tax burdens using multi-years measurements of *TOTAL_ETR* (i.e. *TOTAL_ETR3, TOTAL_ETR5*). Additionally, this supplementary analysis is also necessary to estimate the average period of the differing tax aggressiveness between financial firms and their non-financial peers. Correspondingly, consistent with Dyreng *et al.* (2008), we accumulate three and five consecutive years' total income tax paid, respectively, and divide it by their corresponding total pre-tax income as follows:

$$TOTAL\_ETR3_{it} = \frac{\Sigma_{t=1}^{3}(Comprehensive\ income\ tax\ paid_{it}+Final\ income\ tax\ paid_{it})}{\Sigma_{t=1}^{3}Pretax\ income_{it}} \qquad (4)$$

$$TOTAL\_ETR5_{it} = \frac{\Sigma_{t=1}^{5}(Comprehensive\ income\ tax\ paid_{it}+Final\ income\ tax\ paid_{it})}{\Sigma_{t=1}^{5}Pretax\ income_{it}} \qquad (5)$$

Furthermore, we re-estimate regression Equation (2) individually using *TOTAL_ETR3* and *TOTAL_ETR5* as the dependent variable. Table 6 reports the results of these estimations. It reveals qualitatively the same results as previously reported in Table 4. Specifically, operating in financial industries (*FIN*) is negatively and significantly (p<0.01) associated with total tax burdens both using *TOTAL_ETR3* and *TOTAL_ETR5* as proxies, suggesting the correlation between total tax burdens and membership in financial industries is not sensitive to year-to-year variations in *TOTAL_ETR*. Additionally, Column (3) of Table 6 shows a marginally higher fit relative to that previously reported in Table 4, implying *TOTAL_ETR3* appears to be a better measure of total income tax burdens relative to the annual proxy.

Table 6.
Analysis of Financial Firms' Tax Aggressiveness Using Long-run Measures

This table reports coefficients of the following regression equation (2):

$TOTAL\_ETR3_{it}/TOTAL\_ETR5_{it} = \alpha + \beta FIN_{it} + \Sigma\delta_{k}CONTROLS_{it} + \Sigma\theta_{n}YEAR_{nt} + \varepsilon_{it}$

The equation includes *SIZE, ROA, LEV, CAPITAL, INVEN, FOREIGN, LOSS,* and *ΔLOSS* as control variables. In addition, we control for year-fixed effects. All variables are as defined in Appendix A. *ROA* and *ΔLOSS* are censored to –1 and 1. Similarly, *TOTAL_ETR3, TOTAL_ETR5, LEV, CAPITAL, INVEN,* and *FOREIGN* are censored to 0 and 1. Untabulated variance inflation factor (VIF) analysis shows individual VIF of the independent variables is less than two suggesting moderate correlations between independent variables and, thus, low risk of multicollinearity. Standard errors are robust and clustered by firms. R^2 is stated in percentage (%). Lastly, ***, **, and * indicate the statistical significance at the 1%, 5% and 10% significance levels, respectively.

Variable	Predicted Sign	Dependent Variable	
		TOTAL_ETR3	*TOTAL_ETR5*
(1)	(2)	(3)	(4)
FIN	–	–0.0661 (–7.95)***	–0.0528 (–5.51)***
SIZE	+	0.0041 (4.49)***	0.0036 (3.35)***
ROA	+	0.0084 (0.63)	–0.0388 (–2.36)**
LEV	–	0.0114 (0.89)	0.0311 (1.88)*
CAPITAL	–	–0.0056 (–0.60)	–0.0066 (–0.60)
INVEN	+	0.0725 (6.06)***	0.0713 (5.05)***
FOREIGN	+	0.8154 (2.53)**	0.5462 (3.77)***
LOSS	–	–0.1757 (–20.32)***	–0.1362 (–7.37)***
ΔLOSS	–	0.3224 (5.80)***	0.5236 (3.90)***

Table 6.
Analysis of Financial Firms' Tax Aggressiveness Using Long-run Measures
(Continued)

Variable	Predicted Sign	Dependent Variable	
		TOTAL_ETR3	*TOTAL_ETR5*
(1)	(2)	(3)	(4)
Constant		0.1428 (6.33)***	0.1616 (6.09)***
Year fixed effects		Yes	Yes
N		13,568	7,547
R^2		10.22	6.62

B. Quantile Regression Estimations on the Use of Specific Tax Avoidance Methods

Financial firms with an extreme level of tax aggressiveness (i.e. the left tail of *TOTAL_ETR*'s distribution) may exploit different tax avoidance methods in their tax planning compared to those with a moderate level of tax aggressiveness. Therefore, the associations between financial firms' total tax burdens and specific tax avoidance methods reported in Table 5 may not persist at the differing levels of tax aggressiveness. To alleviate this potential concern, we evaluate the consistency of financial firms' tax avoidance methods across the overall *TOTAL_ETR*'s distribution, rather than focusing on the conditional mean effects under standard OLS estimations, using quantile regressions.[11] Furthermore, by minimising the total absolute deviation of residuals, quantile regression is more robust to outliers than conventional OLS. Thus, it can improve the precision of our earlier estimations and offer a more nuanced understanding of financial firms' tax planning.

Correspondingly, we rerun Equation (3) using quantile regressions and report the results of these estimations in Table 7. It reveals that financial firms use multiple tax avoidance methods in all levels of tax aggressiveness. Nevertheless, firms with a lower level of total income tax burdens (i.e. towards the left tail of *TOTAL_ETR*'s distribution) appear to have more ability in executing various tax avoidance techniques, including those which require complex cross-border transactions (i.e. inter-jurisdictional income shifting, treaty-shopping, tax sheltering, tax havens). Additionally, *SHELTER_RESID* is negatively and significantly ($p<0.01$) associated with *TOTAL_ETR* in all estimations also *PERMDIFF* and *TBTD* are negatively correlated ($p<0.05$) with *TOTAL_ETR* in nearly all estimations, supporting our earlier findings of financial firms' tendency to exploit more sophisticated and less costly tax avoidance methods in their tax planning.

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[11] Previous tax studies (e.g. Armstrong *et al*., 2015; Hoopes *et al*., 2012) have frequently used quantile regressions in verifying the consistency of the associations of interest, especially when there are tendencies that the associations are not uniform across the variable's distribution.

Table 7.
Quantile Regression Analysis on the Use of Specific Tax Avoidance Methods by Financial Firms

This table reports coefficients of the following quantile regression equation (3):

$$TOTAL\_ETR_{tq}$$

$$= \alpha + \beta_1 NON\_ROUTINE_{it} + \beta_2 SHELTER_{it} + \beta_3 LOSS_{it} + \beta_4 TREATY_{it} + \beta_5 HAVEN_{it} + \beta_6 PERMDIFF_{it} + \beta_7 TBTD_{it} + \beta_8 CONFORM_{it} + \beta_9 LEV_{it} + \Sigma \delta_k CONTROLS_{it}$$

$$+ \Sigma \delta_m SUBSECTOR_{mt} + \Sigma \theta_n YEAR_{nt} + \varepsilon_{it}$$

The equation includes *SIZE, ROA, CAPITAL, INVEN,* and *FOREIGN* as control variables. In addition, we control for year and subsector-fixed effects using two-digit of Indonesia's standard industry classification. *SHELTER_RESID* is the residuals (ε_{ij}) of regressing *SIZE* to *SHELTER* to lessen multicollinearity problems, as follows:

$$SHELTER_{it} = \alpha + \beta_1 SIZE_{it} + \varepsilon_{it}$$

All variables are as defined in Appendix A. *TBTD, PERMDIFF,* and *ROA* are censored to –1 and 1. Similarly, *TOTAL_ETR, NON_ROUTINE, TREATY, HAVEN, LEV, CAPITAL,* and *INVEN* are censored to 0 and 1. Standard errors are robust. Pseudo R^2 is stated in percentage (%). The asterisks indicates the statistical significance of the coefficients at the 1% (***), 5% (**), and 10% (*) significance levels, respectively.

Variable	Predicted Sign	TOTAL_ETR Quantile								
		(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)
NON_ROUTINE	–	0.0138	0.0013	0.0264	0.0358	0.0280	0.0313	0.0289	0.0170	0.0329
		(0.70)	(0.08)	(1.44)	(3.08)***	(2.64)***	(3.62)***	(1.69)*	(1.00)	(0.65)
SHELTER_RESID	–	-0.0414	-0.0564	-0.0698	-0.0905	-0.1046	-0.1056	-0.0981	-0.0808	-0.0883
		(-3.37)***	(-5.78)***	(-10.34)***	(-9.48)***	(-35.41)***	(-21.13)***	(-9.27)***	(-5.53)***	(-5.09)***
LOSS	–	-0.0639	-0.0913	-0.0533	-0.0512	-0.0345	-0.0118	0.0136	0.0569	0.1150
		(-4.91)***	(-5.84)***	(-5.28)***	(-4.87)***	(-2.25)**	(-0.51)	(0.49)	(1.39)	(3.29)***
TREATY	–	0.1288	0.0959	0.0866	0.0701	0.0561	0.0242	0.0422	0.0063	0.0285
		(4.06)***	(2.08)**	(3.17)***	(2.95)***	(4.95)***	(1.48)	(1.29)	(0.28)	(0.43)
HAVEN	–	0.0296	0.0709	0.1046	0.0957	0.0506	0.0111	-0.0108	0.0499	-0.0810
		(0.25)	(0.53)	(1.49)	(2.01)**	(1.87)*	(0.28)	(-0.14)	(0.27)	(-0.39)
PERMDIFF	–	0.0152	-0.0712	-0.1616	-0.1878	-0.2643	-0.3004	-0.2593	-0.2878	-0.2369
		(0.21)	(-1.00)	(-4.60)***	(-3.77)***	(-7.24)***	(10.15)***	(-4.64)***	(-4.19)***	(-2.06)**
BTD	–	0.0103	-0.1198	-0.2194	-0.2359	-0.3453	-0.4040	-0.4628	0.4987	-0.3722
		(0.11)	(-1.13)	(-4.82)***	(-3.10)***	(-6.54)***	(-8.71)***	(-7.51)***	(-8.85)***	(-2.12)**
CONFORM	+	1.1431	1.1273	0.9813	0.6479	0.2816	0.2017	0.1428	-0.0915	-0.0392
		(8.51)***	(6.53)***	(8.32)***	(5.10)***	(2.90)***	(2.41)**	(1.18)	(-0.37)	(-0.09)
LEV	–	-0.0676	-0.0203	-0.0464	-0.0960	-0.1369	-0.15099	-0.1319	-0.1008	-0.0948
		(-0.70)	(-0.33)	(-2.41)**	(-4.06)***	(-14.65)***	(-7.96)***	(-6.23)***	(-1.97)**	(-0.70)

Table 7.
Quantile Regression Analysis on the Use of Specific Tax Avoidance Methods by Financial Firms (Continued)

Variable	Predicted Sign	TOTAL_ETR Quantile								
		(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)
SIZE	+	0.0012	0.0024	0.0016	0.0017	0.0027	0.0012	0.0000	-0.0019	-0.0116
		(0.85)	(1.93)*	(1.63)	(1.33)	(2.41)**	(0.95)	(0.03)	(-0.84)	(-1.90)
ROA	+	-0.0883	-0.2084	-0.2849	-0.3407	-0.4140	-0.5127	-0.5206	-0.5529	-0.5776
		(-2.36)**	(-4.95)***	(-10.88)***	(-8.98)***	(-12.20)***	(-24.51)***	(-14.16)***	(-10.58)***	(-5.89)***
CAPITAL	–	-0.0049	0.1547	0.2955	0.3997	0.3413	0.2685	0.4098	0.4109	0.3139
		(-0.04)	(1.38)	(2.47)**	(7.10)***	(6.12)***	(3.66)***	(3.87)***	(4.54)***	(1.85)*
INVEN	+	-0.0458	-0.0517	-0.0570	-0.0507	-0.0333	0.0217	0.0062	-0.0009	0.0558
		(-3.13)***	(-4.54)***	(-2.25)**	(-1.07)	(-1.40)	(0.36)	(0.11)	(-0.01)	(0.20)
FOREIGN	+	4.9700	2.1425	-2.2372	-4.3431	-3.2604	-1.9944	-3.7844	40.0715	-3.8372
		(0.07)	(0.06)	(-0.03)	(-0.05)	(-0.03)	(-0.03)	(-0.06)	(0.32)	(-0.03)
Constant		0.0325	0.1093	0.1644	0.2006	0.1943	0.2516	0.2958	0.3580	0.7266
		(0.66)	(2.77)***	(5.55)***	(5.29)***	(5.69)***	(6.54)***	(7.64)***	(5.08)***	(3.78)***
Subsector fixed		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N		1,713	1,713	1,713	1,713	1,713	1,713	1,713	1,713	1,713
Pseudo R^2		11.87	20.53	26.35	28.95	27.78	23.70	18.65	15.51	14.56

C. The Application of Particular Tax Avoidance Methods Over Time

The earlier finding on the association between total income tax burdens and membership in financial industries reported in Table 4 may be sensitive to any unobservable internal characteristics. To mitigate the potential concern that control variables included in the previous estimations are not fully capturing the effects of financial firms' specific characteristics, we re-estimate regression Equation (3) using a fixed effects-panel data specification. Furthermore, earlier studies (e.g. Griliches and Hausman, 1986; Plesko, 2003) have asserted that panel data model, through analysing deviations of individual means, is capable of correcting estimation bias caused by serial correlations of the explanatory variables and omitted-individual effects. Nevertheless, the model may exacerbate the negative correlations between errors in variables' measurement and the model's residuals.

Table 8 reports the result of this estimation. It reveals a qualitatively comparable result with the earlier finding reported in Table 5. Specifically, Table 8 presents negative and significant ($p<0.01$) associations of *SHELTER_RESID* and *TBTD* with total income tax burdens in the consistent directions as initially estimated, indicating the selections of these sophisticated and less costly tax avoidance methods are not sensitive to any unobservable internal characteristics. However, *PERMDIFF* becomes irrelevant in financial firms' tax planning suggesting permanent differences between accounting standards and tax laws are less decisive over time. Similarly, *NON_ROUTINE* becomes positively correlated with total tax burdens implying that, contrary to common beliefs and considerable anecdotal evidence on financial firms' transfer pricing aggressiveness, these firms seem to use non-routine internal transactions to shift their group profits to Indonesia over time.

Table 8.
The Use of Specific Tax Avoidance Methods in Financial Firms' Tax Planning Over Time

This table reports coefficients of the fixed-effect panel data specification of the following regression equation (3):

$TOTAL\_ETR_{it}$
$= \alpha + \beta_1 NON\_ROUTINE_{it} + \beta_2 SHELTER_{it} + \beta_3 LOSS_{it} + \beta_4 TREATY_{it} + \beta_5 HAVEN_{it} + \beta_6 PERMDIFF_{it}$
$+ \beta_7 TBTD_{it} + \beta_8 CONFORM_{it} + \beta_9 LEV_{it} + \Sigma \delta_k CONTROLS_{it} + \varepsilon_{it}$

The equation includes *SIZE, ROA, CAPITAL, INVEN,* and *FOREIGN* as control variables. *SHELTER_RESID* is the residuals (ε_{it}) of regressing *SIZE* to *SHELTER* to lessen multicollinearity problems, as follows:

$SHELTER_{it} = \alpha + \beta_1 SIZE_{it} + \varepsilon_{it}$

All variables are as defined in Appendix A. *TBTD, PERMDIFF,* and *ROA* are censored to −1 and 1. Similarly, *TOTAL_ETR, NON_ROUTINE, TREATY, HAVEN, LEV, CAPITAL,* and *INVEN* are censored to 0 and 1. R^2 is stated in percentage (%). The asterisks indicate the statistical significance of the coefficients at the 1% (***), 5% (**), and 10% (*) significance levels, respectively.

Variable	Tax Avoidance Method	Predicted Sign	Coefficient	*t*-statistics
NON_ROUTINE	Inter-jurisdictional income shifting	−	0.0749	3.08***
SHELTER_RESID	Tax sheltering	−	−0.0554	−5.49***
LOSS	Loss carry-over	−	−0.0119	−0.65
TREATY	Treaty-shopping	−	−0.0138	−0.25
HAVEN	Income shifting to tax havens	−	−0.0979	−0.92
PERMDIFF	Non-conforming permanent tax avoidance schemes	−	−0.0690	−1.48

Table 8.
The Use of Specific Tax Avoidance Methods in Financial Firms' Tax Planning Over Time

Variable	Tax Avoidance Method	Predicted Sign	Coefficient	*t*-statistics
TBTD	Non-conforming temporary tax avoidance schemes	–	–0.2538	–2.87***
CONFORM	Conforming tax avoidance schemes	+	0.3764	1.98**
LEV	Thin capitalisation	–	–0.0447	–0.89
SIZE		+	–0.0031	–0.70
ROA		+	–0.3688	–6.96***
CAPITAL		–	0.1063	0.64
INVEN		+	–0.1658	–2.49**
FOREIGN		+	7.8499	0.66
Constant			0.3369	2.81***
N (group)			1,713 (363)	
R^2			21.03	

D. The Influence of Foreign Ownership on Financial Firms' Tax Aggressiveness

The association between total income tax burdens and membership in financial industries presented in Table 4 may be sensitive to varying ownership structures. Consistent with earlier studies (e.g. Rego, 2003; Thomsen and Watrin, 2018), foreign-owned financial firms may have better access to particular tax avoidance techniques which influence their tax planning. To investigate this potential concern, our study constructs an indicator variable of foreign ownership, *MNC*, and interacts it with *FIN* in the following regression equation:

$$
\begin{aligned}
TOTAL\_ETR_{it} \\
= \alpha + \beta_1 FIN_{it} + \beta_2 MNC_{it} + \beta_3 FIN_{it} * MNC_{it} + \beta_4 SIZE_{it} + \beta_5 ROA_{it} \\
+ \beta_6 LEV_{it} + \beta_7 CAPITAL_{it} + \beta_8 INVEN_{it} + \beta_9 FOREIGN_{it} + \beta_{10} LOSS_{it} \\
+ \beta_{11} \Delta LOSS_{it} + \Sigma \theta_n YEAR_{nt} + \varepsilon_{it} \quad\quad\quad (6)
\end{aligned}
$$

The dependent variable is *TOTAL_ETR*, as previously defined. The explanatory variables are *FIN* as previously defined, *MNC* (a dummy proxy for foreign ownership, coded one if at least one of a firm's shareholders is located outside Indonesia and zero otherwise), and the interaction of *FIN* and *MNC*. Our variable of interest is the interaction of *FIN* and *MNC*. If different ownership structures affect financial firms' tax aggressiveness, the interaction variable needs to present a statistically significant coefficient. Conversely, if ownership characteristics are irrelevant in financial firms' tax planning, the coefficient should be insignificant. Furthermore, *FIN* and *MNC* are included as individual explanatory variables to control any direct effect independent of the interaction. Additionally, the equation includes *SIZE, ROA, LEV, CAPITAL, INVEN, FOREIGN, LOSS,* and *ΔLOSS* as control variables. Also, we control for year fixed effects.

Table 9 presents the result of this estimation. It shows that the coefficient of *FIN* is negative and significant (p<0.01), consistent with our earlier findings. Moreover, the coefficient of *MNC* is positive and significant (p<0.01), suggesting foreign-owned firms are paying a larger amount of taxes than purely domestic firms during observation periods akin to similar findings documented by previous studies (Dyreng *et al.*, 2017; Efendi *et al.*, 2021b; Thomsen and Watrin, 2018). Similarly, the interaction of *FIN* and *MNC* is positively and significantly (p<0.01) related with *TOTAL_ETR*, indicating foreign-owned financial firms have different intensities of tax aggressiveness compared to their domestic peers. Furthermore, foreign-owned financial firms appear to have higher total tax burdens, implying that foreign affiliates are less aggressive than domestic firms.

Table 9.
The Effect of Foreign Ownership to Financial Firms' Tax Aggressiveness

This table reports coefficients of the following regression equation (6):

$$TOTAL\_ETR_{it}$$
$$= \alpha + \beta_1 FIN_{it} + \beta_2 MNC_{it} + \beta_3 FIN_{it} * MNC_{it} + \beta_4 SIZE_{it} + \beta_5 ROA_{it} + \beta_6 LEV_{it} + \beta_7 CAPITAL_{it} + \beta_8 INVEN_{it}$$
$$+ \beta_9 FOREIGN_{it} + \beta_{10} LOSS_{it} + \beta_{11} \Delta LOSS_{it} + \Sigma \delta_k CONTROLS_{it} + \Sigma \theta_n YEAR_{nt} + \varepsilon_{it}$$

The equation includes *SIZE, ROA, LEV, CAPITAL, INVEN, FOREIGN, LOSS,* and *ΔLOSS* as control variables. In addition, we control for year-fixed effects. All variables are as defined in Appendix A. *ROA* and *ΔLOSS* are censored to −1 and 1. Similarly, *TOTAL_ETR, LEV, CAPITAL, INVEN,* and *FOREIGN* are censored to 0 and 1. Untabulated variance inflation factor (VIF) analysis shows individual VIF of the independent variables is less than two suggesting moderate correlations between independent variables and, thus, low risk of multicollinearity. Standard errors are robust and clustered by firms. R^2 is stated in percentage (%). The asterisks indicate the statistical significance of the coefficients at the 1% (***), 5% (**), and 10% (*) significance levels, respectively.

Variable	Predicted Sign	Coefficient	*t*-statistics
FIN	−	−0.0748	−8.00***
MNC	+	0.0199	4.87***
*FIN * MNC*	+	0.0567	4.34***
SIZE	+	0.0027	3.01***
ROA	+	0.0241	1.93*
LEV	−	0.0121	1.04
CAPITAL	−	−0.0043	−0.46
INVEN	+	0.0698	5.86***
FOREIGN	+	0.3679	0.69
LOSS	−	−0.1614	−28.47***
ΔLOSS	−	−0.0947	−3.33***
Constant		0.1753	7.97***
Year fixed effects		Yes	
N		20,414	
R^2		8.33	

E. Propensity Scores Matching Analyses

The previous finding on the association between total income tax burdens and membership in financial industries reported in Table 4 may be sensitive to any unobservable difference between financial and non-financial firms. To assuage the potential concern that control variables included in the previous estimations are not fully capturing the effects of individual differences between financial

and non-financial sample groups, we re-estimate regression Equation (2) using propensity score matching based on *SIZE* and *ROA* in multiple specifications (i.e. nearest neighbour matching, radius matching, kernel matching, stratification matching). Table 10 reports the result of these estimations. It consistently shows a lower *TOTAL_ETR* reported by the financial subsample relative to their non-financial counterparts, coherent with the earlier finding reported in Table 4, suggesting unobservable differences between financial and non-financial firms are not prevalent.

Table 10.
Propensity Scores Matching Analysis

This table reports coefficients of the propensity score matching specifications of the following regression equation (2):

$$TOTAL\_ETR_{it} = \alpha + \beta FIN_{it} + \Sigma \delta_k CONTROLS_{it} + \varepsilon_{it}$$

The equation includes *SIZE* and *ROA* as control variables. All variables are as defined in Appendix A. *ROA* is censored to −1 and 1 while *TOTAL_ETR* is censored to 0 and 1. Standard errors are in parentheses. The kernel matching reports bootstrap standard errors. The asterisks indicate the statistical significance of the coefficients at the 1% (***), 5% (**), and 10% (*) significance levels, respectively.

Matching Method	Financial Firms (N)	Non-financial Firms (N)	Average Treatment Effect	*t*-statistics
Nearest neighbour	1,944	1,606	−0.041	−4.52*** (0.009)
Radius	1,937	19,128	−0.069	−16.86*** (0.004)
Kernel	1,944	19,128	−0.051	−14.09*** (0.004)
Stratification	1,884	19,188	−0.052	−11.10*** (0.005)

VII. CONCLUSIONS AND POLICY IMPLICATIONS

In navigating the current post-pandemic economic recovery, it is necessary for governments to secure tax revenues to ensure the sustainability of its fiscal capacity. Promoting tax compliance, including for financial firms, contributes to supporting government ability to carry out policy. Conventional discussions on the role of financial firms in the economy have always been dominated by their intermediary and prudential aspects. All the while, considering the ever-increasing complexity of financial products and cross-border transactions, financial firms have been able to avail themselves of greater opportunities to avoid tax effectively, causing the loss of fiscal revenues suffered by the government.

While tax compliance of financial firms has been the subject of various international initiatives and recommendations, research has rarely addressed this issue. The tax avoidance literature mainly focuses on the tax aggressiveness of non-financial firms and tends to exclude their financial counterparts. Moreover, the sample of empirical studies in the field mainly consists of listed companies with publicly-available data, potentially causing survivorship bias and an inability to capture tax aggressiveness to its full extent. Our study fills this gap by investigating whether financial firms are more tax aggressive than non-financial peers and identifying the most frequent methods employed in their tax planning. Instead of merely relying on listed financial firms, we obtain a confidential, large set of annual tax return data from the Indonesian tax authority.

Our large sample comprises 33,098 firm-year observations across the period 2009 to 2017. We find evidence consistent with financial firms having reduced tax burdens relative to non-financial firms, suggesting that financial firms are able to more effectively exploit opportunities for tax avoidance. Our result is robust across different tax avoidance measurements. Furthermore, we document simultaneous use of tax shelters, temporary differences, and permanent differences by these firms, indicating that financial firms favour the most sophisticated and less costly techniques to minimise their tax burdens. However, our additional analysis reveals that multinational financial firms tend to be less tax aggressive, suggesting that tax compliance is a function of financial firms' ownership structure.

Beyond the academic literature, our findings also have several important implications for policymakers, especially in securing any tax revenues to help governments execute policies. We believe that such implications apply not only to the Indonesian policymaking landscape but also to other developing economies that share similar institutional environments. First, our findings suggest that tax aggressiveness of financial firms is an important and unexplored, unintended consequence of the government's conventional prudential policies. While the government might be able to keep financial firms prudent and supporting real economic activities, such firms can still benefit from opportunities for tax avoidance. This underlines the need for a better and more orchestrated coordination between relevant authorities (e.g. the central bank, the financial regulator, and the tax authority). Several proposed policies to deter financial firms' tax avoidance and improve their operational stability include improving book-tax conformity (Andries *et al.*, 2017) and allowing public access to their tax reporting (Joshi *et al.*, 2020).

Second, we are able to identify several tax avoidance techniques that are frequently used in financial firms' tax planning. This provides key insights for the tax authority regarding its efforts in deterring tax avoidance, particularly among financial firms. Given its relatively limited resources, the tax authority might need to consider focusing resources on specific tax avoidance methods used by financial firms (i.e. tax shelters, permanent differences, temporary differences). Third, given the finding that multinational financial firms are less tax aggressive, our study tends to suggest that various cross-border initiatives and coordination in curbing tax avoidance, either bilaterally or multilaterally, may be having a positive impact on curtailing tax aggressiveness. We expect that such inter-jurisdictional cooperation would always be given high importance by tax authorities, given the increasingly complex cross-border financial arrangements and transactions.

Although investigating novel tax return data, this study is not without limitations. Due to the confidential nature of our data set, we are not able to access or exploit the identities of specific firms in our sample. As such, we are unable to further analyse the impacts of particular regulations concerning the soundness of financial firms (e.g. capital adequacy ratio for banks and risk-based capital for insurance companies) on tax aggressiveness. We hope that future studies, with more access to confidential data, can address these issues, thereby providing deeper insights into whether the soundness of financial firms and tax avoidance are empirically correlated.

Appendix A: Variable Definitions

Variable		Definition
BTD_{it}	=	A temporary component of firm i's book-tax differences, measured as total temporary fiscal adjustments scaled by total assets at the end of year t.
$CAPITAL_{it}$	=	Total non-current assets of firm i scaled by total assets at the end of year t.
$TOTAL\_ETR_{it}$	=	Firm i's total cash tax paid scaled by total pre-tax income at the end of year t.
$TOTAL\_ETR3_{it}$	=	Firm i's total three-year aggregate cash tax paid scaled by total three-year aggregate pre-tax income.
$TOTAL\_ETR5_{it}$	=	Firm i's total five-year aggregate cash tax paid scaled by total five-year aggregate pre-tax income.
$CONFORM_{it}$	=	A proxy for firm i's conforming tax avoidance strategies suggested by Badertscher *et al.* (2019), measured as the residuals of the following regression equation: $TAXESPAID\_TO\_ASSETS_{it} = \alpha_0 + \alpha_1 BTD_{it} + \alpha_2 NEG_{it} + \alpha_3 BTD_{it} X NEG_{it} + \alpha_4 NOL_{it} + \alpha_5 \Delta NOL_{it} + \varepsilon_{it}$
FIN_{it}	=	A dummy variable for a financial firm, coded one if the firm's standard industry classification at the end of year t refers to banking; broker, dealer, and financial securities; insurance services; equity financing (holding companies); trust financing; or stock exchange and settlements, and 0 otherwise.
$FOREIGN_{it}$	=	Total foreign income of firm i scaled by total assets at the end of year t.
$HAVEN_{it}$	=	Firm i's total intra-group transactions with affiliates located in tax havens scaled by total net sales at the end of year t.
$INVEN_{it}$	=	Total inventory of firm i scaled by total assets at the end of year t.
LEV_{it}	=	Financial leverage as a proxy for thin capitalisations, measured as total long-term debts of firm i scaled by total assets at the end of year t.
$LOSS_{it}$	=	A dummy variable for fiscal losses, coded one if firm i has fiscal loss compensation at the end of year t and 0 otherwise.
$\Delta LOSS_{it}$	=	Changes in affiliate i's fiscal loss carry-forward of scaled by lagged total assets at the end of year t.
MNC_{it}	=	A dummy variable for a foreign affiliate, coded one if at least one of firm i's shareholder at the end of year t is located outside Indonesia and 0 otherwise.
$NON\_ROUTINE_{it}$	=	Total non-routine intra-group transactions (i.e. transfers of non-current and financial assets; payments of royalties, interests, service fees, and other expenses) of firm i scaled by total sales at the end of year t.
$PERMDIFF_{it}$	=	Permanent difference of firm i, measured as total permanent fiscal adjustments scaled by total assets at the end of year t as suggested by Frank *et al.* (2009).
ROA_{it}	=	Total pre-tax net income of firm i scaled by total assets at the end of year t.

Appendix A: Variable Definitions (Continued)

Variable		Definition
$SHELTER_{it}$	=	A probability of firm i's involvement in tax sheltering activities at the end of year t proposed by Wilson (2009) as follows: $SHELTER=-4.30+6.63*BTD-1.72*Leverage+0.66*Size+2.26*ROA+1.62*ForeignIncome+1.56*R\&D$ However, we exclude research and development expenses from the variable construction since they are not statistically significant in Table 5 of Wilson (2009 p. 988).
$SIZE_{it}$	=	Log natural of firm i's total assets at the end of year t.
$TREATY_{it}$	=	Firm i's total intra-group transactions with affiliates domiciled in Indonesia's treaty-partner countries scaled by total net sales at the end of year t.

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