Siahaan, Fernando; Amberger, Harald; Sureth, Caren

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Fernando Siahaan, Harald Amberger, Caren Sureth-Sloane

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Fernando Siahaan
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Turnover-Based Corporate Income Taxation and Corporate Risk-Taking

Fernando Siahaan
Vienna University of Economics and Business

Harald Amberger
Vienna University of Economics and Business

Caren Sureth–Sloane
Paderborn University
Vienna University of Economics and Business

Abstract

This study investigates the effect of a Turnover-based Corporate Income Tax (TbCIT) on corporate risk-taking. TbCIT is a simplified presumptive tax levied on a firm's turnover and commonly applied to SMEs and hard-to-tax income. Using a rich sample of Indonesian firms for the years 2009 to 2021, we provide evidence that corporate risk-taking is negatively associated with a firm's TbCIT exposure. The negative effect is stronger for firms in industries with high profit margins and firms with prior year losses. However, we find no association between risk-taking and the effective TbCIT rate. Overall, our findings extend prior research on the effects of limited risk sharing between taxpayers and the government by showing that turnover-based taxation can depress corporate risk-taking. Our study also informs policymakers about potential unintended consequences of adopting simplified, turnover-based tax regimes.

Keywords: turnover-based tax; corporate income tax; risk-taking; SMEs taxation

JEL Classifications: H25; H32; G32; O53

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I. INTRODUCTION

We investigate the effect of a turnover-based corporate income tax (TbCIT) on corporate risk-taking. Countries regularly apply TbCIT as a simplified tax regime for small and medium-sized enterprises and hard-to-tax income. Moreover, the government may use tax policy to encourage corporate risk-taking (Domar & Musgrave, 1944) as a key driver of entrepreneurial activity and economic growth (John et al., 2008). Therefore, it is important to understand whether and to what extent TbCIT regimes affect firms' risky investments. Prior theoretical and empirical research (Domar & Musgrave, 1944; Feldstein, 1969; Langenmayr & Lester, 2018; Ljungqvist et al., 2017; Osswald & Sureth-Sloane, 2020) shows that both tax rate and loss offset rules affect corporate risk-taking. These studies, however, are limited to a common form of corporate taxation—the profit-based corporate income tax (PbCIT)—that taxes profits while providing loss offset opportunities.

TbCIT is a simplified presumptive tax levied on gross revenue or turnover. TbCIT is particularly suitable for small and medium-sized enterprises (SMEs) that can maintain basic record-keeping (World Bank Group, 2007). This special tax regime is widely adopted for SME taxation by both developing countries like Indonesia, Brazil, China, India, and South Africa, and developed nations such as Austria, France, and Italy (OECD, 2015). Some countries also utilize turnover as a proxy for income in specific industries such as agriculture and forestry (Austria), property, mining, and land transport (Chile), and shipping (Denmark) (OECD, 2015). In addition, the United States has witnessed a resurgence in the popularity of turnover taxes, also known as Gross Receipts Taxes (GRT), due to their revenue generation potential (Hansen et al., 2022). Recent developments in the taxation of digital services (KPMG, 2022) and ongoing discussions surrounding Pillar One (OECD, 2022) indicate an increasing trend towards adoption of turnover-based taxes. Overall, the significance of TbCIT or comparable taxes on current taxation is extensive.

In a TbCIT regime, the investor bears the entire burden of a tax loss. Specifically, while the government taxes gross revenue, a TbCIT system does not provide refunds for a loss. In such a scenario, risk-taking should become less attractive for investors. Moreover, irrespective of the TbCIT rate, the investor might not expect any benefits from a loss offset. On the other hand, TbCIT reduces the potential for uncertain future tax liabilities by employing a straightforward tax calculation method solely reliant on turnover. This feature allows firms to better predict an investment's ultimate after-tax return and optimize investment-specific risk-taking. Therefore, the effect of TbCIT on corporate risk-taking is ex-ante unclear and constitutes an empirical question.

To address our research question, we study the TbCIT system in Indonesia.[1] Indonesia is a unique setting because the TbCIT not only applies to SMEs but is levied more broadly on specific types of income earned by large companies. This institutional feature enables us to examine the risk-taking effects of TbCIT across a broad sample of firms active in different industries and size categories. Moreover, as the TbCIT contributes substantially to Indonesia's national tax revenue, this tax is an essential element of national tax policy.

We use two measures to examine the effect of TbCIT on corporate-risk taking. First, we compute a firm's TbCIT exposure as the ratio of turnover subject to TbCIT divided by total turnover. This measure captures the extent of a firm's revenue potentially subject to turnover-based taxation. Second, we compute TbCIT rate as TbCIT expense scaled by TbCIT turnover. We use this measure to capture a firm's effective turnover-based tax rate because the Indonesian TbCIT regime provides different tax rates for individual income categories. We collect business segment data from Refinitiv Eikon and identify TbCIT turnover and TbCIT expense based on the segment's industry classification and the firm's SME qualification. For each firm, we

[1] Indonesia is the 7th world largest economy (GDP) based on purchasing power parity as of 2022 (International Monetary Fund, 2022).

retrieve data for up to ten business segments. The resulting sample constitutes a panel of Indonesian corporate taxpayers for the years 2009 to 2021.

Our main test examines the association between corporate risk-taking and TbCIT exposure and TbCIT rate, respectively. The results suggest that TbCIT exposure is negatively associated with corporate risk-taking. In economic terms, a one standard deviation higher TbCIT exposure is associated with 9.3 percent less risk-taking. Additional tests using first differences (FD) support our inferences and address concerns about time-invariant firm characteristics driving our results. Our findings are also robust to an alternative measure of TbCIT exposure and four alternative measures of risk-taking. However, we find that corporate risk-taking is not associated with the TbCIT rate.

Next, we address further concerns that unobserved firm characteristics might be associated with TbCIT exposure and corporate risk-taking. Specifically, we use matched samples of domestic and foreign firms (Malaysian) and compare the risk-taking behavior of firms that have similar characteristics but are subject to different tax regimes (i.e., turnover-based taxation versus regular corporate income tax). The results of this analysis corroborate our main findings and suggest that firms subject to TbCIT take less risk than their matched counterfactuals subject to the regular corporate income tax.

Finally, we examine whether the relation between TbCIT and corporate risk-taking differs with firm characteristics: profitability and loss exposure. TbCIT causes a disproportionate effective tax burden to firms with different profitability and loss exposure; therefore, it may affect both return and risk-taking. First, we observe that the effect of TbCIT exposure is stronger for firms in industries with high-profit margins. Second, we find a stronger effect of TbCIT exposure for firms that expect to offset losses.

This study contributes to the literature in two ways. First, to the best of our knowledge, we are the first to study the effect of turnover-based taxation on corporate risk-taking. We document a negative association between turnover-based taxation and risk-taking. Our study

extends prior research on the effect of taxation on corporate risk-taking, which is limited to PbCIT. Prior studies (Domar & Musgrave, 1944; Feldstein, 1969; Stiglitz, 1975; Langenmayr & Lester, 2018; Ljungqvist et al., 2017; Osswald & Sureth-Sloane, 2020) find that the combination of tax rates and loss-offset rules have significant effects on corporate risk-taking.

Second, our study provides new insights into the effects of presumptive taxation on taxpayer behavior. Our finding shows that using a presumptive tax on gross receipts leads to lower risk-taking behavior. Empirical studies on the real effects of presumptive taxation on taxpayer behavior are limited (Bucci, 2020) and focus on aggregate tax revenue and administrative compliance (e.g., Bruhn & Loeprick, 2016; Danquah & Osei-Assibey, 2018; Dube, 2018). Moreover, according to Bucci (2020), the settings of the prior empirical studies are characterized by short sample periods, with the latest researched period being 2014. By contrast, we are able to exploit recent data with an extensive sample period.

Finally, our study informs policymakers by showing that a TbCIT can have unintended consequences in the form of lower corporate risk-taking. This result is relevant because policy discussions on turnover-based taxation focus primarily on reducing compliance and administration cost for SMEs without considering potential implications for long-term growth. Since in emerging economies, SMEs contribute up to 45% of total employment and 33% of GDP (OECD, 2017),[2] having a clear understanding of the economic implications of turnover-based taxation is important.

II. INSTITUITONAL SETTING

II.1 Turnover-Based Corporate Income Tax

TbCIT is a simplified form of presumptive tax levied on gross revenue or turnover. TbCIT reduces the cost of tax compliance and administration because turnover as a tax base is easier to measure, report, and verify than that profit taxed under a standard corporate income tax rate

[2] In all OECD countries, the SMEs account for 99% of the firms, 70% of jobs, and 50% to 60% value added on average (OECD, 2017)

(Slemrod & Yitzhaki, 1994). Many countries regard TbCIT as an instrument to reduce tax evasion and prior evidence suggests that TbCIT can reduce tax evasion by up to 60 to 70 percent (Best et al., 2015). However, due to being levied on turnover, TbCIT results in higher effective tax rates for firms with low gross profit margins. Therefore, TbCIT discourages capital allocation to businesses with below average profit margins (OECD, 2015). To mitigate this issue, some jurisdictions impose different TbCIT rates across firms and industries, varying with firm size (assets, turnover, or employees), business type, and region. TbCIT is also criticized for a lack of loss offset relief, its inherent disincentive for bookkeeping, and the risk of abuse, for example, via fake invoices (World Bank Group, 2007).

Countries regularly use TbCIT for hard-to-tax income (Thuronyi, 2004) and the taxation of SMEs. The latter approach can be found in both developing[3] and developed countries[4]. In several countries, TbCIT may also apply to specific businesses[5], such as the digital tax, which is a direct tax on the digital economy (KPMG, 2022). Our finding on the TbCIT as analyzed in this study can be generalized to any direct tax based on gross revenue/income[6].

II.2 TbCIT in Indonesia

Indonesia introduced a TbCIT on certain types of income in 1984.[7] TbCIT contributes significantly to Indonesian income tax revenue, ranging from 16% to 21% in the period from 2015 to 2021. TbCIT is termed a final tax because the tax amount is determined by multiplying turnover with the tax rate without any adjustments or tax credits. TbCIT applies to certain types of income, including dividends, interest, property rent, gain on the sale of property, and construction works. In 2013, Indonesia changed SME taxation from profit-based to mandatory

[3] For example: Indonesia, Brazil, China, India, etc. (Wei & Wen, 2019, p. 4).
[4] For example: Austria, France, Italy, etc. (OECD, 2015, pp. 97–98).
[5] For example: agriculture and forestry in Austria, shipping in Denmark, transportation in India, etc. (OECD, 2015, pp. 97–98).
[6] For example: turnover tax (South Africa), final income tax (Indonesia), tonnage tax (shipping industry in Denmark)
[7] article 4 paragraph (2) of law number 6, year 1983 of Republic of Indonesia concerning Income Tax as latest amended by law number 7, year 2021, concerning Tax Law Harmonization.

turnover-based taxation for taxpayers with annual revenues below IDR 4.8 billion (equal to around EUR 297,397 or USD 336,771).[8] The government reduced the tax rate from one percent in 2013 to 0.5 percent in 2018. Table 1 presents the TbCIT rate for different income/revenue types (per fiscal year 2021).

[Table 1 around here]

A firm may be subject to TbCIT in two ways: i) it receives specific types of revenues or ii) it qualifies as an SME. TbCIT applies to specific types of revenues regardless of the size of the taxpayer (see Table 1, list number 1 to 15). Thus, while non-SMEs pay TbCIT on the revenue items listed in Tables 1, these firms pay PbCIT for any other income. Importantly to avoid double taxation, turnover subject to TbCIT is exempt from PbCIT. SMEs pay TbCIT on any turnover other than the aforementioned industry-based TbCIT turnover.

III. HYPOTHESES DEVELOPMENT

Taxes affect both the return of an investment and its risk (Domar & Musgrave, 1944). While it is clear that an income tax reduces the return of an investment, it is less obvious how it affects risk-taking. If loss offset provisions are in place, an investor is able to share risk with the government (Domar & Musgrave, 1944; Langenmayr & Lester, 2018; Ljungqvist et al., 2017; Osswald & Sureth-Sloane, 2020). Specifically, through a loss offset, the government compensates the investor for a loss by reducing its future tax payment (loss carryforward) or refunding its past tax payment (loss carryback). The magnitude of the refund depends on the loss offset allowance and the tax rate at the time of the offset. The higher the loss offset allowance and/or the tax rate, the higher the benefit from a loss offset. Consequently, an unlimited, comprehensive loss offset (e.g., the tax authority provides an immediate cash refund in case of a loss) does not distort investors' risk-taking behavior (Domar & Musgrave, 1944).

[8] Government Regulation number 46, year 2013, concerning Income Tax on Income from Business Received by Taxpayer Having Certain Turnover.

While prior studies assume a profit-based tax, the TbCIT taxes gross turnover instead of profit. In a TbCIT regime, a firm pays tax on every unit of turnover, irrespective of its profitability. In other words, the firm pays tax both in good and bad states. Given that turnover is the tax base, there is no opportunity to benefit from a loss offset. Based on the abovementioned theories, the lack of a loss offset implies that firms and their investors are unable to share risk with the government and thus bear the entire risk themselves. Since the government does not absorb part of the loss, the compensation per unit of risk is lower under a TbCIT than a PbCIT, making risk-taking less attractive.

However, under the TbCIT regime, the amount of tax a taxpayer has to pay is a percentage of its turnover. Thus, since TbCIT is relatively straightforward to measure and verify, the risk of an uncertain tax liability is low, and the firm might be able to better predict the after-tax return of an investment. Hence, TbCIT may increase risk-taking.

Taken together, the above arguments form the basis for our first hypothesis, stated in the null form:

H1: Corporate risk-taking is not associated with a firm's exposure to the Turnover-based Corporate Income Tax.

Aside from a firm's *exposure* to TbCIT, the effective TbCIT *rate* might also matter for corporate risk-taking. Under a full loss-offset, standard PbCIT regime, a higher tax rate will increase the advantage of loss-offset in a profitable year. Langenmayr & Lester (2018) show that the tax rate positively affects risk-taking for firms that expect to comprehensively use losses but has no effect on firms that have no loss offset possibility. Ljungqvist et al. (2017) provide evidence that an increase in the tax rate reduces risk-taking and loss offset provision moderate the tax rate effect. Osswald and Sureth-Sloane (2020) confirm the positive risk-taking effect of loss offset provisions under a profit tax regime. However, they also identify settings in which high tax rates reduce risk-taking, consistent with tax rates showing a non-monotonic relation with risk-taking.

Since under a TbCIT regime, a firm may not deduct any losses for tax purposes, the TbCIT rate should not affect risk-taking behavior. This reasoning forms the basis for the second hypothesis:

H2: Corporate risk-taking is not associated with a firm's Turnover-based Corporate Income Tax rate.

IV. RESEARCH DESIGN, SAMPLE SELECTION, AND DESCRIPTIVE STATISTICS

IV.1 Research Design

We employ an OLS regression using panel data to test for the association between TbCIT and corporate risk-taking. Specially, we estimate the following specification:

$$RISK_{i,t} = \beta_0 + \beta_1 TBMAG_{i,t} + \beta_2 TBRATE_{i,t} + \beta_3 TBMAG \times TBRATE_{i,t} + \beta_4 Controls_{i,t} + \beta_4 FE + \varepsilon_{i,t} \quad (1)$$

The dependent variable, $RISK_{i,j,t}$, measures firm *i*'s risk-taking in year *t*. *RISK* is measured as the volatility of a firm's adjusted return on assets (ROA) over three years. The resulting measure captures the deviation of the firm's ROA from the average ROA in industry *j* in year *t*, and the volatility of this deviation over three years. Consistent with prior research (Acharya et al., 2011; John et al., 2008; Langenmayr & Lester, 2018; Osswald & Sureth-Sloane, 2020), we measure *Risk* over the years *t* to *t+2*. Greater deviations/higher volatility represent greater risk-taking.

Our independent variables of interest are *TBMAG* and *TBRATE*. We calculate *TBMAG* as the total segment-level turnover subject to TbCIT divided by a firm's total turnover. Hence, this measure captures a firm's *exposure* to TbCIT and we use it to test H1. To construct this measure, we first extract segment-level turnover and industry (four-digit SIC) data from Refinitiv Eikon. This database provides time-series data for up to ten business segments per firm. Since segment industry classification is dynamic over time and can differ from the (static) industry classification of the firm, it more closely reflects a firm's actual business activities in a

particular year. Next, we determine segment turnover subject to TbCIT based on the segment's SIC code (see Table 1). We then sum the turnover subject to TbCIT per firm-year and scale it by the firm's annual total turnover. Note that *TBMAG* of an SME is always equal to one because its total turnover is subject to the TbCIT. Prior to estimating regressions, we standardize *TBMAG* to have a mean of zero and a standard deviation of one.

TBRATE is the proportion of TbCIT expense over TbCIT turnover, reflecting a firm's effective TbCIT *rate*. We use this measure to test H2. To construct *TBRATE*, we first multiply a segment's TbCIT turnover by the relevant TbCIT rate (see Table 1). According to Indonesian tax law, *TBRATE* for SME applies only to residual turnover not subject to industry-specific TbCIT. Next, we sum segment-level TbCIT expense and scale it by TbCIT turnover. We again standardize *TBRATE* to have a mean of zero and a standard deviation of one. In addition to estimating the main effects of *TBMAG* and *TBRATE*, we interact the two variables and assess whether the effect of TbCIT exposure on corporate risk-taking varies with the TbCIT rate.

We control for several firm characteristics prior research has found to be associated with risk-taking. Specifically, we include firm *SIZE* (natural logarithm of assets), *ROA* (ratio of EBIT to assets), *LEVERAGE* (ratio of liabilities to assets), *SALESGROWTH* (the change in the natural logarithm of turnover), and *DUMMYLCF*, which is equal to one if the firm reports negative EBIT in the preceding year, and zero otherwise. We also include year-fixed effects to control for variation in macroeconomic conditions over time. Appendix A provides a summary of all regression variables.

IV.2 Sample Selection and Descriptive Statistics

For our empirical analysis, we use panel data for Indonesian firms for fiscal years 2009 to 2021. As noted, we obtain the financial-statement data from Refinitiv Eikon. The initial sample includes 899 unique firms, representing 11,015 firm-years. First, we drop 113 firms

(1,469 firm-years) active in the financial sectors[9] because they are subject to a highly regulated industry that impacts their risk-taking, and public administrations sectors. Next, we remove 450 firms (2,562 firm-years) with incomplete turnover data, 30 firms (33 firm-years) with incomplete EBIT data, and six firms (9 firm-years) with incomplete asset data. Since *RISK* requires two-year forward ROA data, we drop observations for the years 2020 and 2021. This procedure results in a final sample of 716 firms (5,466 firm-years). Table 2 Panel A describes the sample selection.

The final sample comprises 606 firms (4,359 firm-years) taxed under the standard PbCIT, 177 firms (667 firm-years) partially subject to TbCIT, and 116 firms (440 firm-years) only subject to TbCIT. Since a firm at the same time may be taxed with TbCIT *and* PbCIT, the number of firms under both tax regimes does not add up to the total number of sample firms. Moreover, note that a firm switchs tax regimes (i.e., become either subject to TbCIT or no longer subject to TbCIT) due to changing its business activities (e.g., the firm moves in or out of sectors subject to TbCIT) or losing/gaining SME qualification. Table 2 Panel B reports the sample composition by tax regime and firm industry.

[Table 2 around here]

Table 3 reports the descriptive statistics for our regression variables. We winsorize all variables (except *RISK* and *DUMMYLCF*) at the 1 and 99 percent levels. *RISK* is not winsorized given that the input, ROA, has been winsorized. Panel A presents the descriptive statistics for the full sample. The mean (median) of *RISK* is 0.0534 (0.0287). The mean (median) of *TBMAG* is 0.1542 (0.0000), which means that most sample firms are subject to PbCIT and, on average, only 15,42 % of turnover is subject to TbCIT. The value of *TBRATE* ranges from 0.5% to 10%, with a mean (median) value of 4.88% (3.03%).

[9] The sectors are depository institutions; non-depository credit institutions; security and commodity brokers, dealers, exchanges, and services; insurance carriers; insurance agents, brokers, and service; holding and other investment offices (SIC codes 6000-6499 and 6700-6799).

Panel B reports the summary statistics of the variables of interest by the firm industry. We observe mining (construction) industry is the highest (lowest) in risk-taking. Further, construction (agriculture) industry is the highest (lowest) in the TbCIT exposure. Retail trade (agriculture) is the highest (lowest) in the effective TbCIT rate. Note that the industry classification in Panel B is the static (registered) industry, whereas the TbCIT exposure and rate are measured based on the reported actual segment SICs.[10]

[Table 3 around here]

Table 4 reports Pearson correlation coefficients for the variables used in the main test. *RISK* is negatively correlated with *TBMAG* ($p<0.010$), providing univariate evidence of a negative association between risk-taking and TbCIT exposure. There is no significant correlation between *RISK* and *TBRATE*. *RISK* is also negatively correlated with *SIZE*, *ROA*, and *SALESGROWTH*, but is positively correlated with *LEVERAGE*. *TBMAG* has a negative correlation with *TBRATE*.

[Table 4 around here]

IV.3 Univariate Analysis

Before we turn to our multivariate tests, we first conduct a univariate analysis and examine whether there is a significant difference in *RISK* between groups of PbCIT and TbCIT firms and between groups of firms with low and high *TBRATE*, respectively. Table 5, Panel A reports results of t-tests for differences in *RISK* between full PbCIT firms (4,359 firm-years) and partial or full TbCIT firms (1107 firm-years). The result shows that *RISK* is significantly higher for PbCIT firms ($p = 0.0000$), consistent with TbCIT reducing corporate risk-taking. Panel B reports results for differences between groups with Low (554 firm-years) and High *TBRATE* (553 firm-years). The results indicate that there is no significant difference in *RISK*

[10] The static industry is Refinitiv Eikon static data code WC07021. The segment's SICs are time-series data code WC17506, WC17516,…, WC17596.

(p = 0.0536), which suggests that the TbCIT rate is not associated with differences in risk-taking.

We also observe no significant difference in *ROA* between groups of PbCIT and TbCIT and between groups of Low and High *TBRATE*. The results show that the groups are not different in average *ROA*, but TbCIT firms have a lower *RISK* or lower industry deviation and volatility of *ROA*. Therefore, over time, the TbCIT firms are lower in risk-taking but are not significantly different in return compared to the PbCIT firms.

[Table 5 around here]

V. EMPIRICAL RESULTS

V.1 Association between Corporate Risk-Taking and Turnover-Based Corporate Income Tax

Table 6 presents the main test of H1 and H2 using equation 1.[11] In Panel A, we report the association between *RISK* and *TBMAG*. First, we regress separately *RISK* on *TBMAG* (Column 1) without control variables. The results indicate that *TBMAG* has a significant negative coefficient. Next, we add control variables (Columns 2 & 3). Using the full sample (Column 2) and the TbCIT subsample (Column 3), *TBMAG* shows a significant negative coefficient of -0.005 and -0.007, respectively.

In Panel B, we report the association between *RISK* and *TBRATE* and the interactive variables of *TBMAG* and *TBRATE*. We regress separately *RISK* on *TBRATE* with and without control variables in (Columns 1 & 2), respectively. In both specifications, the coefficients of *TBRATE* remain insignificant. Further, we interact *TBMAG* with *TBRATE* (Column 3). The *TBMAG* coefficient remains significantly negative (-0.007), whereas *TBRATE* and the interactive variables are insignificant (coefficients of -0.004 and 0.002, respectively).

These results indicate that TbCIT exposure is negatively associated with corporate risk-taking, consistent with missing the loss offset under turnover-based taxation depressing risk-

[11] Every regression using TBRATE as a regressor uses only the TbCIT (partial or full TbCIT) subsample, because TBRATE requires the existence of TbCIT turnover

taking incentives. In economic terms, one standard deviation higher exposure to TbCIT (34.3 percent of the ratio of TbCIT turnover to total revenue[12]) is associated with 0.005 points lower corporate risk-taking. When evaluated at the mean of *RISK*, this effect translates into 9.3 percent less risk-taking on average.[13] By contrast, the TbCIT rate does not have a significant association with corporate risk-taking.

We further examine whether the condition of having a business segment that subjects to TbCIT affects risk-taking. Thus, in Panel C, we use a binary measure to capture TbCIT exposure. Specifically, we use, a dummy variable (*DUMMY_TBCIT*) equal to one if the firm has revenue that is subject to TbCIT, and zero otherwise. Thus, the partial and full TbCIT firms are deemed as one and PbCIT firms as zero. Columns (1) and (2) report the results of regressing *RISK* on *DUMMY_TBCIT* without and with control variables, respectively[14]. Consistent with our initial results, the coefficient of *DUMMY_TBCIT* is negative -0.010 and significant.

[Table 6 around here]

V.2 First-Difference Specification

To mitigate concerns about an omitted variable bias, and especially about time-invariant confounding factors, we modify Equation 1. Specifically, we calculate annual changes of our regression variables and estimate the following first-difference regression:

$$\Delta RISK_{i,t} = \beta_0 + \Delta\beta_1 TBMAG_{i,t} + \Delta\beta_2 TBRATE_{i,t} + \Delta\beta_3 TBMAG \times \Delta TBRATE_{i,t} + \beta_4 \Delta Controls_{i,t} + \beta_4 FE + \varepsilon_{i,t} \quad (2)$$

We report the results in Table 7. We note that *ΔTBMAG* is negatively associated with *ΔRISK* in all columns. Yet, the coefficient is insignificant in some specifications. Consistent with our main findings, these results suggest that increases (decreases) in TbCIT exposure are

[12] TBMAG is a standardized value of the ratio of TbCIT turnover to total turnover, of which standard deviation is 34.3 percent.
[13] The mean of RISK is 0.0537, thus the economic magnitudes are –0.005/ 0.0537 = –0.093.
[14] We do not include TBRATE as an independent variable because the results are similar to Columns (2) in Panel B.

associated with less (more) corporate-risk taking. Moreover, omitted time-invariant firm characteristics are unlikely to drive our results. Note that we again find no significant association between *ΔTBRATE* and *ΔRISK*.

[Table 7 around here]

V.3 Matched Sample

To further alleviate concerns about confounding factors driving our results, we employ propensity score matching (PSM) and estimate the effect of the TbCIT by comparing corporate risk-taking of matched groups of TbCIT and PbCIT firms. We use nearest-neighbor matching and match observations on *SIZE*, *ROA*, *LEVERAGE*, *SALESGROWTH*, *DUMMYLCF*, *INDUSTRY*, and *YEAR*. The treatment group covers Indonesian full-TbCIT firms; the control group concerns Malaysian PbCIT firms. We choose Malaysian firms as our control group because Malaysia is similar to Indonesia geographically, demographically, and culturally[15]. Moreover, both are developing countries and members of the ASEAN-5 economic cluster.

Table 8 reports our results for the matched samples.[16] Before we turn to matched samples of Indonesian and Malaysian firms, we first present in Column (1) the average *RISK* difference between domestic matched full TbCIT and PbCIT firms. Using propensity score and nearest neighbor matching with different criteria, we find that full TbCIT firms takes significantly less risk than matched domestic PbCIT firms. Column (2) presents the TbCIT effects using foreign firms as a control group. We find that the full-TbCIT Indonesian firms take less risks compared to the matched PbCIT Malaysian firms, with the difference in RISK being –0.006 to –0.012 (11.1 to 22.3 percent of the average). All results are again consistent with our baseline findings, providing evidence that TbCIT firms lower risk-taking in comparison to PbCIT firms.

[Table 8 around here]

[15] According to Country Similarity Index (2022), https://objectivelists.com

[16] The untabulated descriptive statistics of Malaysian firms sample is as follows. Frequency: 8733, Mean: 0.0447 median:0.0270, and standard deviation: 0.0518.

V.4 Heterogeneous Effects

We next examine whether the TbCIT effect varies across firms. We split the sample based on first, the profit margin of a firm's major industry (two-digit SIC) and second, based on loss-offset availability. The high-profit margin group includes firms in major industries with a profit margin above the median and vice versa for the low-profit margin group. The loss-offset group includes firms experiencing negative EBIT in the preceding year.

The effect of TbCIT on corporate risk-taking of high- versus low-profitability firms is ex-ante unclear. On the one hand, low-profit firms are more sensitive to the change in the TbCIT exposure as a slight decrease in their profit margin will disproportionally drive up their effective tax burden. On the other hand, according to the risk-return trade-off principle, a higher return is associated with higher risk. Since high-profit firms expect more risk sharing with the government under the PbCIT in order to compensate for their high risk-taking behavior, TbCIT might more strongly affect the risk-taking of high-profit firms than that of low-profit firms.

Next, the effects of TbCIT should be stronger for firms that expect to take advantage of the prior year's loss offset. Since the TbCIT regime does not allow a loss offset, the loss-making firms will incur greater losses from the uncompensated losses and thus be more sensitive to the change of the TbCIT exposure. The greater the TbCIT exposure, the greater portion of the uncompensated loss.

Table 9 presents the results. In columns (1) to (4), we regress *RISK* on *TBMAG*, *TBRATE*, and control variables conditional on profitability. Columns (1) and (2) show that the coefficients on *TBMAG* are equal but significant only in the high-profit margin group. The finding suggests that risk-taking of firms in high-profit margin industries is more sensitive to TbCIT. Consistent with our main results, *TBRATE* is insignificant in columns (3) and (4). Columns (5) to (8) report the results for loss offset and no-loss offset firms, respectively. As predicted, the negative effect of *TBMAG* on risk-taking are more pronounced for loss-offset firms. Firms that experience

losses in the prior year are 2.5 times[17] more sensitive to TbCIT exposure. Again, *TBRATE* remains insignificant in both clusters.

[Table 9 around here]

VI. ROBUSTNESS TESTS

VI.1 Alternative Measure of the TbCIT Exposure

To assess the robustness of our main results, we first construct an alternative measure of TbCIT exposure based on the proportion of assets used for generating TbCIT turnover. Similar to the initial version of *TBMAG*, we sum the assets of segments subject to TbCIT, scale the aggregate by total firm assets, and standardize the values. Since a firm's asset base is more stable over time than segment-level turnover, this resulting measure is less volatile than the initial *TBMAG* variable.

We repeat the analysis of the association between *RISK* and TbCIT exposure using the asset-based measure of *TBMAG*. We present the results in Table 10, Panel A. Using the full sample (column 1), we find a negative and significant coefficient on *TBMAG*. The coefficient of *TBRATE* remains insignificant. These results imply that one standard deviation (36.1 percent of the ratio of TbCIT assets to total assets[18]) higher exposure to TbCIT is associated with 0.004 points (6.9 percent[19]) lower corporate risk-taking. Taken together, the results in Panel A are consistent with our main findings.

[Table 10 around here]

VI.2 Alternative Measures of Corporate Risk-taking

We perform several analyses using different measures of corporate risk-taking, including a) the unadjusted ROA, b) the standard deviation of adjusted ROA over four years, c) the

[17] The value comes from the coefficients of *TBMAG* of the loss offset divided by the no loss offset (0.010 / 0.004 = 2.5)

[18] The untabulated descriptive statistics of *TBMAG_ASSETS* before standardization is as follows. Mean:0.1689 median:0 standard deviation:0.3611

[19] The mean of change in *RISK* is 0.0537, thus the economic magnitudes is –0.004/ 0.0537 = –0.069

standard deviation of adjusted ROA over five years, and d) the volatility of the operating cash flow (OCF) over three years.[20] Using different measurements of *RISK*, we observe consistent significant and negative coefficients of *TBMAG* with magnitudes that are relatively comparable with the main test results.

Table 10, Panel B reports the results of robustness test using these different measures. Columns (1) to (3) use the unadjusted ROA to measure *RISK*. In this measurement, we calculate *RISK* as the standard deviation of ROA over three years without adjusting ROA by the industry-year average. Using firms' unadjusted ROA mitigates the industry-related bias in the measurement. The coefficients on TBMAG remain negative and significant –0.005 and – 0.008 for the full and TbCIT sample, respectively.

Columns (4) to (6) report results using the standard deviation of the adjusted ROA over four years instead of three years as in the main test. Using an extended period to calculate *RISK* reduces the influence of single firm-years on our risk measure. The results show that, consistent with the main test, the coefficients on *TBMAG* are negative and significant 0.005 and –0.006 for the full sample and TbCIT sample, respectively.

We replicate the above test using the standard deviation of the adjusted ROA over five years and present the results in columns (7) to (9). This measurement resembles the approach in (John et al., 2008).[21] The results indicate that the negative coefficient on *TBMAG* is highly significant for the full sample (coefficient of –0.006) but insignificant for the TbCIT sample (coefficient of –0.003).

Finally, we measure corporate risk-taking using the standard deviation of the ratio of industry-adjusted operating cash flow to total assets over three years. We present the results in columns (10) to (12). This measurement of risk-taking is based on cash flows instead of the

[20] We do not report the analysis using log of R&D expenses as risk–taking measure because the low number of available data (368 firm–years).
[21] Tabel II John et al. (2008) reports Indonesia's *RISK* average is 0.06 for the period 1992 to 2002. Our measurement: 0.0614.

accrual-based measurement using ROA. The results show that the *TBMAG* coefficient is significant and negative for the full sample (coefficient of –0.002) but is insignificant for the TbCIT sample (coefficient of –0.003)[22].

Taken together, the results of our robustness tests are consistent with our main findings and continue to suggest that corporate risk-taking is negatively associated with TbCIT exposure. All tests also provide evidence that the TbCIT rate is not associated with risk-taking.

VII. CONCLUSION

We study the effect of a Turnover-based Corporate Income Tax on corporate risk-taking. Under a TbCIT regime, firms are taxed on their gross income instead of profit. On the one hand, due to the lack of a tax loss offset under turnover-based taxation, we expect risk-taking to become less attractive. On the other hand, TbCIT reduces the risk of uncertain future tax liabilities, allowing firms to more reliably predict their investments' after-tax return and thus potentially facilitating more investment-specific risk-taking.

We empirically examine the effects of a firm's TbCIT exposure and TbCIT rate on corporate risk-taking using panel data of Indonesian firms covering 2009 to 2021. Indonesia applies TbCIT to specific types of income of firms of all sizes as well as to SMEs irrespective of their income. We capture TbCIT exposure and TbCIT rate for firms depending on their industry segment (SIC) and SME qualification. Our results provide empirical evidence that risk-taking is negatively associated with TbCIT exposure. This result implies that the larger the portion of turnover subject to the TBCIT, the lower firms' risk-taking. Furthermore, and in contrast to profit-based tax regimes, we find no find evidence that TbCIT rate is associated with risk-taking. Our results also show that the adverse effects of TbCIT exposure on risk-taking are stronger for the firms in high-profit margin industries and firms expecting a loss offset.

[22] We adjust CFO/TA winsorizing to 2% and 99% to account for outliers in the bottom side. A 5% and 99% winsorization results in TBMAG coefficient –0.003, significant at 5% level.

We are the first to provide evidence on TbCIT discouraging corporate risk-taking and shed light on heterogeneity in the effect across different types of firms. Our findings add to prior research on the effects of limited risk sharing between taxpayers and the government by highlighting that turnover-based taxation can depress risk-taking incentives. Moreover, when considering turnover-based taxation, policymakers should consider our finding and weigh the potential benefits of such a tax (e.g., tax simplification) against its unintended consequences for risk-taking and economic growth.

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Appendix A
Variable Definitions

Variable	Definition	Source
RISK	the standard deviation over three years of a firm's ROA's deviation from the industry-average ROA e, defined as: $Risk_{it} = \sqrt{\frac{1}{2}\sum_{t=1}^{3}\left(D_{it} - \frac{1}{3}\sum_{t=1}^{3} D_{it}\right)^2}$, where: $D_{ijt} = ROA_{ijt} - \frac{1}{N_{jt}}\sum_{k=1}^{N_{jt}} ROA_{jkt}$ *Nt* indexes firm *i* from industry *j* in year *t*. This is the standard deviation over three years of a firm's ROA's deviation from the year average ROA.	Refinitiv Eikon
ROA	Ratio of *EBIT* (Refinitiv Eikon data code, RE: WC18191) over assets (RE: WC02999), where *EBIT* is earnings before interest and taxes. We use database-computed ROA (RE: WC08326) if *EBIT* or assets data are missing. The values are winsorized at 1% and 99%.	
TBMAG	The standardized value of the ratio of turnover that is subject to TbCIT over total turnover, which is defined as: $TBMAG = \frac{TBREVENUE}{REVENUE} = \frac{\sum_{s=1}^{10} SEGTBREVENUE_s}{REVENUE}$ *SEGTBREVENUE* is segment revenues (RE: WC19501, WC19511, WC19521, etc.) that are subject to TBCIT. *SEGTBREVENUE* equals to segment revenues if the segment industry (SIC RE: WC19506, WC19516, WC19526, etc.) is subject to TBCIT (see Table 1 Panel B) or if firm-year is subject to SME TBCIT and equals to 0 otherwise. Refinitiv Eikon provides up to 10 segment revenues. Segment 1 revenues are deemed as total revenue if segment revenues are missing. Segment SIC is deemed as static SIC (RE: WC07021) if segment SIC is missing. The values are winsorized at 1% and 99%.	Refinitiv Eikon
TBRATE	The standardized value of the ratio of Turnover-based Corporate Income Tax over total turnover that is subject to TbCIT, which is defined as: $TBRATE = \frac{TBTAX}{TBREV} = \frac{\sum_{s=1}^{10} SEGTBTAX_s}{TBREVENUE}$ $SEGTBTAX = SEGTBREVENUE \times TBRATE$ SEGTBTAX is segment TbCIT which is computed by multiplying SEGTBREVENUE with the applicable rate based on the segment types of income (SIC or the SME TbCIT rate). The values are winsorized at 1% and 99%.	Refinitiv Eikon
SIZE	Natural logarithm of total assets (RE: WC02999). The values are winsorized at 1% and 99%.	Refinitiv Eikon
SALESGROWTH	Natural logarithm of total revenue (RE: WC01001) minus prior year's total revenue. The values are winsorized at 1% and 99%.	Refinitiv Eikon
LEVERAGE	Ratio of total liabilities (RE: WC03351) to total assets. The values are winsorized at 1% and 99%.	Refinitiv Eikon
DUMMYLCF	Equals to one if the prior year period EBIT is negative, 0 otherwise.	Refinitiv Eikon

Table 1

Institutional Design: Turnover-based CIT in Indonesia

Panel A: Turnover-based CIT types of income and rate

No	Types of Income	Tax Rate (FY 2021)	Tax Regulation*
1	Dividends paid to Individuals	10.0%	UU–36/2009
2	Lottery prizes	25.0%	KMK–639/KMK.04/1994
3	Sale of shares in Stock Exchange	0.1%	PP–14/1997
4	Sale of Founder shares at IPO price	0.5%	PP–14/1997
5	Interest on bank deposit	20.0%	PMK–212/PMK.03/2018
6	Gain on approved asset revaluation	10.0%	PMK–79/PMK.03/2008
7	Interest or discount on Indonesian Central Bank certificates, savings and deposits	20.0%	PMK–212/PMK.03/2018
8	Interest or discount on bonds, including zero coupon bonds	15.0%	PP–16/2009
9	Interest or discount on bonds, received by a registered mutual fund	15.0%[1]	PP–16/2009
10	Construction Service: Planning & Supervisory Services	4%, or 6%[2]	PP–51/2008
11	Construction Service: Construction Work	2%, 3%, or 4%[3]	PP–51/2008
12	Sale of land and/or buildings	2.5%[4]	PP–34/2016
13	Rental of land and/or buildings	10.0%	PP–34/2017
14	Shipping services	1.2%	KMK–416/KMK.04/1996
15	International contract manufacturing of children toys	2.1%	KMK–543/KMK.03/2002
16	SME business income whose revenues does not exceed IDR 4.8 billion in the preceding year	0.5%[5]	PP–46/2013; PP–23/2018

Panel B: Turnover-based CIT types of income, rate and affected industry (SIC) used in the analysis

No	Types of Income	Tax Rate (FY 2021)	SIC
1	Construction Service: Planning & Supervisory Services	4.0%	8712
2	Construction Service: Construction Work	3.0%	1521–1799
3	Sale of land and/or buildings	2.5%[4]	6531–6553
4	Rental of land and/or buildings	10.0%	6512–6519
5	Shipping Services	1.2%	4421–4426, 4481–4489
6	International contract manufacturing of children toys	2.1%	3942–3949
7	SME business income whose revenues does not exceed IDR 4.8 billion in the preceding year	0.5%	All SICs

Panel A presents the Turnover-based Corproate Income Tax (TbCIT) types of income and the applicable rate as of fiscal year 2021. Panel B presents the TbCIT rates and the affected industries (SIC).

[1] 5% for 2011–2013, 15% from 2014.

[2] 4% for certified contractors; 6% for non-certified contractors.

[3] 2% for small-scale certified contractors, 3% for medium and large certified contractors, 4% for non-certified contractors.

[4] 5% before 2016, 2.5% from 2017.

[5] 1% for January 2013–June 2018; and 0.5% for July 2018.

* UU: Undang-undang (Law); PP: Peraturan Pemerintah (Government Regulation); Perpu: Peraturan Pemerintah Pengganti Undang–undang (Government Regulation Substituting for Laws); PMK: Peraturan Menteri Keuangan (Minister of Finance Regulation); KMK: Keputusan Menteri Keuangan (Minister of Finance Decree)

Table 2
Sample Selection and Composition

Panel A: Sample selection

Criteria	Firms	Firm-years
Data available for the period of 2009 to 2021	899	11,015
Less: finance and insurance industry	(113)	(1,469)
incomplete revenues data	(450)	(2,562)
incomplete EBIT data	(30)	(33)
incomplete assets data	(6)	(9)
incomplete consecutive three-year ROA data, including years 2020–2021	(730)	(1,476)
final sample	716	5,466

Panel B: Sample composition

Composition by CIT Regime	Firms	Firm-years
PbCIT (exposure to TbCIT equals 0%)	606	4,359
Partial TbCIT (exposure to TbCIT is between 0% to 100%)	177	667
TbCIT (exposure to TbCIT equals 100%)	116	440
total	716	5,466

	CITRegime			
Composition by CIT Regime & industry	PbCIT	Partial TbCIT	TbCIT	Total
agriculture, forestry, and fishing	141	2	–	143
construction	14	290	293	597
finance, insurance, and real estate (*real estate only*)	20	112	133	265
manufacturing	1,876	53	2	1,931
mining	557	36	1	594
retail trade	255	20	–	275
services	439	89	4	532
transportation, communications, electric, gas, and sanitary services	717	34	7	758
wholesale trade	340	31	–	371
total	4,359	667	440	5,466

The table describes the sample selection and composition. The final sample in Panel A represents all data with complete data of the main variables of interest, including RISK, TBMAG and TBRATE. RISK measurement requires a complete t to t2 ROA data; thus, firm-years 2020–2021 are not available for the analysis.
Panel B presents observations composition by CIT regime and industry.

Table 3
Descriptive Statistics

Panel A: Summary statistics of key variables

Variables	N	Mean	Median	SD	p5	p95
RISK	5466	0.0537	0.0298	0.0701	0.006	0.2009
TBMAG_Unstandardized	5466	0.1542	0	0.3433	0	1
TBMAG	5466	0	–0.4491	1	–0.4491	20.4635
TBRATE_Unstandardized	1107	0.0488	0.0303	0.0292	0.012	0.1
TBRATE	1107	0	–0.6361	1	–1.2611	1.7505
SIZE	5466	14.1808	14.2437	1.8424	10.9775	17.1253
ROA	5466	0.0703	0.0684	0.132	–0.104	0.2658
LEVERAGE	5466	0.5537	0.5015	0.4389	0.1094	1.0142
SALESGROWTH	4720	0.2413	0.096	0.856	–0.3735	1.0567
DUMMYLCF	5466	0.1334	0	0.34	0	1

Panel B: Summary of the main variables statistics by industry

Industry	N	RISK		TBMAG		TBRATE	
		Mean	Std. Error	Mean	Std. Error	Mean	Std. Error
Agriculture, Forestry, And Fishing	143	0.0537	0.0049	–0.4477	0.0010	–0.8162	0.0000
Construction	597	0.0352	0.0019	2.2091	0.0228	–0.3858	0.0221
Finance, Insurance, And Real Estate (Real Estate only)	265	0.0396	0.0029	2.0173	0.0534	0.4891	0.0650
Manufacturing	1931	0.0460	0.0014	–0.4297	0.0039	–0.4846	0.1123
Mining	594	0.0834	0.0036	–0.3959	0.0118	–0.6174	0.1661
Retail Trade	275	0.0542	0.0042	–0.4431	0.0014	1.4802	0.1861
Services	532	0.0622	0.0034	–0.2928	0.0194	0.6401	0.1348
Transportation, Communications, Electric, Gas, And Sanitary Services	758	0.0691	0.0031	–0.3781	0.0141	0.6541	0.2295
Wholesale Trade	371	0.0414	0.0028	–0.4321	0.0069	1.2979	0.1900
total	5466	0.0537	0.0009	0.0000	0.0135	0.0000	0.0301

The table presents the descriptive statistics. Panel A shows the descriptive statistics of the main variables. Variable TBMAG_Unstandardized, TBRATE_Unstandardized, SIZE, ROA, LEVERAGE, SALESGROWTH are winsorized at 1% and 99%. RISK is not winsorized given that the input, ROA, has been winsorized. TBMAG and TBRATE is the standardized value of TbCIT exposure (TBMAG_Unstandardized) and rate (TBRATE_Unstandardized).
Panel B summarizes statistics of the main variables of interest, i.e., RISK, TBMAG and TBRATE by industry.

Table 4
Pairwise Correlations

Pearson Correlations

Variables	RISK	TBMAG	TBRATE	SIZE	ROA	LEVERAGE	SALESGROWTH
RISK	1.0000						
TBMAG	–0.1000*	1.0000					
TBRATE	–0.0377	–0.2989*	1.0000				
SIZE	–0.2088*	0.0513*	0.0946*	1.0000			
ROA	–0.1839*	–0.0166	0.0220	0.1200*	1.0000		
LEVERAGE	0.3332*	–0.0625*	0.0384	–0.1263*	–0.2306*	1.0000	
SALESGROWTH	0.0026	0.0632*	–0.1238*	–0.0673*	0.0908*	–0.0475*	1.0000

***, **, * indicate statistical significance at the one, five, and ten percent, respectively.
The table presents Pearson correlation matrix of the variables.

Table 5
Mean Differences in Risk-Taking

Panel A: RISK and ROA difference between PbCIT and TbCIT firm-years.

	RISK			
	PbCIT	Prediction	TbCIT	Diff/ SE Mean
Obs	4,359		1,107	
Mean	0.0569	>	0.0408	(0.0161)
p-value	0.0000			
	ROA			
Mean	0.0718	?	0.0645	(0.0072)
p-value	0.1032			

Panel B: Mean RISK and ROA difference between Low and High TBRATE firm-years.

	RISK			
	Low TBRATE	Prediction	High TBRATE	Diff/ SE Mean
Obs	554		553	
Mean	0.0439	?	0.0377	(0.0063)
p-value	0.0536			
	ROA			
Mean	0.0607	?	0.0684	0.0078
p-value	0.2023			

Table 6 reports a univariate analysis of RISK and ROA between groups. Panel A reports t-tests of RISK and ROA between the PbCIT regime (TbCIT exposure = 0%) and TbCIT regime (partial and full TbCIT, TbCIT exposure > 0%).
Panel B reports t-tests of RISK and ROA between Low TBRATE (equals and under the median) and High TBRATE (over the median).

Table 6
Association between Risk-Taking and TbCIT

Panel A: Association between RISK and TBMAG

VARIABLES	RISK		
	All		TbCIT sample
	(1)	(2)	(3)
TBMAG	–0.007***	–0.005***	–0.007**
	(0.001)	(0.001)	(0.002)
SIZE		–0.004***	–0.006***
		(0.001)	(0.001)
ROA		–0.014	0.076*
		(0.019)	(0.040)
LEVERAGE		0.042***	0.038**
		(0.007)	(0.014)
SALESGROWTH		0.001	0.002
		(0.001)	(0.002)
DUMMYLCF		0.031***	0.024**
		(0.005)	(0.010)
Constant	0.054***	0.086***	0.110***
	(0.002)	(0.016)	(0.023)
Observations	5,466	4,720	968
R-squared	0.013	0.162	0.171
YEAR FE	yes	yes	yes

Panel B: Association between RISK and TBMAG & TBRATE using the TbCIT firm-years

VARIABLES	RISK		
	TbCIT sample		
	(1)	(2)	(3)
TBRATE	–0.001	0.000	–0.004
	(0.003)	(0.003)	(0.004)
TBMAG			–0.008**
			(0.003)
TBMAG × TBRATE			0.002
			(0.002)
SIZE		–0.005***	–0.006***
		(0.001)	(0.001)
ROA		0.075	0.075*
		(0.042)	(0.040)
LEVERAGE		0.037**	0.037**
		(0.015)	(0.014)
SALESGROWTH		0.002	0.001
		(0.002)	(0.002)
DUMMYLCF		0.026**	0.023**
		(0.010)	(0.010)
Constant	0.041***	0.092***	0.114***
	(0.002)	(0.024)	(0.022)
Observations	1,107	968	968
R-squared	0.019	0.152	0.173
YEAR FE	yes	yes	yes

Panel C: Association between RISK and Dummy TBCIT

VARIABLES	RISK	
	All	All
	(1)	(2)
DUMMY_TBCIT	–0.016***	–0.010***
	(0.003)	(0.003)
SIZE		–0.004***
		(0.001)
ROA		–0.014
		(0.019)
LEVERAGE		0.042***
		(0.007)
SALESGROWTH		0.000
		(0.001)
DUMMYLCF		0.031***
		(0.005)
Constant	0.057***	0.088***
	(0.002)	(0.016)
Observations	5,466	4,720
R-squared	0.012	0.160
YEAR FE	yes	yes

***, **, * indicate statistical significance at the one, five, and ten percent, respectively.
The table presents main test of the association between corporate risk-taking (RISK), and the TbCIT exposure (TBMAG or DUMMY_TBCIT) and TbCIT rate (TBRATE) using panel data and OLS regression. Panel A reports the association between RISK and TBMAG using a continuous value of TbCIT exposure (TBMAG). Columns (1) and (2) use full sample, Column (3) uses only firm-years where firms have any revenues that are subject to TbCIT (TbCIT sample).
Panel B reports the association between RISK and TBRATE, TBMAG, and TBMAG-TBRATE interaction using the TbCIT firm-years.
Panel C reports the association between RISK and a binary value of TbCIT exposure (DUMMY_TBCIT) using full sample. Each estimation includes intercept and YEAR fixed effects (FE) and presents the clustered standard errors by FIRM and by YEAR in the parentheses.

Table 7
First–Difference Specification

VARIABLES	CHANGE_RISK				
	All		TbCIT		
	(1)	(2)	(3)	(4)	(5)
CHANGE_TBMAG	–0.009**	–0.006			–0.010
	(0.003)	(0.004)			(0.006)
CHANGE_TBRATE			0.003	0.003	0.003
			(0.003)	(0.005)	(0.006)
CHANGE_TBMAG × CHANGE_TBRATE					0.005
					(0.006)
CHANGE_SIZE		–0.009**		–0.012	–0.012
		(0.003)		(0.007)	(0.007)
CHANGE_ROA		0.008		0.119***	0.116***
		(0.015)		(0.018)	(0.020)
CHANGE_LEVERAGE		0.016*		0.039**	0.039**
		(0.009)		(0.015)	(0.015)
CHANGE_SALESGROWTH		–0.000		–0.001**	–0.001*
		(0.001)		(0.000)	(0.001)
CHANGE_DUMMYLCF		–0.005		–0.008	–0.008
		(0.003)		(0.007)	(0.007)
Constant	0.001***	0.003***	–0.001***	0.004***	0.003***
	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)
Observations	4,746	4,022	873	758	758
R–squared	0.009	0.019	0.026	0.132	0.144
YEAR FE	yes	yes	yes	yes	yes

***, **, * indicate statistical significance at the one, five, and ten percent, respectively.
The table presents the association between the change in corporate risk-taking (CHANGE_RISK) and the change in the TbCIT exposure (CHANGE_TBMAG) and the change in the TbCIT rate (CHANGE_TBRATE) using panel data and OLS regression. Columns (1) and (2) use full sample; columns (3) to (5) use only TbCIT sample. Each estimation includes intercept and FIRM-by-YEAR fixed effects (FE). The table presents the clustered standard errors by FIRM and by YEAR in the parentheses.

Table 8
Matched Samples

Matching Method/ Criteria	Difference in RISK, (standard error) and frequency	
	Domestic Firms	Malaysian Firms
	(1)	(2)
Propensity Score Matching	–0.012***	–0.009***
(SIZE, SIZE, ROA, LEVERAGE, SALESGROWTH, DUMMYLCF)	(0.003)	(0.003)
	4,092	8,091
One nearest neighbor matching	–0.008***	–0.006**
SIZE, SIZE, ROA, LEVERAGE, SALESGROWTH, DUMMYLCF)	(0.003)	(0.002)
	4,092	8,091
Five nearest neighbor matching	–0.014***	–0.009***
SIZE, SIZE, ROA, LEVERAGE, SALESGROWTH, DUMMYLCF)	(0.003)	(0.002)
	4,092	8,091
One nearest neighbor matching	–0.024***	–0.012***
SIZE, SIZE, ROA, LEVERAGE, SALESGROWTH, DUMMYLCF, INDUSTRY, YEAR)	(0.006)	(0.003)
	4,092	8,091

***, **, * indicate statistical significance at the one, five, and ten percent, respectively.
The table presents the estimation of the TbCIT effects using matched samples from domestic firms (column 1) and foreign firms (Malaysian, column 2). The estimations use propensity score matching (PSM) and nearest-neighbor matching (NNM) methods to match samples using similarities in SIZE, SIZE, ROA, LEVERAGE, SALESGROWTH, DUMMYLCF, INDUSTRY, and YEAR.

Table 9
Cross-Sectional Analyses

VARIABLES	RISK							
	Profit margin of the industry major group				Loss offset			
	Low	High	Low	High	No	Yes	No	Yes
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
TBMAG	–0.005	–0.005***			–0.004***	–0.010**		
	(0.003)	(0.001)			(0.001)	(0.004)		
TBRATE			–0.004	–0.000			–0.001	–0.003
			(0.005)	(0.003)			(0.002)	(0.017)
SIZE	–0.004**	–0.004**	–0.004	–0.006***	–0.005***	–0.003	–0.005***	–0.002
	(0.001)	(0.002)	(0.004)	(0.002)	(0.001)	(0.003)	(0.001)	(0.007)
ROA	–0.034	–0.005	0.055	0.089	0.022	–0.112*	0.113***	0.055
	(0.046)	(0.021)	(0.066)	(0.063)	(0.017)	(0.058)	(0.034)	(0.127)
LEVERAGE	0.028*	0.047***	–0.006	0.045**	0.033***	0.056***	0.003	0.075*
	(0.013)	(0.009)	(0.009)	(0.019)	(0.008)	(0.012)	(0.007)	(0.034)
SALESGROWTH	0.001	–0.000	0.002	0.001	0.003	–0.001	0.002	0.001
	(0.002)	(0.002)	(0.004)	(0.002)	(0.002)	(0.003)	(0.002)	(0.006)
DUMMYLCF	0.030***	0.030***	0.008	0.028**				
	(0.009)	(0.006)	(0.018)	(0.012)				
Constant	0.095***	0.077***	0.099*	0.095***	0.092***	0.083*	0.101***	0.048
	(0.021)	(0.023)	(0.048)	(0.027)	(0.014)	(0.044)	(0.021)	(0.095)
Observations	1,804	2,916	176	792	4,022	698	873	95
R-squared	0.101	0.201	0.127	0.185	0.084	0.209	0.089	0.395
YEAR FE	yes	yes	yes	yes	yes	yes	yes	yes

***, **, * indicate statistical significance at the one, five, and ten percent, respectively.
The table presents the heterogeneous effect of TBMAG and TBRATE on RISK. Columns (1) to (4) report the heterogeneous effect of TbCIT on profit-margin-based firm clusters. The low (high) profit margin cluster covers firms in the industry major group (two-digits of the SIC) of which average which average profit margin is less than or equal to (more than) the median of the full sample profit margin. Columns (5) to (8) report the heterogeneous effect of TbCIT on loss-offset-based firm clusters. The no loss-offset (loss offset) cluster consists of firm-years where firms report positive (negative) EBIT in the preceding year.
Columns (1), (2), (5), and (6) use full sample; Columns (3), (4), (7), and (8) use TbCIT sample.
Each estimation includes intercept and YEAR fixed effects (FE) and presents the clustered standard errors by FIRM and by YEAR in parentheses.

Table 10
Robustness Tests

Panel A: Association between RISK and TBMAG based on assets

VARIABLES	RISK		
	All	TbCIT	
	(1)	(2)	(3)
TBMAG_ASSETS	–0.004***		–0.005
	(0.001)		(0.003)
TBRATE		0.000	–0.003
		(0.003)	(0.004)
TBMAG_ASSETS × TBRATE			0.001
			(0.002)
SIZE	–0.004***	–0.005***	–0.006***
	(0.001)	(0.001)	(0.001)
ROA	–0.014	0.075	0.075
	(0.019)	(0.042)	(0.042)
LEVERAGE	0.042***	0.037**	0.037**
	(0.007)	(0.015)	(0.015)
SALESGROWTH	0.000	0.002	0.002
	(0.001)	(0.002)	(0.002)
DUMMYLCF	0.031***	0.026**	0.025**
	(0.005)	(0.010)	(0.010)
Constant	0.087***	0.092***	0.109***
	(0.016)	(0.024)	(0.024)
Observations	4,720	968	968
R-squared	0.160	0.152	0.160
YEAR FE	yes	yes	yes

***, **, * indicate statistical significance at the one, five, and ten percent, respectively.
The table presents the robustness test of the association between corporate risk-taking (RISK) and the TbCIT exposure (TBMAG_ASSETS) and the TbCIT rate (TBRATE) using panel data and OLS regression. TBMAG_ASSETS is analogous to TBMAG, but using proportion of TbCIT assets instead of turnover to measure the TbCIT exposure. Column (1) uses full sample, Columns (2), and (3) use TbCIT sample.
Each estimation includes intercept and YEAR fixed effects (FE) and presents the clustered standard errors by FIRM and by YEAR in parentheses.

Panel B: Association between RISK and TbCIT using different measurements of RISK

VARIABLES	RISK											
	Unadjusted ROA			s.d. of adjusted ROA over four years			s.d. of adjusted ROA over five years			Volatility of Operating Cash Flow		
	All	TbCIT		All	TbCIT		All	TbCIT		All	TbCIT	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
TBMAG	–0.005***		–0.008**	–0.005***		–0.006*	–0.006***		–0.003	–0.002*		–0.003
	(0.001)		(0.003)	(0.001)		(0.003)	(0.001)		(0.002)	(0.001)		(0.002)
TBRATE		–0.001	–0.005		0.000	–0.003		0.002	–0.000		–0.002	0.000
		(0.003)	(0.004)		(0.002)	(0.004)		(0.002)	(0.004)		(0.003)	(0.005)
TBMAG × TBRATE			0.002			0.001			0.001			–0.003
			(0.002)			(0.002)			(0.002)			(0.002)
SIZE	–0.004***	–0.006***	–0.006***	–0.004**	–0.005**	–0.005***	–0.004**	–0.005**	–0.006**	–0.009***	–0.012***	–0.012***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)
ROA	–0.002	0.097**	0.097**	–0.023	0.039	0.042	–0.025	0.015	0.017	0.059***	0.108***	0.109***
	(0.021)	(0.040)	(0.038)	(0.020)	(0.039)	(0.039)	(0.018)	(0.043)	(0.044)	(0.012)	(0.027)	(0.026)
LEVERAGE	0.044***	0.039**	0.040**	0.042***	0.034***	0.035***	0.043***	0.028**	0.029**	0.017***	0.026***	0.028***
	(0.008)	(0.016)	(0.016)	(0.008)	(0.009)	(0.009)	(0.008)	(0.011)	(0.011)	(0.004)	(0.006)	(0.006)
SALESGROWTH	0.000	0.001	0.001	0.000	0.000	0.000	0.001	–0.001	–0.001	0.005***	0.003	0.004
	(0.001)	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)
DUMMYLCF	0.032***	0.024*	0.021*	0.032***	0.023**	0.022**	0.029***	0.019*	0.018*	–0.000	–0.002	–0.002
	(0.005)	(0.011)	(0.011)	(0.005)	(0.008)	(0.008)	(0.006)	(0.008)	(0.008)	(0.003)	(0.005)	(0.006)
Constant	0.084***	0.095***	0.115***	0.088***	0.089***	0.105***	0.092***	0.105***	0.113***	0.166***	0.200***	0.205***
	(0.017)	(0.024)	(0.022)	(0.019)	(0.022)	(0.021)	(0.022)	(0.024)	(0.023)	(0.013)	(0.023)	(0.025)
Observations	4,720	968	968	4,037	812	812	3,409	675	675	4,712	968	968
R-squared	0.150	0.157	0.174	0.173	0.126	0.140	0.169	0.115	0.120	0.124	0.225	0.232
YEAR FE	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes

***, **, * indicate statistical significance at the one, five, and ten percent, respectively.
The table presents sets of robustness tests on the association between corporate risk-taking (RISK) and the TbCIT exposure (TBMAG) and the TbCIT rate (TBRATE) using panel data and OLS regression. We also use different measurements of risk, such as a) the Unadjusted ROA (columns 1–3), b) the standard deviation of adjusted ROA over four years (columns 4–6), c) the standard deviation of adjusted ROA over four years (columns 7–9), and d) the volatility of Operating Cash Flow (OCF) over three years (columns 10–12). Each estimation includes intercept and controls fixed effects as reported at the bottom. The table presents the clustered standard errors by FIRM and by YEAR in parentheses.

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Arbeitskreis Quantitative Steuerlehre, arqus, e.V.
Vorstand: Prof. Dr. Ralf Maiterth (Vorsitzender),
Prof. Dr. Kay Blaufus, Prof. Dr. Dr. Andreas Löffler
Sitz des Vereins: Berlin

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Kontaktadresse:
Prof. Dr. Dr. h.c. Dr. h.c. Caren Sureth-Sloane,
Universität Paderborn, Fakultät für Wirtschaftswissenschaften,
Warburger Str. 100, 33098 Paderborn,
www.arqus.info, Email: info@arqus.info

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