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Assessing the Importance of Taxation on FDI: Evidence from South-East Asian Developing Countries

by

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Abstract

This study examines the influence of taxation on FDI using data from South-East Asia. It employs the quantile regression approach with fixed effects that provides a comprehensive view of the tax sensitivity across the FDI distribution. Estimates confirm the significantly negative impact of the bilateral effective average tax rate and indicate the marked difference in the tax sensitivity levels at the two ends of the distribution. This stresses the importance of understanding the effect of taxation across the distribution rather than only at the mean. The economic significance of the tax is also relatively smaller than that of other fundamental factors such as labor quality and governance.

Key words: Tax incentives; Effective average tax rate; International tax; Corporate income tax; FDI; South-East Asia; Developing countries

JEL classifications: F21, H25, H87, K34

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1. Introduction

The effect of taxation on foreign direct investment (FDI) has been well documented in the economic literature. It has also been widely accepted in public economics that, in order to analyze how tax affects investment incentives, the study should take into account not only statutory tax rates but also related components of tax provisions in both host and home countries (see Devereux and Griffith, 1998). While there are many studies on this issue for developed countries, the empirical evidence that incorporates international taxation aspects for developing countries is relatively limited. This represents an important gap in the literature since the effect of taxes on FDI in the advanced economies may not carry over in a straightforward way for developing economies. A number of studies have shown that the tax sensitivity varies with the income level of host countries (see, for example, Mutti and Grubert 2004; Blonigen and Wang, 2005; and Azemar and Delios, 2008; and Goodspeed et al., 2011). Moreover, developing countries are especially reliant on corporate income tax revenue for revenues and many of them use tax incentives to attract foreign investors.

This paper pays primary attention to developing countries and examines the extent to which the tax influences foreign direct investment (FDI) using empirical evidence from South-East Asia. The region's development over the past two decades concerning FDI and tax policy provides a good opportunity to study the role of taxes. South-East Asia has been one of the largest recipients of FDI in the developing world. More importantly, the tax development in the region is characterized by rounds of cuts on headline corporate income tax rates. Examples include Thailand's aggressive cuts in the statutory tax rate from 30% to 20% over 2011-2013 and Indonesia's tax rate cuts from 30% to 25% over 2008-2010. On top of those tax rate cuts, all South-East Asian economies have also offered tax holiday incentives (exemption of taxes for a given period) in order to

attract FDI. In addition, some home countries have switched from Worldwide to Territorial taxation during the past decade. Those developments have provided important variations in the tax costs facing foreign investors.

An important challenge on understanding the effects of taxes on FDI is the fact that, from a firm's prospective, the tax costs associated with the decision to choose an investment location depend on domestic as well as international tax law. In order to capture those costs, this study computes bilateral effective average tax rate (EATR) using the methodology proposed by Devereux and Griffith (2003). Also, as emphasized by Azemar and Delios (2008), the analysis of taxes on FDI in developing countries should take into account the bilateral tax agreements since the embedded tax relief provisions could play an important role in the attractiveness of host countries. Consequently, I take into account both domestic taxation (e.g. depreciation deduction and tax holidays) and international taxation (that is, measures to relief double taxation as specified in bilateral tax agreements such as underlying tax credit and tax sparing provision).

Furthermore, the effect of taxation could be heterogeneous across the distribution of FDI. The FDI flows are highly skewed—the effects of taxes at the upper tails of the distribution could be different from those at the mean or at the lower tails. Focusing on only the average effect could therefore obscure important effects at various points in the distribution. Studies that use subsector data for developed countries tend to find that investment geared toward different purposes is subject to different level of tax sensitivity (see, for example, Mutti and Grubert, 2004). Given the limited availability of such micro data for developing countries, it is critical for researchers and policymakers who rely on aggregate FDI data to have a comprehensive view of the relationship between tax and FDI across the distribution.

Methodologically, this study analyzes the role of taxation as a determinant of net FDI inflows using a pooled-quantile regression model with fixed effects proposed by Canay (2011). This approach allows me to address an issue of negative FDI flows as well as enables me to take a comprehensive look at the tax sensitivity across the FDI distribution. The study focuses on bilateral net FDI flows into ASEAN's middle-income countries (Indonesia, Malaysia, the Philippines, Thailand and Vietnam) from 16 developed countries over 2002-2013.

The findings indicate that taxation plays an important role in attracting FDI into the region. The effect of taxes is negative and statistically significant across the distribution of FDI flows. The results also suggest that the importance of taxation for the pairs of countries at the upper end of the distribution is much smaller than the importance for those at the lower end. Ranking the data reveals that the impact of the tax would be much smaller to country pairs such as Indonesia-Singapore and Thailand-Japan rather than country pairs such as Indonesia-Germany and Thailand-Spain. This finding underlines the importance of understanding the effect of taxation across the distribution rather than only at the mean.

The importance of taxes, however, should not be overemphasized as they are not the only factor influencing FDI. The findings indicate that the fundamental factors of host countries such as labor productivity and rule of law are also important and their economic significance are greater than that of the bilateral EATR. These findings are generally robust across alternative specifications.

This paper is closely related to the empirical literature that studies the impact of taxation on FDI. Most studies in this literature have focused on OECD or European countries and have computed the forward-looking effective tax rates using the framework provided by

Devereux and Griffith (2003). Examples include Devereux and Griffith (1998), Buettner and Ruf (2007), Bellak and Leibrecht (2009) and Egger et al. (2009). The general conclusion is that the tax produces negative and statistically significant influence on FDI.

Studies that focus on non-European developing countries typically use statutory tax rates or indicator variables for tax incentives as measures of taxation. Examples include Van Parys and James (2010) and Klemm and Van Parys (2012). In particular, the findings of Klemm and Van Parys (2012) suggest that the effects of taxation could be different even within developing countries. It finds that cutting statutory tax rate and extending tax holiday are effective in attracting FDI in Latin America and the Caribbean but not in Africa.

This study contributes to the literature in two important ways. First, it constructs the bilateral EATR and analyzes how it affects the FDI flows into middle-income South-East Asian countries. To my knowledge, no existing empirical research specifically investigates this issue for developing Asian countries using a forward-looking effective tax measure. Second, it employs an estimation approach that accommodates the skewed distribution of FDI and provides the effect of taxation across the FDI distribution rather than only at the mean.

The remainder of this paper is organized as follows. The next section illustrates how I address the empirical challenges associated with estimating the effects of taxation on FDI flows. Section 3 describes the dataset used here. The results and their policy implications are discussed in Section 4. The final section concludes the study.

2. Empirical strategy

This study specifically estimates the impact of bilateral effective average tax rate (EATR) on the bilateral net FDI inflows. Typically, studies that estimate the determinants of FDI employ the gravity model. An important challenge, however, is that the FDI flows can take negative values. This potentially creates important complications for the gravity model which employs log transformation of the dependent variable. To address this problem, I follow Daniels et al. (2015) by using a pooled-quantile regression model with fixed effects proposed by Canay (2011) to analyze the effects of taxes on FDI levels rather than logs.[1] More importantly, this approach enables me to take a comprehensive look at the tax sensitivity across the distribution of FDI flows.

I apply the quantile regression approach using the two-step estimator proposed by Canay (2011). This approach models fixed effects as pure location shifts. It consists of two steps. In the first step, I estimate the unobserved fixed effects and transform the dependent variable. The second step then involves using standard quantile regressions with the new transformed dependent variable. The resulting estimator is consistent and asymptotically normal under certain regularity conditions. I also include year dummies to control for time-specific events and country-pair fixed effects to capture unobserved time-invariant characteristics across country pairs. The standard errors are computed using bootstrap, clustered at the country-pair level. As a comparison, I also show the conditional mean estimate using the fixed-effect panel model.

[1] Other methods proposed in the literature to deal with this problem include 1) dropping negative observations (see, for example, Bellak and Leibrecht, 2009), 2) setting negative values to some small positive values before taking the log transformation (see, for example, Blonigen and Davies, 2004), 3) adopting a selection model by setting negative observations to missing and using a Tobit model (see, for example, Razin and Sadka, 2007), and 4) using stocks instead of flows but stocks will likely take a much longer time to respond than flows (see, for example, Egger et al., 2009).

The dependent variable used is the real bilateral net FDI flows. The key independent variable in this study is the bilateral effective average tax rate (EATR). As discussed by Devereux and Maffini (2007), the forward-looking effective tax measures such as the bilateral EATR, take into account all present and future values of cash flows associated with the decision to invest in an investment project and, therefore, are generally preferred measures when studying the impact of taxation on investment incentives. The computation of the bilateral EATR here is based on the methodology proposed by Devereux and Griffith (2003) and later modified by Klemm (2012) to incorporate incentives that are typically used in developing countries such as tax holidays.

The tax computation in this study takes into account both domestic and international tax provisions. For host-country taxation, it incorporates standard and preferential tax treatments. Examples are standard depreciation deduction, withholding taxes on repatriated profits, tax holidays and post-holiday tax reduction. Also it takes into account the treatment of repatriated foreign-earned profits in the home countries and the bilateral measures to relief double taxation as specified in the bilateral tax treaties. This includes, for example, underlying tax credit, territorial exemption and tax sparing provision.

The computation of the bilateral EATR is necessarily based on a few parameter assumptions. For consistency with previous studies that compute the EATR for the region, e.g. Botman et al. (2010) and Suzuki (2014), I assume that the profit rate is 20% and the economic depreciation rates for machinery and buildings are 12.25% and 3.6%, respectively. I also assume the real interest rate of 5% and the headline inflation of 2%. These assumptions are in line with the region's historical data. Using the macroeconomic assumptions in this fashion is consistent with the literature and allows the bilateral EATR measure to reflect the tax system associated with each country pair and abstracts from the effect of macroeconomic policy.

The shares of investment assets are chosen to represent an average investment project and are based on the Office of National Economics and Social Development Board's Input-Output Table of Thailand (2010). Those shares are 59% for machinery and 41% for buildings. Also, consistent with Suzuki (2014), I assume that all investment is financed with retained earnings and there is no dividend taxation at the personal income tax level.[2] By design, the EATR computation here does not take into account personal income taxation and tax planning.

In the baseline analysis, the bilateral EATR computation is based on the maximum tax incentives available in each country pair.[3] As discussed by Suzuki (2014), not all firms will be able to receive the maximum tax incentive. Consequently, in one of the robustness tests, I show the results where I replaced the bilateral EATR under the maximum incentives with the bilateral EATR under standard tax treatment.

3. Data description

This study focuses on net FDI inflows from developed countries into ASEAN's middle-income host countries: Indonesia, Malaysia, the Philippines, Thailand and Vietnam. The information on bilateral net FDI inflows is obtained from UNCTAD.[4] The sample covers the 2002-2013 period. The home countries include Australia, Canada, China,

[2] Specifically, the computation assumes that a parent company in the home country undertakes investment through a fully owned foreign subsidiary in the source country. That subsidiary finances its investment using its retained earnings so it cuts its dividend to the parent company by the same amount. Finally, the subsidiary's corresponding profits are immediately and fully repatriated to the parent company. This consequently causes potential double taxation of profits.

[3] See Suzuki (2014) for the details of the tax incentives associated with the host countries.

[4] Net FDI inflows are the value of inward direct investment made by foreign investors in the host country. They are converted to real values using host-country GDP deflator from the World Bank's WDI.

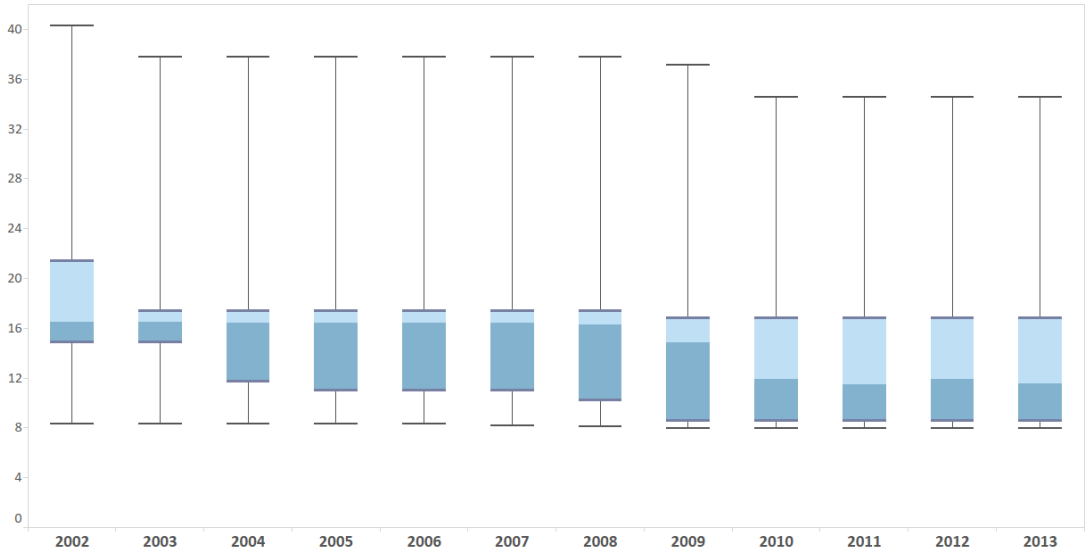
France, Germany, Hong Kong, Italy, Japan, Netherlands, Portugal, Singapore, South Korea, Spain, Switzerland, the UK and the US.

As discussed earlier, South-East Asia provides a good case study because there are significant variations in the tax policy. Those variations come from three sources. The first source is change in the taxes imposed by the host country. For example, all five host countries have cut their statutory corporate income tax rates, with an average cut of 7 percentage points. The second source is change in the taxes imposed by the home country. Examples include the switches by Japan and the United Kingdom from worldwide to territorial taxation in 2009.

The third source of variation is difference in the effective tax rates across country pairs. Such variation can result from differences in the statutory tax rates and the tax incentives across countries as well as differences in the double taxation relief methods across country pairs. One example of the latter case is the tax sparing credit which is allowed in the treaties between Thailand and Japan but is forbidden between Thailand and the US.

Those three sources of variations are illustrated in Figure 1 which shows the Box Plot of the bilateral EATR over the 2002-2013 period. There is a general downward trend in the distribution of the effective tax rates. The median tax rate, for example, falls from 16.5% in 2002 to 11.6% in 2013.

Figure 1: Box Plot of the bilateral EATR (2002-2013)



Note: Whiskers indicate maximum and minimum values. Boxes indicate upper quartile, median and lower quartile.

Source: Author's estimate

Table 1 describes the distribution of real net FDI flows, which is strongly skewed. Its mean is about 939 million USD and falls between the 70th and 90th percentiles. I include control variables that are drawn from existing literature and are available for the studied time period. This includes core gravity variables (lagged real GDP of host- and home-countries), host-country economic fundamentals (lagged GDP per capita, labor productivity, air transport infrastructure, cellular subscription), openness of host- and home-countries (trade and financial openness). I also include six host-country governance measures (regulation quality, corruption control, rule of law, political stability, voice and accountability and government effectiveness).

Table 1: Distribution of real net FDI flows (Unit: million USD)

Percentiles				
10	30	50	70	90
-9.54	19.86	166.80	498.95	2843.87

Other Statistics	
Mean	938.60
S.D.	2,748.98
Skewness	4.03
Kurtosis	36.90

Source: Author's Estimate

The macroeconomic and infrastructure variables are taken from the World Bank's World Development Indicator (WDI) database. Trade openness is defined as the share of exports and imports to GDP. Financial openness is defined as the share of net inflows of portfolio equity to GDP. The ratio of registered air carrier departures to country size is used as a proxy for air transport infrastructure. Information and communication infrastructure is represented by the ratio of mobile cellar subscription per 100 people. Labor productivity is based on hours worked and is taken from the APO Productivity Database. The variables on the governance measures are taken from the World Bank's Worldwide Governance Indicators (WGI) database. Table 2 lists the summary statistics of the variables used in the regression analysis. Table A1 in the appendix provides the variance decomposition of those variables.

It is important to note the limited variation among these control variables. All of the host countries are middle-income developing countries so their GDP per capita are in a certain range. Further, several variables are constructed as functions of GDP. Nevertheless, the important developments concerning the tax policies in the region help add variation to the effective tax rate and allow the identification of its relationship with the FDI flows. As illustrated in Table A1, there are appreciable amounts of both within and between variation in the effective tax rate variables.

Table 2: Summary statistics for the variables used in the empirical analysis

Variables	Observ-ation	Mean	Median	S.D.
Real net FDI flow (millions)	641	938.60	166.80	2,748.98
Bilateral EATR (Max incentives)	641	16.11	14.83	6.54
Bilateral EATR (Standard treatment)	641	32.63	32.11	6.15
Host real GDP (log)	641	26.21	26.14	0.64
Home real GDP (log)	641	28.06	28.11	1.20
Host GDP per capita (log)	641	7.97	7.97	0.61
Labor productivity	641	1.28	1.24	0.18
Host trade openness	641	117.37	127.41	47.92
Home trade openness	641	114.61	60.15	123.77
Host financial openness	641	0.69	0.46	1.73
Home financial openness	641	1.24	0.82	3.22
Air transport ratio	641	0.35	0.27	0.17
Cellular subscription ratio	641	76.22	75.63	37.83
Regulation quality	641	48.61	51.46	13.18
Corruption control	641	38.89	35.41	14.20
Rule of law	641	44.77	42.11	11.96
Political stability	641	28.56	20.75	20.63
Voice and accountability	641	36.26	41.35	14.87
Government effectiveness	641	57.97	56.10	12.86

Source: Author's Estimate

4. Empirical Results

4.1 Baseline Estimates

I begin the analysis using Canay (2011)'s pooled-quantile regression model with fixed effects.[5] The baseline model describes the net FDI flows as a function of the bilateral EATR under maximum tax incentives and other control variable. It also includes country-pair and as well as year-fixed effects. The results for the 10^{th}, 30^{th}, 50^{th}, 70^{th} and 90^{th} percentiles are provided in Columns 1-5 of Table 3.

The bilateral EATR variable constitutes the main focus point of the analysis. Its coefficient is negative and statistically significant across the distribution of FDI flows. At the median, a one percentage point cut in the bilateral EATR increases net FDI by $103.9 million holding other variables constant. The effects of the tax, however, are not homogeneous across the entire distribution. The coefficient at the 90^{th} percentile is -87.9, while it is larger in absolute value by about 34% at the 10^{th} percentile (-118.0). This indicates that the importance of taxation for the pairs of countries at the upper end of the distribution is much smaller than the importance for those at the lower end. Sorting the data shows that the impact of the tax would be much smaller to country pairs such as Indonesia-Singapore and Thailand-Japan rather than country pairs such as Indonesia-Germany and Thailand-Spain.

In addition to the tax, the coefficient on host-country rule of law is positive and statistically significant for the median and upper quantiles. Also, labor productivity is positive and significant in the middle of the distribution. The coefficients of other

[5] Using all variables specified in the baseline model, a Hausman test on fixed vs. random effects models rejects a random effects model.

control variables are imprecisely estimated. This is likely due to multicollinearity among those control variables. It is important to note that the main findings in the baseline model are robust to the inclusion of these control variables and the multicollinearity concern (shown in one of the robustness tests below).

The findings so far suggest that the taxation is an important factor attracting FDI into the region. To get a sense of the economic significance of its impact, consider the beta coefficients associated with the baseline model in Table 4. A beta coefficient is defined as the product of the estimated coefficients and the standard deviation of its corresponding regressor, divided by the standard deviation of the dependent variable. This basically converts the estimated coefficients into units of sample standard deviations.

Column 3 of Table 4 indicates that a one standard deviation cut in the bilateral EATR raises the median FDI by about 25% of a standard deviation. Such impact is smaller than the impacts of labor productivity and rule of law at the median (56% and 29%, respectively). This thus suggests that the tax plays an important role in attracting the FDI but its role should not be overemphasized. The fundamental factors such as labor productivity and rule of law are also critical.

Table 3: Baseline quantile regression estimates (Dependent variable: Real net FDI flows)

VARIABLES	(1) 0.1	(2) 0.3	(3) 0.5	(4) 0.7	(5) 0.9
Bilateral EATR	-118.0**	-104.5**	-103.9**	-104.8**	-87.9*
	(50.94)	(50.42)	(51.43)	(51.74)	(51.90)
Lagged host GDP	-14,570.9	-15,518.9	-14,999.5	-15,282.7	-13,601.8
	(28,284.18)	(28,299.39)	(28,539.67)	(28,716.30)	(28,802.99)
Lagged home GDP	2,358.2	2,300.4	2,334.0	2,424.2	2,420.3
	(2,601.53)	(2,607.18)	(2,621.14)	(2,639.64)	(2,600.17)
Lagged host GDP	14,492.0	15,964.1	15,308.7	15,677.9	14,700.3
per capita	(36,554.35)	(36,698.23)	(37,003.58)	(37,308.75)	(36,359.06)
Labor productivity	-3,543.4	7,228.8**	8,580.9**	7,732.6**	8,645.5
	(5,270.98)	(3,190.08)	(3,620.48)	(3,927.63)	(6,010.16)
Host trade	36.2	1.4	0.7	-0.2	22.2
openness	(45.43)	(40.72)	(40.62)	(42.06)	(60.67)
Home trade	4.0	6.5	7.2	8.7	10.9
openness	(13.73)	(14.10)	(14.17)	(14.53)	(15.24)
Host financial	-37.8	65.3	31.8	11.2	-93.9
openness	(116.70)	(78.91)	(84.82)	(110.93)	(226.91)
Home financial	-25.9	22.7	13.9	-0.5	-38.5
openness	(38.53)	(24.78)	(21.78)	(24.86)	(30.70)
Air transport	275.2	2,401.6	3,302.5	2,648.6	-1,517.3
	(3,401.16)	(2,838.12)	(2,837.99)	(2,884.28)	(3,260.37)
Cellular	-16.8	-6.9	-6.1	-10.2	-12.3
subscription	(19.30)	(20.13)	(18.95)	(20.34)	(32.10)
Regulation	37.6	16.2	15.5	9.6	8.6
quality	(40.15)	(34.57)	(31.88)	(35.49)	(68.76)
Corruption	-6.4	16.8	22.7	29.1*	-44.7
control	(23.99)	(17.26)	(16.22)	(17.43)	(46.60)
Rule of law	-85.1	26.2	65.9**	92.1***	162.1**
	(70.07)	(43.11)	(31.63)	(31.74)	(81.67)
Political stability	68.4*	33.5	16.8	14.2	-22.0
	(38.97)	(36.30)	(35.77)	(34.06)	(32.00)
Voice and	-70.9	-58.8	-65.8	-67.7	-85.9
accountability	(61.31)	(56.73)	(61.10)	(61.09)	(86.60)
Government	13.8	-45.5	-54.0	-82.7	-8.3
effectiveness	(66.18)	(61.71)	(61.60)	(68.45)	(146.44)
Constant	201,474.7	208,035.3	196,795.3	201,023.6	160,340.9
	(476,152.93)	(474,497.11)	(477,657.50)	(480,612.38)	(487,522.07)
Pseudo R^2	0.876	0.904	0.899	0.885	0.850
Observations	641	641	641	641	641

Note: The table reports selected coefficients. Each regression includes both country pair- and year-fixed effects. Numbers in parentheses indicate bootstrapped standard error with 100 replications. *** = Significantly different from zero at the 1% level, ** = Significantly different from zero at the 5% level, * = Significantly different from zero at the 10% level.

Table 4: Selected beta coefficients associated with the baseline estimate

VARIABLES	(1) 0.1	(2) 0.3	(3) 0.5	(4) 0.7	(5) 0.9
Bilateral EATR	-0.28	-0.25	-0.25	-0.25	-0.21
Labor productivity	-0.23	0.48	0.56	0.51	0.57
Rule of law	-0.37	0.11	0.29	0.40	0.71

4.2 Robustness tests

We perform and discuss a series of tests to study the robustness of our results. For brevity, we report only the coefficient on the tax variable (Table 5). The full tables are provided in the appendix.

Table 5: Robustness tests

VARIABLES	(1) 0.1	(2) 0.3	(3) 0.5	(4) 0.7	(5) 0.9
A) Inclusion of the control variables					
Including only core gravity variables					
Bilateral EATR	-113.6**	-99.3*	-100.0*	-98.4*	-87.1
	(56.64)	(57.65)	(57.17)	(56.84)	(59.64)
Including core gravity, economic and infrastructure variables					
Bilateral EATR	-128.3**	-102.6**	-101.4**	-102.4**	-94.3*
	(53.20)	(48.21)	(49.97)	(50.64)	(51.02)
B) Standard tax treatment					
Bilateral EATR	-135.1**	-101.1*	-109.1*	-109.8*	-85.7
	(60.20)	(59.24)	(57.85)	(59.29)	(61.57)
C) Conditional mean estimate					
	Mean				
Bilateral EATR	-108.7**				
	(46.45)				

Note: Numbers in parentheses indicate bootstrapped standard error with 100 replications for quantile regression estimates and robust standard error for mean regression estimate. *** = Significantly different from zero at the 1% level, ** = Significantly different from zero at the 5% level, * = Significantly different from zero at the 10% level.

A) Inclusion of the control variables

In order to show the sensitivity of the main findings to the choice of control variables, I add the control variables to the model incrementally. I estimate two specifications: 1) including only GDP of host and home countries (core gravity variables) and 2) including core gravity, economic and infrastructure variables. The coefficients of the bilateral EATR are negative and statistically significant in both specifications (Panel A of Table 5). The findings on the heterogeneous effects of the tax across the distribution of the FDI flows are also generally consistent with the baseline estimate. This suggests that the other control variables are not closely correlated with taxation and, therefore, do not alter the findings regarding taxation when those variables were omitted. The full results are shown in Tables A2 and A3.

B) Standard tax treatment

The computation of the bilateral EATR in the baseline specification is based on the maximum tax incentives. However, as discussed earlier, not all firms will qualify for the host-country maximum tax incentives. Here I perform the robustness test where I use instead the bilateral EATR under the standard tax treatment (removing the host-country preferential tax treatment such as tax holidays).

As illustrated in Panel B of Table 5, the effects of taxation are negative and statistically significant across the distribution except only at the 90^{th} percentile. The findings about the heterogeneous effects of the tax across the FDI flow distribution are also consistent with that in the base specification. The full results are shown in Table A4.

C) Conditional mean estimate

Panel C of Table 5 shows the results for the mean panel regression. The coefficient on the bilateral EATR is negative and statistically significant. Its magnitude is roughly comparable with that associated with the median estimate but is appreciably different from those at the tails of the distribution. This underlines the importance of having a comprehensive view of the effect of the tax across the FDI distribution. The coefficients on host country's labor productivity and rule of law are positive and significant—consistent with the baseline estimate. The full results are shown in Table A5.

5. Conclusion

The primary objective of this paper is to assess the importance of taxation on FDI in the context of developing Asian countries. Understanding this cross-border impact of tax policies is crucial for developing countries since their uses of tax incentives may erode a source of revenue that they are especially reliant on. This study computes the bilateral effective average tax rate which incorporates relevant domestic and international tax law and employs the quantile regression approach with fixed effects that accommodates the skewed distribution of FDI flows. Estimates confirm the negative and significant impact of taxation and illustrate that investment associated with country pairs at the tails of the distribution is subject to noticeably different levels of tax-sensitivity. This underlines the importance for equipping policymakers with a comprehensive understanding of the effects of taxation rather than focusing only on the effect at the mean. Another important finding is that the economic significance of the tax is relatively smaller than that of labor productivity and rule of law. This suggests that policymakers should not overemphasize the role of taxes since other economic and governance factors are also important determinants of FDI. Finally, it is important to note that, while this study takes into account both domestic and international tax aspects of host countries, it does not take into account important tax issues such as tax certainty, tax compliance burden and

international tax avoidance opportunities. We leave these issues an avenue for future research.

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APPENDIX

Table A1: Variance decomposition of the variables used in the empirical analysis

Variables	Overall SD	Between SD	Within SD
Real net FDI flow (millions)	2,748.98	1,696.12	2,110.69
Bilateral EATR (Max incentives)	6.54	6.31	2.20
Bilateral EATR (Standard treatment)	6.15	6.01	2.28
Host real GDP (log)	0.64	0.61	0.15
Home real GDP (log)	1.20	1.17	0.11
Host GDP per capita (log)	0.61	0.65	0.11
Labor productivity	0.18	0.15	0.11
Host trade openness	47.92	50.16	11.19
Home trade openness	123.77	116.23	15.71
Host financial openness	1.73	0.63	1.65
Home financial openness	3.22	1.56	2.77
Air transport ratio	0.17	0.11	0.14
Cellular subscription ratio	37.83	14.64	35.86
Regulation quality	13.18	13.32	3.54
Corruption control	14.20	14.63	4.78
Rule of laws	11.96	12.42	3.26
Political stability	20.63	19.88	8.69
Voice and accountability	14.87	14.07	5.37
Government effectiveness	12.86	14.12	2.18

Source: Author's Estimate

Table A2: Robustness test - Including only core gravity variables

VARIABLES	(1) 0.1	(2) 0.3	(3) 0.5	(4) 0.7	(5) 0.9
Bilateral EATR	-113.6**	-99.3*	-100.0*	-98.4*	-87.1
	(56.64)	(57.65)	(57.17)	(56.84)	(59.64)
Lagged host GDP	-5,863.5	-5,744.2	-5,635.7	-5,611.2	-5,419.3
	(8,158.47)	(8,123.98)	(8,141.82)	(8,142.23)	(8,144.94)
Lagged home GDP	2,605.5	2,347.3	2,339.7	2,348.8	2,170.1
	(2,566.46)	(2,541.23)	(2,504.40)	(2,482.29)	(2,417.86)
Constant	80,797.5	85,481.7	83,108.3	82,487.6	82,659.7
	(212,166.54)	(211,419.00)	(211,874.70)	(211,921.51)	(212,359.40)
Pseudo R^2	0.681	0.761	0.771	0.738	0.580
Observations	641	641	641	641	641

Note: The table reports selected coefficients. Each regression includes both country pair- and year-fixed effects. Numbers in parentheses indicate bootstrapped standard error with 100 replications. *** = Significantly different from zero at the 1% level, ** = Significantly different from zero at the 5% level, * = Significantly different from zero at the 10% level.

Table A3: Robustness test - Including core gravity, economic and infrastructure variables

VARIABLES	(1) 0.1	(2) 0.3	(3) 0.5	(4) 0.7	(5) 0.9
Bilateral EATR	-128.3**	-102.6**	-101.4**	-102.4**	-94.3*
	(53.20)	(48.21)	(49.97)	(50.64)	(51.02)
Lagged host GDP	-21,597.5	-22,799.6	-22,759.7	-22,963.6	-22,902.7
	(19,902.96)	(19,848.48)	(19,995.23)	(20,097.13)	(20,184.26)
Lagged home GDP	2,264.7	2,253.1	2,304.1	2,366.5	2,408.3
	(2,614.06)	(2,571.94)	(2,571.00)	(2,586.21)	(2,510.66)
Lagged host GDP	22,739.5	24,761.5	24,786.2	25,097.6	25,545.4
per capita	(22,569.70)	(22,428.51)	(22,580.00)	(22,627.69)	(22,853.64)
Labor productivity	2,968.0	7,450.0*	7,375.0*	7,833.2*	5,675.1
	(4,174.43)	(4,156.14)	(4,271.43)	(4,196.27)	(3,588.27)
Host trade	10.9	-10.8	-8.7	-11.8	6.2
openness	(37.83)	(30.84)	(31.82)	(33.05)	(41.96)
Home trade	2.1	6.8	7.4	8.6	10.9
openness	(13.96)	(14.26)	(14.23)	(14.60)	(15.71)
Host financial	2.5	94.7	76.5	72.3	-79.5
openness	(98.72)	(65.58)	(70.80)	(91.72)	(151.84)
Home financial	45.7	21.4	9.2	5.9	-39.8
openness	(49.81)	(23.54)	(18.54)	(21.51)	(32.96)
Air transport	4,697.6**	2,762.3	2,214.5	1,404.6	-4,017.4
	(2,171.55)	(1,922.88)	(1,697.65)	(1,678.45)	(3,041.09)
Cellular	1.9	-0.4	-7.2	-7.3	-25.7
subscription	(20.71)	(17.15)	(17.75)	(17.92)	(28.38)
Constant	315,852.4	329,882.2	327,510.4	329,047.8	324,852.5
	(358,700.76)	(357,574.43)	(359,965.89)	(361,933.56)	(361,983.01)
Pseudo R^2	0.896	0.923	0.921	0.917	0.892
Observations	641	641	641	641	641

Note: The table reports selected coefficients. Each regression includes both country pair- and year-fixed effects. Numbers in parentheses indicate bootstrapped standard error with 100 replications. *** = Significantly different from zero at the 1% level, ** = Significantly different from zero at the 5% level, * = Significantly different from zero at the 10% level.

Table A4: Robustness test - Standard tax treatment

VARIABLES	(1) 0.1	(2) 0.3	(3) 0.5	(4) 0.7	(5) 0.9
Bilateral EATR	-135.1**	-101.1*	-109.1*	-109.8*	-85.7
	(60.20)	(59.24)	(57.85)	(59.29)	(61.57)
Lagged host GDP	-10,075.5	-10,653.2	-10,581.7	-10,581.0	-8,732.9
	(27,822.55)	(27,895.38)	(28,118.64)	(28,196.34)	(28,971.44)
Lagged home GDP	2,078.2	2,080.9	2,143.8	2,205.3	2,221.9
	(2,531.31)	(2,524.57)	(2,542.99)	(2,554.14)	(2,563.10)
Lagged host GDP	12,121.6	13,080.2	12,923.3	12,835.0	11,897.7
per capita	(36,210.14)	(36,479.82)	(36,832.91)	(36,895.07)	(37,609.69)
Labor productivity	-2,437.9	5,571.6*	6,134.6	6,466.1	6,506.1
	(4,892.12)	(3,225.49)	(3,785.51)	(4,053.75)	(6,108.09)
Host trade	31.9	8.4	1.1	3.9	28.4
openness	(43.84)	(40.27)	(40.27)	(40.54)	(61.09)
Home trade	3.2	6.1	7.1	7.9	9.9
openness	(13.63)	(14.08)	(14.14)	(14.47)	(15.20)
Host financial	-25.6	58.7	39.6	7.9	-102.7
openness	(121.57)	(79.67)	(79.82)	(103.44)	(226.07)
Home financial	-18.5	27.9	9.6	3.7	-28.1
openness	(41.42)	(25.15)	(20.78)	(23.28)	(30.33)
Air transport	915.7	2,257.5	2,932.9	2,857.7	-1,311.8
	(3,380.59)	(2,898.41)	(2,924.73)	(2,942.39)	(3,470.80)
Cellular	-14.4	-12.6	-9.0	-13.3	-17.4
subscription	(19.76)	(19.73)	(18.11)	(19.42)	(32.06)
Regulation	34.9	20.4	22.1	24.3	10.2
quality	(40.68)	(34.84)	(29.98)	(36.55)	(73.77)
Corruption	-35.6	3.1	17.0	24.0	-52.3
control	(23.08)	(18.59)	(18.06)	(17.95)	(48.09)
Rule of law	-79.7	21.4	63.3**	81.2**	169.1*
	(71.50)	(41.59)	(31.09)	(32.63)	(87.86)
Political stability	66.8*	41.8	29.8	21.2	-12.5
	(37.48)	(34.74)	(34.76)	(33.25)	(33.36)
Voice and	-79.3	-66.2	-79.9	-76.9	-98.9
accountability	(59.65)	(55.46)	(58.04)	(60.43)	(85.50)
Government	32.9	-46.3	-72.8	-94.7	-25.3
effectiveness	(59.12)	(55.99)	(64.39)	(63.78)	(143.36)
Constant	113,220.9	113,770.3	111,874.0	110,950.3	65,439.2
	(467,723.04)	(466,066.03)	(468,767.09)	(471,023.43)	(487,586.22)
Pseudo R^2	0.832	0.878	0.880	0.866	0.823
Observations	641	641	641	641	641

Note: The table reports selected coefficients. Each regression includes both country pair- and year-fixed effects. Numbers in parentheses indicate bootstrapped standard error with 100 replications. *** = Significantly different from zero at the 1% level, ** = Significantly different from zero at the 5% level, * = Significantly different from zero at the 10% level.

Table A5: Robustness test – Conditional mean estimate

VARIABLES	Mean
Bilateral EATR	-108.7**
	(46.45)
Lagged host GDP	-14,587.5
	(27,536.44)
Lagged home GDP	2,384.8
	(2,119.61)
Lagged host GDP	15,108.6
per capita	(36,160.81)
Labor productivity	5,909.2*
	(3,431.51)
Host trade	11.4
openness	(49.58)
Home trade	7.6
openness	(13.84)
Host financial	-37.7
openness	(136.44)
Home financial	35.9
openness	(48.51)
Air transport	2,625.1
	(3,395.58)
Cellular	-5.8
subscription	(21.37)
Regulation	37.7
quality	(37.92)
Corruption	-3.4
control	(16.27)
Rule of law	71.8**
	(32.14)
Political stability	14.5
	(32.68)
Voice and	-86.0
accountability	(63.43)
Government	-65.0
effectiveness	(64.84)
Constant	189,279.8
	(470,380.78)
R^2	0.889
Observations	641

Note: The table reports selected coefficients. The regression includes both country pair- and year-fixed effects. Numbers in parentheses indicate robust standard error. *** = Significantly different from zero at the 1% level, ** = Significantly different from zero at the 5% level, * = Significantly different from zero at the 10% level.