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Multinational Tax Avoidance and Anti-Avoidance Enforcement: Firm-level Evidence from Developing ASEAN Countries*

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Abstract

We use firm-level data from ASEAN5 to examine the significance of tax-motivated profit shifting by multinational enterprises and to analyze how anti-avoidance measures mitigate the profit shifting. We show that (1) tax-motivated profit shifting is statistically and economically significant, especially for manufacturing firms, (2) auditing and transfer-pricing scrutiny is more effective in reducing profit shifting than documentation requirement alone, and (3) tax-motivated profit shifting is prominent for large firms, while anti-tax avoidance measures result in the absence of profit shifting detected from small manufacturing firms. The findings have important implications for developing countries with weak governance but dependent on MNEs.

Keywords: Profit shifting, tax avoidance, auditing, transfer pricing, multinational enterprise

JEL classifications: F23, H25, H26, K34, M42

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1. Introduction

International tax avoidance by multinational enterprises (MNEs) have received a great deal of attention in public policy discussions. This issue is likely to be even more crucial after the Covid-19 outbreak ends since most governments will need to seek additional revenue to offset the sharply rising public debt. The public economics literature provides compelling empirical evidence that MNEs shift their profits across jurisdictions in order to lower their total worldwide tax bill. Most empirical studies have focused on this issue for developed economies (see, for example, Hines and Rice, 1994; Huizinga and Laven, 2008). Such challenge, however, is likely to be more serious for developing countries for at least two reasons. First, developing countries tend to be more reliant on corporate income tax than advanced economies.[1] Second, anti-avoidance rules and capacity of tax authorities are generally limited among developing countries. This makes them more susceptible to sophisticated international tax planning by MNEs than developed countries.

This paper addresses two main research questions. First, how significant is the tax-motivated profit shifting for developing countries? Second, to what extent, does such profit shifting respond to the stringency of anti-avoidance enforcement? While developing countries have strengthened their regulations and enforcement to curb profit shifting, little is understood about how such efforts affect MNEs' behavior. This paper is the first to consider, in the developing-countries context, how the tax-motivated profit shifting responds to changes in the stringency associated with transfer pricing regulation, audit risk and scrutiny and withholding-tax environment.

[1] For middle-income countries, average corporate income tax revenue (in % of total tax revenue) is around 16.5% over 2014-2016. This is noticeably higher than the respective share for high-income countries (12.4%). For more detail, see Figure A1 in the appendix.

To answer these questions, we use firm-level financial and ownership data from five middle-income ASEAN countries (Indonesia, Malaysia, the Philippines, Thailand and Vietnam; henceforth, ASEAN5). These economies are good candidates for the study of tax-motivated profit shifting and anti-avoidance measure effectiveness for several reasons. First, these economies have pursued tax policies that attract FDI from MNEs. As a result, they are one of the most important host countries of affiliates of global and regional MNEs.[2] Second, despite having been developed tremendously over the past several decades, institutional foundations of these economies remain relatively weak. The weak governance is likely to foster a low-tax-compliance environment and intensify the tax-motivated profit shifting. Third, although these economies are located in the same region, there is heterogeneity between them. This allows us to test the impacts of various anti-avoidance measures on profit shifting. Finally, corporate income tax is an important source of government revenue in these economies. Findings from this study therefore have important policy implications for the government.

Our empirical strategy is based on the most widely used method in the literature on international tax avoidance (Hines and Rice, 1994). This method detects profit shifting by relating a firm's reported profit to its inputs and relative statutory tax rates[3] (i.e., difference between host-country statutory tax rate and foreign statutory tax rate).[4] A finding that firms systematically report lower profits when they experience higher tax

[2] According to ASEAN Secretariat (2017), 94% of the world's 100 largest non-financial MNEs in term of foreign assets have at least one subsidiary in ASEAN in 2016. The FDI stock in ASEAN also accounts for 21% of total FDI stock in developing countries sand 7% of global FDI stock in 2016.

[3] The relative statutory tax rate serves as a tax incentive to shift profits to its foreign affiliates.

[4] Note that statutory tax rate is used in the literature on the tax-motivated profit shifting since it represents marginal tax rate on profit and thus captures the incentive to report profit. This is in contrast to alternative tax measures such as effective marginal tax rate and effective average tax rates. Those measures, which are based on present and future values of cash flows associated with an investment project, are relevant for the investment decision.

rates relative to their foreign affiliates is taken as an evidence of tax-motivated profit shifting.

For developing countries, however, using the statutory domestic tax rate may confound the profit shifting responses due to their large informal sector (Johannesen et al., 2019; Besley and Persson, 2013). We therefore follow Johannesen et al. (2019) by using country-time fixed effects to fully absorb the variation in domestic tax rates and thus identify the profit shifting through variation the tax rates facing foreign affiliates.

We document three main findings. First, the tax-motivated profit shifting is statistically and economically significant, especially for manufacturing firms. In our baseline specification, a reduction in the average foreign tax rate by 10 percentage points lowers the reported profit by 10.3% on average. Second, auditing and transfer-pricing scrutiny is more effective in reducing profit shifting than documentation requirement alone. Raising the strength of the auditing scrutiny by one standard deviation would lower the tax-motivated profit shifting by 45.1%, whereas the same increase in the regulation level would yield the reduction of 12.3%. Finally, the tax-motivated profit shifting is prominent for large manufacturing firms, with their degree almost twice that observed in the baseline estimation. For small manufacturing firms, the effect of anti-tax avoidance measures is relatively strong and it results in their degree of profit shifting being not statistically significant.

Our findings contribute to the literature on profit shifting that have largely concentrated on empirical evidence from developed countries. We also complement the literature by providing evidence that, in the environment with relatively weak governance, audit scrutiny is more effective at curbing the tax avoidance than documentation requirement.

The remainder of this paper is organized as follows. Section 2 discusses related existing studies and our contribution the literature. We describe the empirical strategy and the data in Section 3 and 4, respectively. Section 5 illustrates the empirical results. Finally, Section 6 concludes the study and discusses policy implications.

2. Related Literature

This study contributes to two strands of research. First, it joins the small but growing pool of literature that study the base erosion and profit-shifting issues in developing countries. For example, Fuest et al. (2011) uses data on foreign affiliates of German MNEs. It focuses on the use of intra-company debt and finds that the financing structures of affiliates located in developing countries are more sensitive to tax incentives than the structures of those in developed countries. Crivelli et al. (2016) takes a macroeconomic perspective and provides a country-level empirical evidence on the erosion of the corporate income tax base for non-OECD countries. Its findings suggest that the tax-base spillovers from the tax rates of other countries may be greater than those associated with developed countries.

Recently, Johannesen et al. (2019) uses a firm-level dataset with an emphasis on developing East European countries to investigate the intensity of tax-motivated profit shifting. It proposes a novel technique to identify profit shifting by using a dummy variable that indicates if reported profits lie within a specified range around zero. It also relies exclusively on tax rates associated with parent companies and other foreign affiliates. It finds that the profit-shifting responses to tax incentives are stronger in less developed economies—consistent with the findings by Crivelli et al. (2016).

We complement this literature in two ways. First, we examine how the stringency of anti-avoidance enforcement impacts MNEs' profit shifting behavior in the developing countries context. Second, by focusing on firms with no further subsidiary, we are able

to utilize consolidated financial account data which are common among many developing countries. This allows us to present evidence from middle-income countries outside Europe and, therefore, extend the literature which have largely concentrated on advanced economies or European developing countries.

Second, this paper contributes to the literature on anti-tax avoidance enforcement. In particular, existing studies have explicitly included anti-avoidance enforcement as a factor in examining the tax-motivated profit shifting. For example, focusing on OECD countries, Bartelsman and Beetsma (2003) create an indicator measuring the degree of formal enforcement of transfer pricing rules. They find a suggestive evidence that the income shifting in response to tax rate differentials appear to be stronger in countries with weak enforcement than it is for those with tough enforcement. Lohse and Reidel (2012) uses an indicator of transfer-pricing documentation requirements and find that the documentation rules have negative significant effects on profit shifting. Klassen and Laplante (2012) find an evidence that weaker regulation in the US is associated with higher profit shifting of US MNEs to their low-tax foreign affiliates.

Saunders-Scott (2014) use an index of transfer price risk developed in Mescal and Klassen (2018) to examine the relationship between enforcement and profit shifting. Their index is constructed using both documentation requirement and perceived likelihood of a transfer-pricing audit. Using MNEs with unconsolidated data from Orbis, they find that the transfer-pricing audit risk is negatively associated with reported profit. However, they are not able to isolate the effects of audit risk from that of documentation requirement. Finally, Johansson (2017) finds that strong anti-avoidance rules are associated with a reduction in profit shifting. It measures strength of anti-avoidance rules based on existence and strictness of regulations related to areas such as transfer-pricing requirement, thin capitalization rules, Controlled Finance Corporation (CFC) regulations,

and withholding tax levels. Its indicator, however, does not take into account the likelihood in which the associated documentations will be audited by the authorities.

To date, the literature has focused on anti-avoidance efforts in advanced economies. Our study contributes to this literature by examining the impacts of anti-avoidance stringency in the middle-income-country context where institutions and governance are likely to be weak.

3. Empirical Strategy

The primary purpose of this study is to examine the significance of tax-motivated profit shifting and the extent to which the shifting responds to the stringency of anti-avoidance enforcement. Typically, studies that attempt to detect the tax-motivated profit shifting focuses on the difference between the statutory domestic tax rate and the foreign tax rates facing the firm. For developing countries, however, using statutory domestic tax rate in the model may confound the profit shifting responses. As suggested by Johannesen et al. (2019) and Besley and Persson (2013), the relatively high level of informal economy in developing countries makes it more likely that the domestic tax rate could influence unrelated behavioral responses such as moving transactions to the informal sector. Additionally, many developing countries offer tax incentives to attract foreign direct investment (FDI). Examples include 50% tax rate reduction and tax holiday for certain period. These policies lower relevant host-country tax rates for some firms, making domestic statutory tax rate an unsuitable measure of the profit shifting incentive.

To address this concern, we follow Johannesen et al. (2019) by separating domestic and foreign tax rates and using country-time fixed effects to fully absorb the variation in domestic tax rates. This yields the following equation:

$$\log(\pi_{it}) = \beta_0 + \beta_1 \tau_{it}^{foreign} + \beta_2 \tau_{it}^{foreign} Z_{it} + \beta_3 \log(k_{it}) \qquad (1)$$

$$+ individualFE + yearFE + country * yearFE + industry * yearFE + \varepsilon_{it},$$

where π_{it} is the firm's profit before taxes, $\tau_{it}^{foreign}$ is the average tax rate of all foreign affiliates, Z_{it} is measure of anti-tax avoidance stringency, and k_{it} is the total fixed assets. Under this specification, the tax-motivated profit shifting is identified exclusively from the variation in foreign tax rates faced by affiliates across time. This strategy allows us to examine how firms that experience changes in their foreign tax rates systemically alter their reported profit relative to firms in the same country that do not experience any change in their foreign tax rates. In order to examine the overall significance of tax-motivated profit shifting, we also estimate the model specification in which the interaction between foreign tax rate and anti-tax avoidance stringency is not included. Standard errors are heteroscedasticity-robust and clustered on host countries.

The dependent variable is the (log of) profit before taxes. This profit measure takes into account financial income and expenses, allowing us to incorporate profit shifting in the form of financial asset placement (such as thin capitalization) in our analysis. In one of the robustness checks, we use earnings before interest and taxes (EBIT) as a dependent variable instead.

The main explanatory variable is the average foreign tax rate for each firm. It is constructed as a simple average of the corporate income tax rates associated with all foreign affiliates in the corporate group. In the robustness tests, we also use the corporate income rate of a parent company.

There are potential concerns with respect to our empirical strategy that deserves further discussion. First, it is possible that host-country preferential tax treatments may lower marginal tax rate on profits below the statutory tax rates. This results in an endogeneity problem due to measurement error in the tax incentive to shift profit. We

address this concern by including firm, year, country-year and sector-year fixed effects in the baseline specification. The identification is then based solely on changes in foreign tax rates. This consequently mitigates any resulting bias from such measurement error.

Second, the corporate ownership structures in the Orbis database are a snapshot. This feature is typical of most studies using ownership data. While this limits our ability to account for changes in incentives caused by changes in group structures, it allows us to take corporate group structures constant and disregard endogeneity concern due to firm's own location choice.

4. Data

To estimate the magnitude of tax-motivated profit shifting of MNE subsidiaries and the effectiveness of anti-avoidance measures, we combine data from various sources and construct financial and tax avoidance measures.

4.1 Ownership and Financial Data

We use firm-level financial account data and ownership information from Bureau van Dijk's Orbis database. The Orbis database contains information about the global ultimate owner of each firm, which we use to construct corporate groups comprising all firms with the same ultimate owner. This allows us to identify firms that are foreign subsidiary and match them with their foreign affiliates. We draw the dataset from the database in 2018; therefore, the group structure reflects ownership information at that time. Following Huizinga and Laeven (2008), we define a firm as a foreign multinational subsidiary if at least 50% of its shares are ultimately owned by a foreign firm. The data cover the period from 2005 to 2016. Consistent with the literature, we include only firms with positive

profit before taxes.

Given that Orbis mostly contains only consolidated financial account for developing countries, we limit the sample to include those without further subsidiary. This ensures that the observed financial information refers only to the operation of that single affiliate. We also require firms to have at least two years of available data. After the application of these criteria, we arrive at a total sample of 18,308 observations from 2,909 firms. This sample is used for the baseline analysis.

Table 1 provides a breakdown of the sample in terms of the host countries. The top two host countries are Thailand and Malaysia, which account for 55% and 27% of all observations respectively. Summary statistics on the variables used in our analysis are provided in Table 2. Before-tax profit, taking into account financial account and expense, is around $9,300 on average in our baseline sample. Average tax rate facing foreign affiliates of our sample is about 30%.

[Table 1]

[Table 2]

4.2 Anti-Tax Avoidance Measures

There are several mechanisms that foreign subsidiaries can use to shift their profit across borders to affiliates in other countries. One of the most common practices is transfer pricing where transactions between affiliates are systematically mispriced. In particular, sales are overpriced when flowing from low-tax to high-tax affiliates, resulting in higher profit in low-tax host country and lower profit in high-tax host country. In addition, MNEs may allocate balance sheet items strategically; for instance, debt is allocated to high-tax affiliates to maximize tax shield benefits from interest expenses. Effectively, profit

shifting could result in a loss of tax revenue for many countries, raising a concern to the governments that heavily rely on corporate income tax as their source of revenue.

All ASEAN5 countries require the arm's length principle for intra-group transactions and have anti-tax avoidance regulations in place. The rules and enforcement strength associated with those regulations vary across countries. For example, while all countries require that businesses prepare transfer-pricing documentations in 2016, only Indonesia require submission of those documents at the time of tax-filing. Average multinationals in Thailand and Vietnam also report smaller likelihood of being subject to transfer pricing scrutiny than those in the rest of ASEAN5.[5] In addition, despite not being directly anti-tax avoidance rules, higher withholding tax rates can influence cross-border tax planning opportunities. For example, withholding taxes on interest and royalty may lower the incentives associated with the strategic placement of debt and intangible assets. In 2016, average withholding tax rates of interest, royalty and dividend for payments to non-resident entities range from 5% in Vietnam to 30% in the Philippines.

In order to examine the stringency of these rules and enforcement, we construct three indicators representing (1) transfer pricing regulation, (2) audit risk and scrutiny, and (3) withholding tax rates, taking into account existence of bilateral treaties.

First, the transfer pricing regulation indicator takes into account the fact that the arm's length price principle is applied in all countries and focuses on the strength of the documentation requirements. It distinguishes cases where transfer-pricing documentations are required in case of audit and where they are required to submit at the time of tax filing. We collect this information from various publications of

[5] The reported likelihood of transferring pricing scrutiny is based on Ernst&Yong's Worldwide Transfer Pricing Reference Guide.

Ernst&Young's Worldwide Transfer Price Reference Guide and PricewaterhouseCoopers' International Transfer Pricing.

Second, we construct an indicator that captures the level of transfer-pricing audit scrutiny that foreign affiliates typically perceive. It reflects the likelihood of a tax audit and transfer pricing scrutiny for an average MNE (None, low, moderate to slightly high and high). Information used to construct this indicator is based on various publications of Ernst & Young's Worldwide Transfer Pricing Reference Guide.

Finally, the construction of our third indicator is based on Johansson et al. (2016). It combines the average withholding tax rates (standard rates) and the number of effective tax treaties. It measures how unattractive it is to use host countries as part of the cross-border international tax planning. While higher withholding tax rates on interest, dividend and royalty reduce the country's attractiveness in term of international tax planning, fewer availability of tax treaties generally indicates lower opportunities for double-taxation relief and tax-treaty shopping.[6] This variable measures how unattractive it is to use host countries as part of the cross-border international tax planning. The information on withholding tax rates applicable to various income sources and tax treaty is based on the Comtax database.[7]

Note that the first two indicators are direct anti-tax avoidance measures. The last one, however, reflects how easy an MNE may use tax withholding in the host country as a part of the cross-border international tax planning.[8] All three indicators are then normalized to range from 0 to 10 with higher value representing higher stringency level. The overall stringency indicator is a simple average of all of these three indicators.

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[6] It is worth noting that some tax treaties may contain specific anti-tax avoidance provisions.
[7] Comtax is a company providing data and software related to international tax rules to tax practitioners and academic researchers.
[8] The details of their construction are provided in Table A1 in the Appendix.

Table 3 shows the means of anti-tax avoidance indicators by host countries over the study period (2005-2016).[9] The overall stringency level ranges from 4.86 in Thailand to 7.64 in Indonesia. As indicated in Figure 1, the stringency has also slightly weakened over the time period. While all ASEAN5 countries have become more strict regarding the documentation requirement, the environment with respect to withholding taxes and treaties has been more accommodating for cross-border tax planning opportunities.

[Table 3]

[Figure 1]

5. Empirical Results

This section presents and discusses our findings on the significance of the tax-motivated profit shifting and the anti-tax avoidance stringency. Using a simulation, we also illustrate the extent to which changes in tax policy of an advanced economy may impact the tax revenue of developing countries.

5.1 Overall significance of MNEs' international tax avoidance

Before we study the importance of anti-avoidance stringency, we first investigate the overall significance of tax base erosion and profit shifting by MNEs. Table 4 presents our model estimates without the stringency of anti-tax avoidance variables. Consistent with Huizinga and Laven (2008), we restrict the base sample to include only manufacturing firms. We later expand the sample to include services firms in one of the

[9] The correlations between measures of anti-tax avoidance are relatively low: 0.11 between transfer-pricing documentation and audit risk scrutiny, -0.18 between transfer-pricing documentation and withholding tax rate, and -0.10 between audit risk scrutiny and withholding tax rate.

sensitivity analyses. The explanatory variable of interest here is an average tax rate of foreign affiliates. Each regression also includes fixed assets.

We find that the coefficient of the average foreign tax rate is positive and statistically significant throughout Columns (1) to (3) of Table 4 where we incrementally add various fixed effects. Particularly, in Column (3), which is considered as our base estimate, we control for firm-, year-, country-year- and sector-year- fixed effects. We find that the foreign tax rate coefficient is 1.03. This result suggests that the tax-motivated profit shifting in ASEAN5 economies is economically significant—a reduction in the average foreign tax rate by 10 percentage point decreases the reported profit by 10.32% on average. This estimate is in line with the estimate reported by Johannesen et al. (2019) using the dataset with an emphasis on developing East European countries. It is also much larger than Johannesen et al. (2019)'s estimate for high-income countries.

[Table 4]

To gain additional insight regarding the heterogeneous impacts of the tax motivated profit shifting, we split the firms based on their size of total assets.[10] Firms are considered small if their total asset size in the first year is smaller than the sample median value. According to Columns (1) and (2) of Table 5, we find that the coefficient of the foreign tax rate is positive and statistically significant only among large firms. The tax-motivated profit shifting, however, is not statistically significant for small firms. This result suggests that large firms have more ability to shift their profit across borders when compared to small firms.

Column (3) of Table 5 presents our estimate where we include firms in all sectors (not only manufacturing). We find that the foreign tax rate coefficient is still positive and

[10] The size classification is based on the firm's size of total assets in its first year in the sample.

statistically significant. Its magnitude, however, is roughly 40% smaller—suggesting that the tax-motivated profit shifting is likely to be more evident among manufacturing firms.

[Table 5]

We then restrict the sample to manufacturing only again, but take the log of earnings before tax and interest expense (EBIT) rather than before-tax profits. The results, reported in Column (4), show that the coefficient on the average tax rate is consistent with the baseline estimate.

In Column (5), we use parent tax rate rather than the average tax rate of all foreign affiliates. This results in a positive but insignificant estimate of the tax-motivated profit shifting effect. This result suggests that, in deciding their international tax planning strategy, MNEs consider the tax rates of all their corporate groups rather than that of parent firms alone.

5.2 Mitigating Effects of Anti-Tax Avoidance Stringency

To investigate the extent to which the anti-tax avoidance stringency is effective in mitigating international tax avoidance by MNEs, Column (1) of Table 6 presents an estimate where we interact the average foreign tax rate with the overall stringency variable. The coefficient of the interaction variable is negative and statistically significant. This implies that higher stringency of anti-avoidance measures is associated with a reduction in profit shifting. The estimate in Column (1) suggests that a reduction in the average foreign tax rate by 10 percentage points decreases the reported profit by 10.92% in a country with an anti-avoidance stringency at the sample average (5.04).

Increasing the stringency by one standard deviation (1.15) lowers the magnitude of this effect to 7.62% (a reduction of 30.21%).[11]

To better understand the underlying mechanisms, we perform another analysis where we include the three components of the stringency indicator separately. The finding is reported in Column (2) of Table 6. In term of tools combatting tax avoidance, the result suggests that scrutiny of auditing is more effective than regulation. Raising the strength of the scrutiny by one standard deviation would lower the tax-motivated profit shifting by 45.08%, while the same increase in the regulation level would result in the reduction of just 12.28%. The estimate also indicates that the tax environment is important. Less conducive environment to shift profit (higher value of the indicator) is associated with significantly smaller shifting of reported profit.

In Columns (3) and (4) of Table 6, we return to the overall stringency indicator and examine the heterogeneity of the anti-tax avoidance with respect to firm size. In both regressions of small and large firms, the coefficients on foreign tax rate are positive and significant, while those on the interaction term are significantly negative. For small (large) firms, the estimate implies that a reduction in the average foreign tax rate by 10 percentage points decreases the reported profit by 3.71% (19.77%) in a country with an anti-avoidance stringency at the sample average. These results are consistent with our finding earlier that the tax-motivated shifting of reported profit is relatively evident among large firms. They also suggest that the anti-tax avoidance measure is quite important for small firms and the net result for small firms that we observed earlier (Column 1 of Table 5) may result from its mitigating effect.

[Table 6]

[11] To illustrate the economic significance, raising the audit risk/scrutiny indicator from Moderate to slightly high to High would increase the overall stringency by almost one standard deviation.

5.3 Tax Policy Simulation

Our estimates of the semi-elasticity of pre-tax profits can be used to illustrate how tax revenues are affected by the implied degree of international profit shifting. Here we consider the case of a large cut in the corporate income tax rate by a large advanced economy. Specifically, we simulate a scenario where the corporate income tax rate for US affiliates falls to 25.7% in 2018.[12]

[Table 7]

Based on our sample of foreign affiliates, approximately 40% of all firms (excluding Indonesia) have US affiliates in their corporate groups.[13] Among those firms with US affiliates, the average change in foreign tax rate ranges from 3.05% in Vietnam to 6.23% in the Philippines. Note that all average changes in our simulation exercise are computed using observed profit as the weights in order to illustrate the likely impact in term of tax revenue.

Using the estimated semi-elasticity estimate from the specification with the overall stringency, our simulation indicates that, without taking into account the anti-tax avoidance efforts, the tax revenue declines by 8.28% on average. Incorporating the anti-tax avoidance efforts, the net effects are considerably smaller. The tax revenue falls by 3.36% on average —ranging from 2.40% in Malaysia to 3.83% in Thailand. The anti-avoidance effect appears to be largest in the Philippines where its stringency level is highest (see Table 7). We also show that if all countries raise its stringency level by one standard deviation, the average change in tax revenue will fall to 2.28%. Our findings,

[12] The Tax Cuts and Jobs Act (TCJA) of 2017 contains a provision that reduces the US federal corporate income tax rate from 35% to 21% starting from 2018. Taking into account state tax rates, the average US combined corporate income tax rate is 25.7% in 2018.
[13] Indonesia is excluded because of its limited number in our sample.

therefore, underline the importance of the anti-tax avoidance stringency in mitigating international tax avoidance in the region.

6. Conclusion and Policy Implications

This paper uses firm-level data from developing countries to examine the significance of tax-motivated profit shifting from high-tax to low-tax countries by multinational enterprises and to analyze the extent to which anti-avoidance measures mitigate the profit shifting. Focusing on firms in ASEAN5, this study shows that (1) tax-motivated profit shifting is statistically and economically significant, especially for manufacturing firms, (2) auditing and transfer-pricing scrutiny is more effective in reducing profit shifting than documentation requirement alone, and (3) tax-motivated profit shifting is prominent for large firms, while anti-tax avoidance measures result in the absence of profit shifting detected from small manufacturing firms.

The findings have important policy implications. First, tax-motivated profit shifting is significant so the government, especially those that rely heavily on corporate income tax, should pay attention to this issue. Second, the government should leverage information obtained from transfer-pricing documentation requirement to strengthen its capacity to audit. Third, while the existing measures seem to mitigate profit shifting for non-manufacturing firms and small manufacturing firms, there remain possibilities that large manufacturing firms shift their profit abroad so additional efforts should be focused on these firms. Finally, the government should be aware of changes in tax policies, especially corporate income tax reduction, of other countries since these policies could result in higher incentives for foreign subsidiaries in host countries to shift their profit to the country with lower tax rates, which will result in lower tax revenue collection of the current host countries.

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Table 1: Country composition of the baseline sample

Host countries	Number of Observations	Percent
Indonesia	179	1.0
Malaysia	4,970	27.2
Philippines	1,547	8.5
Thailand	10,024	54.8
Vietnam	1,588	8.7
Total	18,308	100.0

Notes: This table presents country composition of the sample of firms used in the baseline analysis.

Source: Authors' estimate

Table 2: Descriptive statistics of the baseline sample

Variables	Obs.	Mean	Median	SD
Profit before taxes (in thousand USD)	18,308	9,347	1,553	118,694
EBIT before taxes (in thousand USD)	18,290	9,549	1,621	120,740
Fixed assets (in thousand USD)	18,308	25,415	5,579	95,025
Average foreign CIT rate	18,308	0.30	0.29	0.09
Parent CIT rate	18,308	0.32	0.34	0.09
Host CIT rate	18,308	0.25	0.25	0.04
TP Documentation regulation	18,308	4.97	5.00	0.74
Audit risk/Scrutiny	18,308	7.74	6.67	1.56
Withholding tax/Treaty	18,308	2.40	0.00	3.24
Overall stringency level	18,308	5.04	5.00	1.15

Notes: This table presents descriptive statistics for the sample of firms used in the baseline analysis.

Source: Authors' estimate

Table 3: Mean of anti-avoidance stringency indicators by host countries

Host countries	Transfer-pricing regulation	Audit risk/ scrutiny	Withholding tax/treaties	Overall
Indonesia	6.67	10.00	6.25	7.64
Malaysia	5.00	10.00	0.83	5.28
Philippines	3.75	7.78	10.00	7.18
Thailand	5.00	6.67	2.92	4.86
Vietnam	5.00	8.33	2.92	5.42
Overall	5.08	8.56	4.58	6.07

Notes: This table presents means of anti-avoidance stringency indicators by host countries over the study period (2005-2016). They are normalized to range from 0 to 10. The overall indicator is constructed as a simple average of all three indicators.

Source: Authors' estimate

Table 4: Baseline model estimate without anti-avoidance stringency indicators: Dep var = log(before-tax profit)

Variables	(1)	(2)	(3)-Baseline
Foreign tax rate	0.866*	1.066**	1.032**
	(0.332)	(0.263)	(0.274)
Fixed assets (Log)	0.630***	0.504**	0.497**
	(0.027)	(0.151)	(0.150)
Constant	1.668***	2.340	2.123
	(0.356)	(1.295)	(1.302)
Observations	18,308	18,308	18,308
Number of firms	2,909	2,909	2,909
Firm FE	NO	YES	YES
Year FE	NO	YES	YES
Country-Yr FE	NO	NO	YES
Sector-Yr FE	NO	NO	YES

Notes: This table presents the baseline model estimate without anti-avoidance stringency indicators. Unit of observations is firm-year. Foreign tax rate is the average foreign tax rate facing each affiliate. Fixed assets is log of fixed assets. Country-Yr FE and Sector-Yr FE are country-year and sector-year fixed effects, respectively. Standard errors are heteroscedasticity-robust and are clustered on host countries. Numbers in parentheses indicate standard error. ***, **, * denotes significance at the 1%, 5%, and 10% levels, respectively.

Source: Authors' estimate

Table 5: Heterogeneity and robustness estimates of the model without anti-avoidance stringency indicators

Variables	(1) Small	(2) Large	(3) All firms	(4) Alternative dependent variable	(5) Alternative tax variable
	Dep var= log(before-tax profit)	Dep var= log(before-tax profit)	Dep var= log(before-tax profit)	Dep var= log(EBIT)	Dep var= log(before-tax profit)
Foreign tax rate	0.281	1.927**	0.594**	1.224***	
	(0.827)	(0.639)	(0.175)	(0.189)	
Parent tax rate					0.265
					(0.695)
Fixed assets (Log)	0.492**	0.493**	0.364**	0.515**	0.498**
	(0.146)	(0.176)	(0.081)	(0.137)	(0.166)
Constant	2.031	2.390	3.205***	1.844	2.663
	(1.217)	(1.603)	(0.563)	(1.150)	(1.405)
Observations	8,371	9,937	39,507	18,083	18,308
Number of firms	1,450	1,459	6,747	2,906	2,909
R-squared	0.157	0.101	0.113	0.148	0.119
Year FE	YES	YES	YES	YES	YES
Country-Yr FE	YES	YES	YES	YES	YES
Sector-Yr FE	YES	YES	YES	YES	YES

Notes: This table presents heterogeneity and robustness estimates of the model without anti-avoidance stringency indicators. Unit of observations is firm-year. Foreign tax rate is the average foreign tax rate facing each affiliate. Parent tax rate is the tax rate of immediate parent firm. Fixed assets is log of fixed assets. Country-Yr FE and Sector-Yr FE are country-year and sector-year fixed effects, respectively. Standard errors are heteroscedasticity-robust and are clustered on host countries. Numbers in parentheses indicate standard error. ***, **, * denotes significance at the 1%, 5%, and 10% levels, respectively.
Source: Authors' estimate

Table 6: Baseline estimate of the model with anti-avoidance stringency indicators

Variables	(1)	(2)	(3)	(4)
Foreign tax rate	2.539***	3.333***	2.458***	3.303***
	(0.340)	(0.710)	(0.399)	(0.235)
Foreign tax rate	-0.287***		-0.414*	-0.263**
x Overall stringency	(0.046)		(0.164)	(0.087)
Foreign tax rate		-0.128		
x Regulation		(0.088)		
Foreign tax rate		-0.223**		
x Scrutiny		(0.077)		
Foreign tax rate		-0.083**		
x Treaty		(0.026)		
Fixed assets (Log)	0.497**	0.497**	0.492**	0.492**
	(0.151)	(0.151)	(0.147)	(0.176)
Constant	1.293	2.366	2.746*	2.680
	(1.354)	(1.308)	(1.140)	(1.622)
Observations	18,308	18,308	8,371	9,937
Number of firms	2,909	2,909	1,450	1,459
R-squared	0.124	0.124	0.158	0.102
Firm FE	Yes	Yes	Yes	Yes
Year FE	YES	YES	YES	YES
Country-Yr FE	YES	YES	YES	YES
Sector-Yr FE	YES	YES	YES	YES

Notes: This table presents the baseline estimate of the model with anti-avoidance stringency indicators. Unit of observations is firm-year. Foreign tax rate is the average foreign tax rate facing each affiliate. Overall stringency is an indicator variable representing average level of all three anti-avoidance indicators. Regulation is an indicator variable representing transfer pricing document regulation. Scrutiny is an indicator variable representing audit risk and scrutiny. Treaty is an indicator variable representing treaty availability and withholding tax rates. Country-Yr FE and Sector-Yr FE are country-year and sector-year fixed effects, respectively. Standard errors are heteroscedasticity-robust and are clustered on host countries. Numbers in parentheses indicate standard error. ***, **, * denotes significance at the 1%, 5%, and 10% levels, respectively.

Source: Authors' estimate

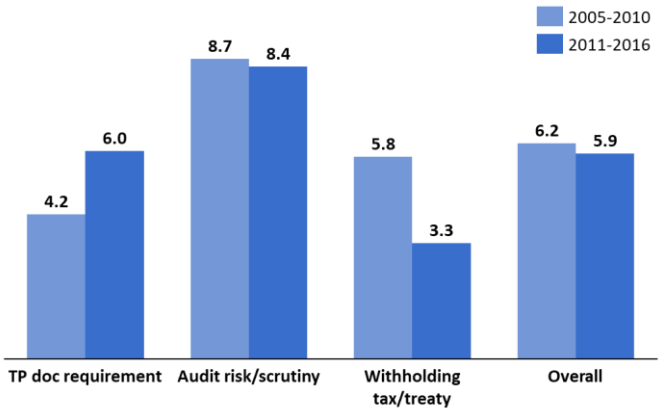
Table 7: Simulated effect of the 2018 Us tax cut on tax revenue associated with foreign subsidiaries

Host country	% with US affiliate	Average change in foreign tax rate (pp)	Average change in tax revenue (%)		
			Gross (without anti-avoidance effects)	Net (with anti-avoidance effects)	With one SD of anti-avoidance efforts
MY	43.86%	-2.32	-5.89%	-2.40%	-1.63%
PH	47.64%	-6.23	-15.81%	-2.78%	-0.73%
TH	36.83%	-3.20	-8.13%	-3.83%	-2.77%
VN	20.97%	-3.05	-7.75%	-3.60%	-2.59%
All ex. ID	38.29%	-3.26	-8.28%	-3.36%	-2.28%

Notes: This table presents simulated effects on tax revenue associated with the 2018 US tax cut. The average changes are computed using observed profit as weights and are based only among firms with US affiliate in corporate group.

Source: Authors' estimate

Figure 1: Development of anti-avoidance stringency level in ASEAN5 over time

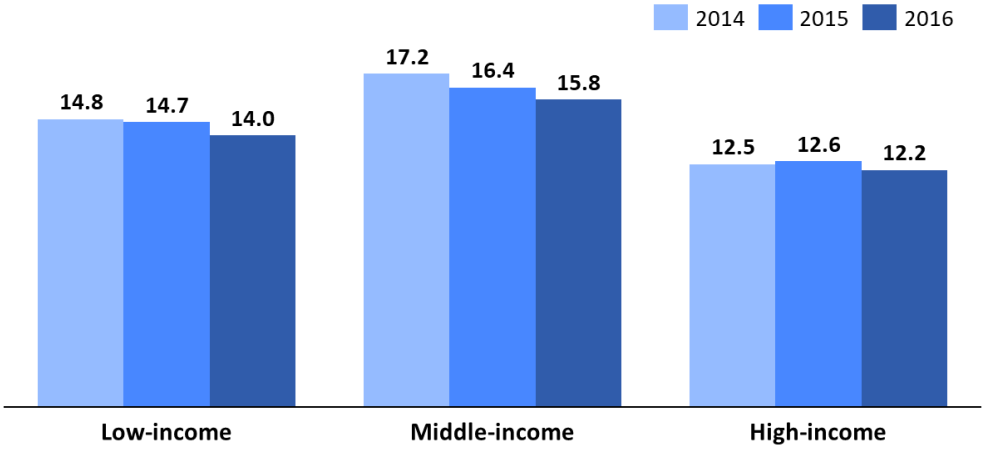


Notes: This figure shows means of anti-avoidance stringency indicators for 2005-2010 and 2011-2016. They are normalized to range from 0 to 10. The overall indicator is constructed as a simple average of all three indicators

Source: Authors' estimate

Appendix

Figure A1: Corporate income tax revenue in % of total tax revenue (2014-2016)



Notes: This figure shows corporate income tax revenue in % of total tax revenue over 2014-2016 for low-, middle- and high-income countries. The income group is based on World Bank's country classification.
Source: ICTD / UNU-WIDER Government Revenue Dataset

Table A1: Construction of anti-avoidance stringency indicators

Indicators	**Construction details**
Transfer-pricing regulation	Are transfer-pricing documentations required to be submitted on an annual basis? 0 = No; 1 = No but documents need to be prepared in case of audit; 2 = Yes and documents need to be submitted at the time of tax.
Audit risk/scrutiny	How likely the tax documents are to be audited or challenged for an average MNE? 0 = None; 1 = Low; 2 = Moderate to slightly high; 3 = High
Withholding taxes/tax treaties	Three levels of strength: 0 if The average rate of taxes on interest, royalties and dividends is below or equal to the median among ASEAN5 in 2011 (13.3%) and the number of bilateral tax treaties is above the average in 2011 (53 treaties). 1 if either (i) the average rate of taxes on interest, royalties and dividends is below or equal to the median among ASEAN5 in 2011 (13.3%) and the number of bilateral tax treaties is below the average in 2011 (53 treaties); or (ii) the average rate of taxes is strictly above the median (13.3%) and the number of bilateral tax treaties is above the average in 2011 (53 treaties). 2 if the average rate of taxes on interest, royalties and dividends is strictly above the median among ASEAN5 in 2011 (13.3%) and the number of bilateral tax treaties is below the average in 2011 (53 treaties).

Notes: This table illustrates construction details of anti-avoidance stringency indicators.

Source: Authors' analysis