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# Tax-Motivated Profit Shifting and Anti-Avoidance Stringency: Firm-Level Evidence from Developing Countries

by

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August 2019

Discussion Paper

No. 111

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**Tax-Motivated Profit Shifting and Anti-Avoidance Stringency:  
Firm-Level Evidence from Developing Countries\***

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August 6, 2019

**Abstract:** 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 regarding tax revenues in developing countries, especially those depending on multinational enterprises but having weak governance.

**Keywords:** Profit shifting, tax avoidance, transfer pricing, anti-tax avoidance, multinational enterprise

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

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## 1. Introduction

Tax avoidance by multinational enterprises (MNEs) have received a great deal of attention in public policy discussions as globalization has opened up opportunities for multinational enterprises to greatly reduce the taxes they pay. This practice, also known as base erosion and profit shifting (BEPS), takes place when MNEs transfer profits from their subsidiaries in higher-tax rate countries to the ones with lower-tax rates, hence minimizing the total tax bill of the whole enterprise. Effectively, it reduces the tax collection of countries with higher tax rates.

To respond to this regulatory arbitrage, OECD has launched an action plan on BEPS in 2013.<sup>1</sup> The BEPS issues, however, are likely to be more critical for developing countries as they tend to be more reliant on corporate income tax than developed countries.<sup>2</sup> Given the need to ensure adequate funding for development projects and the increasing importance of cross-border investment, it is crucial that developing-country policymakers have a sense of the significance of the BEPS and the effectiveness of anti-avoidance measures. This issue is particularly critical for developing economies that depend on foreign direct investment from MNEs and are integrated to the world economy as a part of global production networks.

Economic literature has provided compelling empirical evidence on tax-motivated profit shifting by firms with foreign subsidiaries. However, most previous empirical studies have focused on advanced economies while relatively small numbers are devoted to developing countries. This paper contributes to the literature by addressing two research questions with the main focus on developing countries. First, how significant is the tax-motivated profit shifting for developing countries? Second, how does the tax-motivated profit shifting respond to changes in the enforcement of anti-avoidance measures? Governments generally expect increased enforcement to have a positive effect on reported profit. However, the increased enforcement also raises the compliance cost of doing business, which will

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<sup>1</sup> For details, see OECD (2003).

<sup>2</sup> 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.

negatively affect firms' profitability and thus the corporate income tax revenue. Little is understood about the effect of such increased enforcement on MNEs' behavior for developing countries. To answer these two questions, we focus our analysis on selected developing Asian economies for three reasons: first, MNEs have play an important role in these economy; second, their institutions remain relatively weak when compared to advanced economies; finally, there is large heterogeneity across these economies in terms of diverse quality of institutions.

There are three main findings from our study. First, tax-motivated profit shifting is statistically and economically significant, especially for manufacturing firms. In our baseline specification, a reduction in the average tax rate of foreign affiliates by 10 percentage points decreases the reported profit of a domestic firm by 10.32% 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 the net degree of profit shifting being not statistically significant.

The remainder of this paper is organized as follows. Section 2 discusses related existing studies and the contribution of this study to the literature. We illustrate the empirical strategy in Section 4 and describes the data used in the analysis of this study in Section 3. Section 5 shows 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 studies base erosion and profit-shifting issues in developing countries. For

example, Fuest, Hebous, and Riedel (2011) use data on foreign affiliates of German MNEs. Their study 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, de Mooij, and Keen (2016) provide country-level empirical evidence on the erosion of corporate income tax base for non-OECD countries. Their findings suggest that the tax-base spillovers from other countries may be greater than those associated with developed countries. Johannesen, Torslov, and Wier (2016) use a firm-level dataset with an emphasis on developing East European countries to investigate the intensity of tax-motivated profit shifting. They propose a novel technique to identify profit shifting by using a dummy variable that indicates whether reported profits lie within a specified range around zero. Their study relies exclusively on tax rates associated with parent companies and other foreign affiliates. They find that profit-shifting responses to tax incentives are stronger in less developed economies—consistent with the findings by Crivelli, de Mooij, and Keen (2016). We complement this literature in two ways. First, we examine how anti-avoidance measures impact MNEs' profit shifting behavior in the context of developing countries. Second, by focusing on firms with no further subsidiary, we are able to utilize consolidated financial account data that are common among many developing countries. This strategy 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 to developing Asia where MNEs are very prominent.

The second strand of related literature is on anti-tax avoidance. 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 suggestive evidence that income shifting in response to tax rate differentials appears to be stronger in countries with weak enforcement than it is for those with tough enforcement. Lohse and Reidel (2012) use 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 (2013) 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. He 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. His indicator, however, does not take into account the likelihood in which the associated documentations will be audited by the authorities. Our study contributes to the literature by examining the impacts of anti-avoidance stringency in the context where MNEs are prevalent but institutions and governance are likely to be weak relative to advanced economics.

### **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 anti-tax avoidance measures. 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 the statutory domestic tax rate in the model may confound the profit shifting responses for two reasons. First, many developing countries offer tax incentives to attract foreign direct investment (FDI). These policies effectively lowers the domestic tax rate for qualified firms, making the domestic headline tax rates an unsuitable measure of the profit shifting incentive. Second, as suggested by Johannesen et al. (2017) 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.

To address this concern, we follow Johannesen et al. (2017) by separating domestic and foreign tax rates and using country-time fixed effects to absorb the variation in domestic tax rates. This yields the following equation:

$$\log(\pi_{it}) = \beta_0 + \beta_1 \tau_{it}^{foreign} + \beta_2 \tau_{it}^{foreign} Z_{it} + \beta_3 \log(k_{it}) \\ + individualFE + yearFE + country * yearFE + industry * yearFE + \varepsilon_{it},$$

where  $\pi_{it}$  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 the tax rates of their foreign affiliates systemically alter their reported profit relative to firms in the same country that are not exposed to any change in 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. By using a log form, we unfortunately have to drop all observations with non-positive values of profit before taxes. 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, 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.

## 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. We focus on tax motivation to shift reported profit among foreign subsidiaries in 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 and, as a result, are one of the most important host countries of affiliates of global and regional MNEs.<sup>3</sup> Second, despite having been developed tremendously over the past several decades, institutional foundations of these economies remain relatively weak. Regulation and law enforcement are generally not very effective. Third, although these economies are located in the same region, there is heterogeneity between them, allowing 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; the findings from this study therefore have important policy implications for the government.

In this study, we identify 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 that have no subsidiary. This strategy ensures

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<sup>3</sup> 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 and 7% of global FDI stock in 2016.



that the observed financial information refers only to the operation of that single entity. We also require firms to have at least two years of available data. After applying these criteria, we arrive at a total sample of 18,308 observations from 2,904 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 54.8% and 27.2% of all observations respectively. Descriptive statistics on the variables used in our analysis are provided in Table 2.

Table 1: Country composition of the baseline sample

<b>Host countries</b>	<b>Number of Observations</b>	<b>Percent</b>
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

<b>Variables</b>	<b>Obs.</b>	<b>Mean</b>	<b>Median</b>	<b>SD</b>
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. CIT stands for corporate income tax.

*Source:* Authors' estimate

#### 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 an arm's length principle for intra-group transactions and have anti-tax avoidance regulations in place. The rules and enforcement strength associated with these regulations vary across countries. For example, while all countries in

our data 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.<sup>4</sup> In addition, despite not being designed or commonly considered as anti-tax avoidance rules, higher withholding tax rates can influence cross-border tax planning opportunities as well. 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 the case where transfer-pricing documentations that are requested only when there is an audit from the case where documents are always required with tax filing. We collect this information from various publications of 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 that a tax audit and transfer pricing scrutiny for an average MNE occurs (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.

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<sup>4</sup> The reported likelihood of transferring pricing scrutiny is based on Ernst&Yong's World Wide 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 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.<sup>5</sup> The information on withholding tax rates applicable to various income sources and tax treaty is based on the Comtax database.<sup>6</sup>

Note that the first two variables 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 cross-border international tax planning.<sup>7</sup> All three indicators are then normalized so that each ranges from 0 to 10, with higher value representing higher stringency level. The overall stringency indicator is then computed as a simple average of all of these three indicators.

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

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<sup>5</sup> It is worth noting that some tax treaties may contain specific anti-tax avoidance provisions.

<sup>6</sup> Comtax is a company providing data and software related to international tax rules to tax practitioners and academic researchers.

<sup>7</sup> The details of their construction are provided in Table A1 in the Appendix.

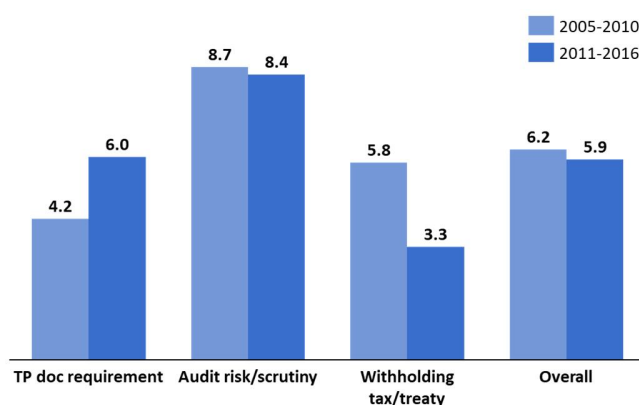
Table 3: Mean of anti-avoidance stringency indicators by host countries

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

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

## 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. Following Huizinga and Laven (2008), we restrict the baseline sample to include only manufacturing firms. We later expand the sample to include services firms in one of the 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 regression coefficient of 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 baseline 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 tax-motivated profit shifting in ASEAN5 economies is economically significant—a reduction in the average tax rate of foreign affiliates by 10 percentage points decreases the reported profit of a domestic firm by 10.32% on average.

Table 4: Baseline model estimate without anti-avoidance stringency indicators

Dep. Var.: log(before-tax profit)	(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-Year FE	NO	NO	YES
Sector-Year 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-Year FE and Sector-Year 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

To gain additional insight regarding the heterogeneous impacts of tax-motivated profit shifting, we split the firms based on their size of total assets.<sup>8</sup> Firms are considered small if their total asset size in the first year is smaller than the sample median. According to Columns (1) and (2) of Table 5, we find that the regression coefficient of foreign tax rate is positive and statistically significant only among large firms. 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

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<sup>8</sup> 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 tax-motivated profit shifting is likely to be more prevalent among manufacturing firms.

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

Dep. Var.:	log (before-tax profit)		log (EBIT)	log (before-tax profit)	
	Small	Large	All firms	All firms	All firms
	(1)	(2)	(3)	(4)	(5)
Foreign tax rate	0.281 (0.827)	1.927** (0.639)	0.594** (0.175)	1.224*** (0.189)	
Parent tax rate					0.265 (0.695)
Fixed assets (Log)	0.492** (0.146)	0.493** (0.176)	0.364** (0.081)	0.515** (0.137)	0.498** (0.166)
Constant	2.031 (1.217)	2.390 (1.603)	3.205*** (0.563)	1.844 (1.150)	2.663 (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-Year FE	YES	YES	YES	YES	YES
Sector-Year 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. Observations included in Columns (4) and (5) are all firms with positive EBIT and all firms with available parent's tax rate, respectively. 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-Year FE and Sector-Year 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

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. Finally, we use the parent tax rate rather than the average tax rate of all foreign



affiliates. The result in Column (5) shows a positive but insignificant estimate of the tax-motivated profit shifting effect, suggesting that MNEs take into consideration the tax rates of all corporate affiliates in their group rather than that of parent firms alone when they design their international tax planning strategy.

### *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%).

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 statutory regulations. Raising the strength of scrutiny by one standard deviation would lower tax-motivated profit shifting by 45.08%, while an increase in the regulation level by one standard deviation would result in a 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 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 firm's 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 tax-motivated shifting of reported profit is relatively evident among large firms. They also suggest that anti-tax avoidance measures are quite effective for small firms, supporting the insignificant evidence no profit shifting observed from small firms that we report earlier (Column 1 of Table 5).

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

Dep. Var.:	(1)	(2)	(3)	(4)
log(before-tax profit)				
Foreign tax rate	2.539*** (0.340)	3.333*** (0.710)	2.458*** (0.399)	3.303*** (0.235)
Foreign tax rate x Overall stringency	-0.287*** (0.046)		-0.414* (0.164)	-0.263** (0.087)
Foreign tax rate x Regulation		-0.128 (0.088)		
Foreign tax rate x Scrutiny		-0.223** (0.077)		
Foreign tax rate x Treaty		-0.083** (0.026)		
Fixed assets (Log)	0.497** (0.151)	0.497** (0.151)	0.492** (0.147)	0.492** (0.176)
Constant	1.293 (1.354)	2.366 (1.308)	2.746* (1.140)	2.680 (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

### 5.3 Tax Policy Simulation

Our estimates of the semi-elasticity of pre-tax profits can be used to demonstrate how tax

revenues are affected by the implied degree of international profit shifting. Here we consider an illustrative 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.<sup>9</sup>

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
Malaysia	43.86%	-2.32	-5.89%	-2.40%	-1.63%
Philippines	47.64%	-6.23	-15.81%	-2.78%	-0.73%
Thailand	36.83%	-3.20	-8.13%	-3.83%	-2.77%
Vietnam	20.97%	-3.05	-7.75%	-3.60%	-2.59%
ASEAN5 excl. Indonesia	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

Based on our sample of foreign affiliates, approximately 40% of all firms in ASEAN5 excluding Indonesia have US affiliates in their corporate groups.<sup>10</sup> 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.

<sup>9</sup> 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.

<sup>10</sup> Indonesia is excluded because of its limited number in our sample.

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, as shown in Table 7. We also show that if each country raises its stringency level by one standard deviation, the average decrease in tax revenue will fall to 2.28%. Our findings, 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. The government, especially those that rely heavily on corporate income tax, should therefore pay attention to this issue. Second, enacting laws and introducing regulations alone are not sufficiently effective in mitigating cross-country profit shifting by MNE subsidiaries; the government should strengthen its auditing and transfer pricing scrutiny to prevent firms from moving reported profits to other countries. Third, while 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 and 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.

## References

- ASEAN Secretariat (2017), ASEAN at 50: A Historic Milestone for FDI and MNEs in ASEAN, Jakarta: ASEAN Secretariat, October 2017
- Bartelsman, E. J., & Beetsma, R. M. (2003). Why pay more? Corporate tax avoidance through transfer pricing in OECD countries. *Journal of public economics*, 87(9-10), 2225-2252.
- Crivelli, E., R. de Mooij, and M. Keen (2016). Base Erosion, Profit Shifting and Developing Countries, *FinanzArchiv: Public Finance Analysis*, 72(3), pp. 268-301.
- Fuest, C., S. Hebous, and N. Riedel (2011). International Debt Shifting and Multinational Firms in Developing Countries. *Economics Letters*, 113(2), pp. 135–38.
- Hines, J., and E. Rice (1994). Foreign Tax Havens and American Business. *Quarterly Journal of Economics*, 109(1), pp. 149–82.
- Huizinga, H., and L. Laeven (2008). International Profit Shifting within Multinationals: A Multi-Country Perspective. *Journal of Public Economics*, 92, pp. 1164–82.
- Johansson, Å., Skeie, Ø. B., Sorbe, S., & Menon, C. (2017). *Tax planning by multinational firms: Firm-level evidence from a cross-country database* (No. 1355). OECD Publishing.
- Johannesen, N., T. Tørsløv, and L. Wier (2016). Are less developed countries more exposed to multinational tax avoidance? Method and evidence from micro-data, WIDER Working Paper, No. 2016/10.
- Klassen, K. J., & Laplante, S. K. (2012). Are US multinational corporations becoming more aggressive income shifters?. *Journal of Accounting Research*, 50(5), 1245-1285.
- Lohse, T., & Riedel, N. (2012). *The impact of transfer pricing regulations on profit shifting within European multinationals*(No. 61-2012). FZID Discussion paper.

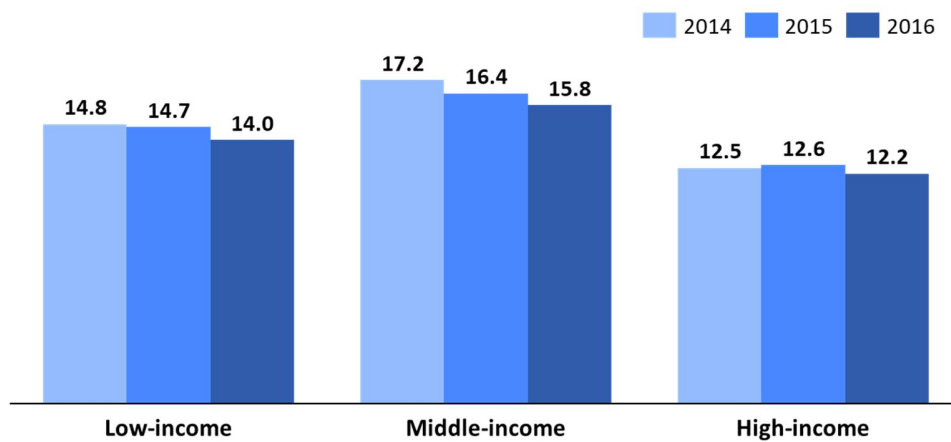
Mescall, D., & Klassen, K. J. (2018). How Does Transfer Pricing Risk Affect Premiums in Cross-Border Mergers and Acquisitions?. *Contemporary Accounting Research*, 35(2), 830-865.

OECD, 2013, Action Plan on Base Erosion and Profit Shifting (OECD: Paris).

Saunders-Scott, M. (2013). How does transfer-pricing enforcement affect reported profits?

## 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

<b>Indicators</b>	<b>Construction details</b>
<b>Transfer-pricing regulation</b>	<p>Are transfer-pricing documentations required to be submitted on an annual basis?</p> <p>0 = No;</p> <p>1 = No but documents need to be prepared in case of audit;</p> <p>2 = Yes and documents need to be submitted at the time of tax.</p>
<b>Audit risk/scrutiny</b>	<p>How likely the tax documents are to be audited or challenged for an average MNE?</p> <p>0 = None;</p> <p>1 = Low;</p> <p>2 = Moderate to slightly high;</p> <p>3 = High</p>
<b>Withholding taxes/tax treaties</b>	<p>Three levels of strength:</p> <p>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).</p> <p>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).</p> <p>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).</p>

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

*Source:* Authors' analysis