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Assessing tax burden differential between foreign multinationals and local firms: Implications for FDI tax incentives

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Abstract

This study uses firm-level data from ASEAN5 to examine whether there are systemic differences in how reported profit is taxed between foreign multinational and comparable local firms. Using propensity score matching, it finds that the effective tax rate (ETR: tax expense divided by pre-tax profit) of foreign MNEs is 1.8 percentage point lower than that of local firms. It also shows that the preferential tax treatment is responsible for 95% of the ETR differential. Under the baseline scenario, the associated revenue loss is 2.6% of total corporate income revenue.

Keywords: Tax incentive, foreign direct investment, multinational enterprises

JEL classifications: E62; F23; H25;

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1. Introduction

Tax incentives have been extensively used by developing countries to attract direct investment from foreign multinational enterprises (MNEs). These incentives can take various forms such as tax holiday, investment tax credits and reduced tax rates. Their treatments can be applicable to all qualified firms or firm-specific depending upon negotiation. While foreign direct investment (FDI) is expected to yield positive direct and spill-over benefits on host countries, these tax incentives could pose an important threat on corporate income tax revenue which represents a major revenue source in the developing world.

In the developing countries context, the public finance literature related to foreign MNEs has provided compelling evidence on the tax base erosion associated with international tax avoidance practices such as profit shifting, strategic placement of assets and tax havens. Examples include Johannesen et al., 2019 and Muthitacharoen and Sampantharak, 2019. The preferential tax treatment, however, represents another important avenue in which MNEs could use to avoid paying taxes in developing countries. To date, there is limited firm-level evidence on the extent to which such tax incentives have eroded corporate income tax revenue for developing countries.

This study examines how reported profit by subsidiaries of foreign MNEs are taxed relative to comparable local firms. Specifically, it investigates whether there is any systematic difference in the effective tax rate (ETR: defined as tax expense divided by pre-tax profit) between that of subsidiaries of foreign MNEs and that of domestic firms. The hypothesis is that, in the absence of the preferential tax treatment and international tax planning opportunities, MNEs' reported profit should be taxed at the same rate as the

reported profit of comparable local firms.² Further, using the information on firms that have received investment promotion certificates, it estimates the extent to which the ETR differentials can be attributed to the preferential tax treatment.

I use firm-level data from five middle-income Southeast Asian countries (Indonesia, Malaysia, Philippines, Thailand and Vietnam). These countries represent a good case study for two reasons: first, they have received relatively large FDI inflows over the past several decades³; and second, all of them have provided a host of tax incentives to attract FDI from multinational firms.

In order to account for the difference in size between foreign MNE subsidiaries and local firms, I employ the propensity score matching approach (Rosenbaum and Rubin, 1985; Dehejia and Wahba, 2002). The matching process is based on size, industry and host country. I then estimate the ETR differentials controlling for various factors including size, profitability and various fixed effects. I also use the estimated ETR differential to construct country-level estimates of tax revenue loss associated with the preferential tax treatment.

I find that foreign multinational subsidiaries have significantly lower ETR than local firms with estimated gap of 1.8 percentage points. Using the subsample of Thai firms where the information on investment promotion certificates is available, it finds that the preferential tax treatment is responsible for approximately 95% of the ETR differential. In addition, there is a substantial degree of heterogeneity in the ETR

² Since the ETR measure is relatively less influenced by profit-shifting practice such as transfer pricing and strategic asset placement (see Azemar, 2019), this approach is likely to capture the difference attributable to preferential tax treatment.

³ Over 90% of the world's 100 largest non-financial MNEs in term of foreign assets have at least one subsidiary in ASEAN in 2016 (ASEAN Secretariat, 2017). Furthermore, the stock in FDI in ASEAN accounts for 21% of total FDI stock in developing countries and 7% of global FDI stock in 2016.

differentials. The wedge between foreign subsidiaries and local firms is higher for firms that are larger in size, firms in the manufacturing sector, and firms with high technological intensity. Finally, the estimate indicates that the preferential tax treatment aimed at foreign MNEs has resulted in significant revenue loss in the ASEAN region. Under the baseline scenario, the revenue loss in term of total corporate income tax revenue is around 2.6% on average ranging from 2.1% in the Philippines to 3.6% in Thailand.

This paper is related to two strands of the public finance literature. First, it contributes to the literature that directly compare tax burden differential between foreign and domestic firms. This literature has provided compelling evidence showing that MNEs systematically pay lower corporate income taxes than their domestic counterparts. Examples include Kinney and Lawrence (2000), Egger, Egert and Winner (2010), and Azemar (2019). I complement this literature by presenting evidence from developing countries and underlining the critical impact of the FDI tax incentives on the tax burden differential.

Second, it joins the pool of studies that investigate the base erosion and profit shifting issues in the developing countries context. Most studies have focused on the international tax avoidance practices that enable MNEs to manipulate their reported profits. Examples are Cobham and Jansky (2018), Crivelli et al. (2016), Fuest, Hebous, Riedel (2011), Jansky and Palansky (2019), Johannesen et al. (2019), and Muthitacharoen and Sampantharak (2019). My study contributes by using firm-level data to illustrate that the significant portion of tax base erosion could be attributed to the use of preferential tax treatment aimed to attract MNEs.

The remainder of this paper is organized as follows. The next section describes the methodology, the data, and the matching quality. Section 3 presents and discusses the

results. The corporate tax revenue implications are presented in Section 4. The final section concludes the study.

2. Research design

As noted previously, the main goal of this study is to estimate the tax burden differential between foreign MNEs and domestic firms and quantify the portion that could be attributable to FDI tax incentives. To address this goal, I measure tax burden using the effective tax rate defined as tax expense divided by profit before taxes. This measure is relatively less biased by profit shifting practice such as transfer pricing manipulations and debt placement (see Azemar, 2019).

I employ the model specification as follow:

$$\begin{aligned}
 etr_{it} = & \beta_0 + \beta_1 foreign_i + size_{it} + yearFE + ctryFE \\
 & + ctry * yearFE + industryFE + industry * yearFE + \varepsilon_{it},
 \end{aligned} \tag{1}$$

where etr_{it} = the effective tax rate for firm i in year t , $foreign_{it}$ = a dummy variable equal to 1 if firm i is a subsidiary of foreign MNEs (0 otherwise), $size_{it}$ is size of firms proxied by total fixed assets, roa_{it} is return on assets defined as profit before taxes divided by total assets and ε_{it} is the error term. I also control for country-, year-, industry-, country-year- and industry-year-fixed effects.

In addition to ownership status, foreign multinational subsidiaries are likely to be much larger than domestic firms. To account for such differences, I use the Nearest-neighbor propensity score matching method without replacement (Rosenbaum and Rubin, 1983; Dehejia and Wahba, 2002). Specifically, I match each foreign firm with a domestic firm using observable characteristics of firms (asset size, revenue, two-digit industry code). I also match each firm based on its host country. The matching process

yields two groups of domestic and foreign firms that are comparable in size of assets and revenue.

This study uses firm-level financial account data and ownership information from Bureau van Dijk's Orbis database. We focus on five middle-income ASEAN countries (Indonesia, Malaysia, the Philippines, Thailand and Vietnam). Consistent with Huizinga and Laeven (2008), Weichenrieder (2009) and Fuest et al. (2012), a firm is considered a foreign multinational subsidiary if at least 50% of the shares are ultimately owned by a foreign firm. I include only firms which do not have foreign subsidiary since the vast majority of ASEAN firms in the Orbis database report only their consolidated accounts. Due to low coverage of financial data for small firms in the Orbis database, I include only firms with total assets at least 2.6 million USD. The study period is from 2009 to 2016. This dataset is then used for the matching process.

Table 1 shows descriptive statistics on foreign multinational subsidiaries and domestics for the whole sample and the matched sample. Panel A indicates that, as expected, foreign subsidiaries tend to be larger than domestic firms in terms of both total assets and total revenue. The propensity score matching procedure yields the group of domestic firms that are much more comparable to foreign subsidiaries in terms of the matching variables (Panel B). In the matched sample, the differences in the means of $\log(\text{total assets})$ and $\log(\text{total revenue})$ are not statistically significant.

Table 1*Descriptive statistics of the whole sample and the matched sample*

	Foreign subsidiaries	Domestic firms
	A) Whole sample	
Log(Total assets)	9.88	7.85
Log(Total revenue)	10.11	8.18
	B) Matched sample	
Log(Total assets)	9.90	9.95
Log(Total revenue)	10.11	10.10

Source: Authors' estimate

Panel A of Table 2 provides a breakdown of the matched sample in term of the host countries. Thailand and Malaysia accounts for most of the sample, with the shares of 49% and 34%, respectively. Panel B of Table 2 shows the summary statistics of the variables used in the regression analysis. The mean effective tax rate is 0.24. The mean size of fixed assets is approximately 75.8 million USD. The mean return on assets, defined as profit before taxes divided by total assets, is 0.12.

Table 2*Summary statistics of variables used in the analysis*

A) Breakdown in terms of parent and host countries				
Host countries	N	Percent		
Indonesia	602	1.2		
Malaysia	17,188	33.4		
Philippines	4,284	8.3		
Thailand	25,154	48.9		
Vietnam	4,240	8.2		
Total	51,468	100.0		

B) Summary statistics for variables used in the regression analysis				
Variable	N	Mean	Median	SD
Effective tax rate	51,468	0.24	0.23	0.14
Fixed assets (thousand USD)	51,468	75,848	4,280	586,258
Fixed assets (log)	51,166	8.29	8.38	2.42
Return on assets	51,468	0.12	0.08	0.11

Source: Authors' estimate

3. Results

In this section, I present the baseline estimate of the difference in the effective tax rate between foreign subsidiaries and domestic firms and examine its robustness using several sensitivity tests. I then explore the extent to which the ETR differential is driven by the preferential tax treatment. Finally, I investigate the heterogeneity of the estimated differences across various firm characteristics.

Baseline estimate

I begin the analysis by examining whether foreign subsidiaries have systematically different effective tax rate from comparable domestic firms. Table 3 presents the empirical results of Equation 1. All columns use effective tax rate (ETR) as a dependent variable. I incrementally add fixed effects and control variables in Column 1 through Column 4 in order to illustrate the robustness of the estimate. The estimate in

Column 4 represents the baseline estimate and is the most general model including a full set of fixed effects and control variable.

The finding suggests that foreign subsidiaries have significantly lower ETR than domestic firm. This result is robust to the inclusion of fixed effects and control variables. The difference is also economically significant, with the estimated gap of 1.8 percentage point in the baseline specification (Column 4). In addition, firms with larger capital tend to have lower ETR than smaller firms. This is possibly because of preferential tax treatment geared toward firms with large investment projects.

Table 3

Baseline estimate of ETR differential (Dep var: ETR)

	(1)	(2)	(3)	(4) Baseline
Foreign	-0.014*** (0.004)	-0.014*** (0.004)	-0.014*** (0.004)	-0.018*** (0.004)
Fixed assets (log)				-0.008*** (0.001)
Observations	51,468	51,468	51,468	51,166
CTRY FE	No	Yes	Yes	Yes
Year FE	No	Yes	Yes	Yes
CTRY_YR FE	No	Yes	Yes	Yes
SEC FE	No	No	Yes	Yes
SEC_YR FE	No	No	Yes	Yes

Notes: This table presents the baseline ETR differential between foreign MNE subsidiary and local firms. Foreign is a dummy variable that equals one for foreign MNE subsidiary. Fixed assets is log of total fixed assets. Standard errors are heteroscedasticity-robust and clustered at the sector level. Numbers in parentheses indicate standard error. ***, **, * denotes significance at the 1%, 5%, and 10% levels, respectively. Full estimation tables are available upon request.

Source: Authors' estimate

This baseline result is generally robust to changes in assumptions and model specifications (Table 4). The ETR differential estimate is estimated to be 1.7 percentage point when controlling for profitability (Column 1). Using unmatched sample results in an increase in the size of the ETR wedge to 2.4 percentage point (Column 2). Finally, I use an alternative matching assumption (nearest neighbor matching method with 0.1

caliper radius, without replacement).⁴ The resulting ETR differential is again consistent with the baseline result (Column 3).

Table 4

Sensitivity tests of the baseline estimate (Dep var: ETR)

	(1) Controlling for profit	(2) Unmatched	(3) Matching with caliper 0.1
Foreign	-0.017*** (0.004)	-0.024*** (0.005)	-0.017*** (0.003)
Fixed assets (log)	-0.009*** (0.001)	-0.001 (0.001)	-0.008*** (0.001)
ROA	-0.016 (0.011)		
Observations	51,166	488,795	49,740
CTRY FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
CTRY_YR FE	Yes	Yes	Yes
SEC FE	Yes	Yes	Yes
SEC_YR FE	Yes	Yes	Yes

Notes: This table presents the robustness tests for the baseline ETR differential between foreign MNE subsidiary and local firms. Foreign is a dummy variable that equals one for foreign MNE subsidiary. Fixed assets is log of total fixed assets. ROA is pre-tax profit divided by total assets. Standard errors are heteroscedasticity-robust and clustered at the sector level. Numbers in parentheses indicate standard error. ***, **, * denotes significance at the 1%, 5%, and 10% levels, respectively. Full estimation tables are available upon request.

Source: Authors' estimate

Exploring the role of preferential tax treatment

In this subsection, I explore the extent to which the preferential tax treatment drives the wedge in the ETR between foreign MNEs and domestic firms. Since the information on whether firms receive the preferential tax treatment from the government is only available for Thailand, the analysis is restricted to Thailand. For Thai firms, I have

⁴ In this specification, I match each foreign MNE subsidiary with a closet comparable local firm within the 0.1 radius in term of the propensity score. Note that the standard deviation of the logit of the propensity score is around 0.5 in the baseline specification.

information on whether a firm has received investment promotion certificate from Thailand's Board of Investment (BOI).

Table 5

Exploring the role of preferential tax treatment

	(1) Dep var: Having promotion certificate	(2) Dep var: ETR (Baseline)	(3) Dep var: ETR (Match on having promotion certificate)
Foreign	0.349*** (0.023)	-0.018*** (0.005)	-0.001 (0.004)
Fixed assets (log)	0.053*** (0.007)	-0.010*** (0.001)	-0.010*** (0.001)
Observations	25,063	25,063	25,063
Year FE	Yes	Yes	Yes
SEC FE	Yes	Yes	Yes
SEC_YR FE	Yes	Yes	Yes

Notes: This table illustrates the extent to which the ETR differential is attributed to the preferential tax treatment. Foreign is a dummy variable that equals one for foreign MNE subsidiary. Fixed assets is log of total fixed assets. Standard errors are heteroscedasticity-robust and clustered at the sector level. Numbers in parentheses indicate standard error. ***, **, * denotes significance at the 1%, 5%, and 10% levels, respectively. Full estimation tables are available upon request.

Source: Authors' estimate

I first consider the difference in the propensity to receive the promotion certificate between foreign MNEs and comparable domestic firms. I re-estimate the baseline model specification but use the indicator variable for having the certificate as a dependent variable. I find that foreign multinational subsidiaries are 34.9 percentage points more likely to receive the certificate than comparable domestic firms (Column 1 of Table 5).

Next, I estimate the baseline model specification using only Thai firms. The finding in Column 2 of Table 5 indicates the ETR differential of 1.8 percentage point. Finally, I re-run the propensity score matching but use the indicator for having the certificate as an additional matching variable. The coefficient on the foreign dummy is estimated to be -0.001 and not statistically significant (Column 3 of Table 5). The ETR

differential is therefore cut by 94.4% when I take into account the promotion certificate information in the matching procedure. This finding suggests that, for Thailand, the preferential tax treatment is principally responsible for the wedge in the ETR between foreign subsidiaries and domestic firms.

Heterogeneity of the ETR differentials

To gain additional insights on the ETR differential, I conduct a set of heterogeneity tests with respect to various firm characteristics. I first explore the heterogeneity with respect to firm's size. Columns 1 and 2 of Table 6 show the estimates where I split firms using the median value of their fixed assets. I find that the difference in the ETR is much more evident among large firms (2.1 percentage points). Among small firms, the ETR difference narrows to 1.4 percentage points. Both differences are statistically significant.

Table 6

Heterogeneity analysis (Dep var: ETR)

VARIABLES	(1) Small	(2) Large	(3) Manu	(4) Services	(5) Low tech	(6) High tech
Foreign	-0.014*** (0.003)	-0.021*** (0.005)	-0.026*** (0.004)	-0.007** (0.003)	-0.014*** (0.004)	-0.025*** (0.005)
Fixed assets (log)	-0.001 (0.001)	-0.010*** (0.002)	-0.012*** (0.001)	-0.005*** (0.001)	-0.007*** (0.001)	-0.011*** (0.002)
Observations	25,432	25,734	27,069	18,619	26,601	19,087
CTRY FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
CTRY_YR FE	Yes	Yes	Yes	Yes	Yes	Yes
SEC FE	Yes	Yes	Yes	Yes	Yes	Yes
SEC_YR FE	Yes	Yes	Yes	Yes	Yes	Yes

Notes: This table presents the baseline ETR differential between foreign MNE subsidiary and local firms. Foreign is a dummy variable that equals one for foreign MNE subsidiary. Fixed assets is log of total fixed assets. Standard errors are heteroscedasticity-robust and clustered at the sector level. Numbers in parentheses indicate standard error. ***, **, * denotes significance at the 1%, 5%, and 10% levels, respectively. Full estimation tables are available upon request.

Source: Authors' estimate

Next, I investigate the ETR differential between manufacturing and service firms (Columns 3-4 of Table 6). While the estimated ETR differential is significantly different from zero for both groups, it is much larger for manufacturing firms. Among manufacturing groups, foreign subsidiaries have an ETR that is 2.6 percentage point lower than domestic firms. That difference reduces to 0.7 percentage point for services firms.

Finally, I split the sample of manufacturing and services firms by their technology intensity (Columns 5-6 of Table 6). The technological intensity is based on Eurostat's industry classification. High-tech group include manufacturing firms that are classified as high-technology and services firms that are classified as high-tech knowledge-intensive and knowledge intensive.⁵ The estimated ETR difference is on average 2.5 percentage points among high-tech firms. In contrast, for low-tech firms, the estimated difference is reduced to 1.4 percentage point.

4. Corporate tax revenue implications

For policy purpose, it is useful to have a sense of the significance of the tax revenue loss associated with the preferential tax treatment to attract FDI. In this subsection, I use the baseline ETR differential (Column 4 of Table 3) to compute country-level revenue loss estimate. The revenue loss for country i is calculated as follow:

$$\left(\frac{\text{Revenue loss}}{\text{CIT revenue}}\right)_i = \frac{\beta_1}{ETR_i^*} (\text{MNE profit share}), \quad (2)$$

where $\frac{\text{Revenue loss}}{\text{CIT revenue}}$ = the revenue loss as a share of corporate income tax revenue, β_1 = the baseline ETR differential, ETR_i^* = weighted effective tax rate, and MNE profit share =

⁵ See https://ec.europa.eu/eurostat/cache/metadata/Annexes/htec_esms_an3.pdf for further details.

share of foreign MNE profits in total corporate profit. The revenue loss can be thought of as addressing the question: How much revenue would country i gain, if there is no preferential tax treatment for FDI and foreign MNE subsidiaries are subject to the same effective rate as comparable local firms? I provide the estimate for all ASEAN5 countries except Indonesia where its Orbis coverage is limited.

For the weighted effective tax rate, I use the Orbis sample and compute the 2016 effective rate using firms' profit as weight. As shown the bottom panel of Table 7, the weighted effective rate ranges from 12.6% in Thailand to 21.4% in the Philippines. The information on the foreign MNE profit share is based on Torslov et al. (2018). For the baseline scenario, I assume that the MNE profit share is 25% which is approximately the same as the average share for small OECD countries.⁶ The rationale for my baseline scenario is that the ASEAN countries studied here are relatively small countries with disproportionately large share of inward FDI. In term of the importance of foreign MNEs in their economy, this makes them closer to small OECD countries than large developing countries. I also construct an alternative scenario (Low scenario) where I assume the MNE profit share of 10%. This is roughly the average of share of large developing countries reported in Torslov et al. (2018).⁷ Finally, I construct another alternative scenario (High scenario) with the assumed MNE profit share of 40%.

The estimate indicates that the tax incentives for FDI FDI have resulted in significant revenue loss in the ASEAN region. Under the baseline scenario, the revenue loss in term of total corporate income tax revenue is around 2.6% on average (Table 7).

⁶ These are non-tax-haven OECD countries with GDP smaller than the OECD median in 2018:

Chile, Czech Republic, Denmark, Estonia, Finland, Greece, Hungary, Iceland, Israel, Latvia, New Zealand, Norway, Portugal, Slovakia, and Slovenia.

⁷ These countries are Brazil, China, India, Russia and South Africa.

It ranges from 2.1% in the Philippines to 3.6% in Thailand. The estimates also suggest that the uncertainty with respect to the share of MNE profit plays an important role in the revenue loss estimate here. The average revenue loss ranges from 1.0% in the Low scenario to 4.2% in the High scenario. Finally, it is important to note that the revenue estimates presented here should be viewed as illustrative since the data do not allow precise quantification of all required parameters.

Table 7

Corporate tax revenue loss estimation (% of total corporate income revenue)

	Malaysia	Philippines	Thailand	Vietnam	Average
Baseline scenario: MNE profit share = 25%					
Revenue loss	2.18%	2.10%	3.56%	2.94%	2.59%
Low scenario: MNE profit share = 10%					
Revenue loss	0.87%	0.84%	1.42%	1.18%	1.04%
High scenario: MNE profit share = 40%					
Revenue loss	3.49%	3.36%	5.70%	4.70%	4.15%
<i>Note:</i>					
Weighted ETR (2016)	20.6%	21.4%	12.6%	15.3%	

Notes: This table illustrates the estimate of the corporate tax revenue loss in percent of total corporate income tax revenue. It is based on the weighted ETR in 2016.

Source: Authors' estimate

5. Conclusion

While there is a lot of anecdotal evidence about the size of revenue forgone associated with the tax incentives for FDI in the developing world, systematic empirical work that quantify its significance is scarce. It is the purpose of this paper to explore empirically difference in tax burden between MNEs and domestic firms and quantify the tax revenue implications of the preferential tax treatment for MNEs.

Using propensity score matching, the finding indicates that the ETR of foreign MNE subsidiaries is roughly 2 percentage point lower than that of comparable local firms. It also shows that the preferential tax treatment, rather than international tax avoidance opportunities, is principally responsible for this tax wedge. Finally, the revenue

implications associated with this ETR differential is quite significant. Under the baseline scenario, the revenue loss in term of the total corporate income tax revenue ranges from 2.1% in the Philippines to 3.6% in Thailand. The findings from this study should provide important empirical underpinnings for ongoing policy debates concerning the revenue implications of the tax incentives to attract FDI in the developing countries context.

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