International Tax Competition, Capital Mobility, and Inequality: Empirical Evidence from Asia-Pacific Economies*

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Abstract

Foreign direct investment (FDI) is one of the main driving forces for domestic economic development. Therefore, attracting FDI inflows has been a core mission for national leaders over the world especially for the policy makers. Given the highly mobile nature of capital, countries have to give enough incentives to bring and retain capital within their territory. The tax incentives and reduction in corporate tax rates are more likely to be the policy means. Therefore, tax competition becomes unavoidable. The present study aimed to investigate how corporate tax rate influenced FDI inflows, how FDI inflows influenced economic growth of Asia-Pacific economies, and whether inward FDI generated some undesired outcomes within these economies. We used panel data from 29 Asia-Pacific economies to examine our hypotheses. Results from system GMM estimation show that a country using tax competition strategy could promote the FDI inflows (i.e., lower corporate tax rate leads to more FDI). And FDIs are more likely to be located in those economies with a larger population, higher GDP per capita, better transportation connectivity, and tax ruling certainty. Surprisingly, control of corruption and smart professionals show significant but negative associations with FDI inflows. In addition, FDI share of GDP shows a positive impact on domestic economic development. However, FDI share of GDP also is positively related to income inequality. The theoretical and policy implications are discussed.

Keywords: foreign direct investment, tax competition, economic growth, income inequality, tax policy, Asia-Pacific

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Introduction

Promoting economic development is always a core mission for policy makers over the world, especially after the slowing global economy caused by the 2008 financial crisis (EUCS, 2016). Capital mobility is considered one of the most important factors of economic development. Success in attracting foreign capital is believed to improve a country's economic performance by generating employment, increasing income and ultimately higher tax revenues, creating a stronger industrial and economic base, improving infrastructure, and raising living standards. Among the majority of Asian developing countries (e. g., China, Vietnam, India), foreign capital inflows have significantly promoted the economic development during the past two decades (Bissinger, 2012; Hoang, Wiboonchutikula, & Tubtimtong, 2010; Kotrajaras,Tubtimtong, & Wiboonchutikula, 2011; Sahoo, 2006). For example, China has witnessed the greatest economic miracle since its opening-up for foreign investments in the 1980s. Statistics show that the FDI contributed 3% to 6% of Chinese gross domestic product (GDP) on average (Li, 2013). Therefore, competing for investment has been one of the top priorities of government agenda.

During the past three decades, China and other Asian countries were favourable investment locations due to low labour cost. However, this trend seems started to change recently. In 2016, the world witnessed Brexit, China slowing economy, the rise of populism in Europe and the US, which presented many uncertainties for the future global economy. More importantly, the US passed the historic tax reform bill at the end of 2017. Based on the new bill, the corporate tax rate would be reduced from 35% to 21%, and profits earned from overseas would be exempted from the US taxation. The Republicans believed that the new

policy would encourage U.S. companies to move back their overseas investments, and promote the FDI inflows as the Tax Reform Act of 1986 did (Morgan & Becker, 2017; Swenson, 1994). Several European countries and China expressed their concerns that the US tax cut would lure international capital back to America and instigate tax competition among the global economies (Thomas & Buell, 2017; Wei, 2017; Zimmermann, 2017). Australia even has had a plan to reduce her tax rate (Kelly & Benson, 2018). Furthermore, the trade tensions between the United States and China escalated since March 2018, which brought more uncertainty for the global investments. For example, after both countries announced that they would apply higher tariffs on each other's exports (Gillespie, 2018), manufacturers such as Puma have shown their concern and said they might move their factories from China to another country. Given the intensified competition, how do tax policies influence capital inflows of Asian developing countries, how do the capital inflows influence the domestic economic development, and what negative effects does it have? The empirical evidence on this issue is still very limited since most of the studies in the past were conducted for non-Asian countries.

The present study will investigate how international tax competition influences foreign investment mobility and its relation with the domestic economic inequality. Panel data from 29 countries will be used to examine our hypotheses. The inter-regional inequality and policy implication will be discussed as well. The results and findings of the current study would contribute to the current international tax policy study by adding empirical evidence from Asian developing countries. The findings would have meaningful policy implications for both domestic policymaking and international tax cooperation. The policy makers should systematically examine the positive and negative outcomes before establishing a competitive tax policy. When the economic gap between urban and rural areas keeps increasing, the policy makers should also consider using effective tax policies to bring capital from rich areas to poor areas.

This study includes four following sections. In the first section, we review the related literature on tax competition and capital mobility, capital mobility and economic growth, and capital mobility and inequality respectively, and develop our hypotheses. Section 2 presents the case study of Singapore. Section 3 describes our methods including data collection, measurement instruments, and data analysis. In the last section, the findings, implications, research limitations and future directions are discussed.

Literature Review and Hypotheses

Tax Competition and Capital Mobility

Tax competition research has proved that FDI is sensitive to taxation policy over the world (Gardiner, Martin, Sunley, & Tyler, 2013). Among the determinants of inward FDI, factors such as tax policy, institutions, infrastructure, and labour quality (Matthews, 2011; Li, 2013) are the key ones. Although a country's capital inflows are not fully determined by taxation, tax rates do have very significant influence (Botman, Klemm, & Baqir, 2010; Fletcher, 2002; De Mooij & Ederveen, 2003; OECD, 2007). Economists asserted that a lower corporate tax rate predicts higher capital inflows (Bretschger & Hettich, 2002). In the research by De Mooij and Ederveen, the median tax rate elasticity of foreign capital is -3.3. This means that one percent reduction in host country tax rate raises the FDI in that country by 3.3%. Countries with a lower tax rate (e.g. corporate tax rate) would attract more FDI inflows (De Mooij & Ederveen, 2003; OECD, 2007). Almost all the global economies' corporate tax rates have decreased sharply during the past two decades (Cnossen, 2018). The increasing number of countries competing for investment may lead to further lowering of the tax rates (Oates, 1972; Wilson, 1986). To guarantee countries are or remain attractive for foreign investment, the host countries are very likely to cut their tax rates (Oates, 1972; Wilson, 1986). This competition

may trigger "competitive tax cuts and a race to bottom in tax levels" (Genschel & Schwarz, 2011). Therefore, we propose our first main hypothesis:

H1. A country's corporate tax rate is negatively associated with its inward FDI

However, empirical evidence showed that the effects of tax competition are unequal between developed and developing countries, large and small countries. The larger countries tend to have more FDI inflows while smaller countries tend to have less FDI inflows (Asiedu, 2006; Campbell & Hopenhayn, 2005; Cheng & Kwan, 2000; Egger & Winner,2005; Plümper, Troeger, & Winner, 2009). And the developed countries which have better infrastructure connectivity, tax ruling certainty, less corruption, and skilled professionals tend to have higher tax rate but still can attract more investment (Asiedu, 2006; Cheng & Kwan, 2000; Garrett, 1995; Habib & Zurawicki, 2002; OECD, 2007; Quinn, 1997). For example, Singapore was the third biggest FDI recipients in Asia in 2017, even though Singapore only has 5.61 million residents. One of the explanations would be that Singapore has very good performance in connectivity (e.g., transportation), tax ruling certainty, anti-corruption and a large pool of smart professionals (e.g., lawyers, accountants, and bankers). Therefore, competitive taxation policy or tax relief is probably not the bigger and richer countries' primary policy to promote investment. On the contrary, in order to attract investments and achieve economic growth, the smaller or developing countries' governments are more likely to reduce their tax rates to an inefficiently low level (OECD, 2007). These may make the economic gap between the developed nations and developing nations even larger. Therefore, we include all the above-mentioned factors namely: population size, GDP per capita, connectivity, smart professionals, tax-ruling certainty, and control of corruption, as control variables.

Capital Mobility and Economic Growth

A large number of studies supported the positive link between FDI inflows and economic development (Alfaro, Chanda, Kalemli-Ozcan, & Sayek, 2004; Hoang, Wiboonchutikula, & Tubtimtong, 2010; Li & Liu, 2005; Zhang, 2001). Compared to domestic capital, foreign investments not only bring capital to the host countries, but also technology, managerial skill, and labour training (Borensztein, De Gregorio, & Lee, 1998; Kotrajaras, Tubtimtong, & Wiboonchutikula, 2011). However, the effects of capital inflows on economic growth depend on host countries' initial economic conditions such as institution, governance, etc.(Kotrajaras, Tubtimtong, & Wiboonchutikula, 2011; Matthews, 2011). Some studies even argue that FDI has little effects on long-term growth (Hoang, Wiboonchutikula, & Tubtimtong, 2010). Two studies based on large sample size even revealed that FDI does not yield a significant impact on growth (Carkovic & Levine, 2002; Durham, 2004). The study by Athukorala (2003) also did not show much support for the view of a robust link between FDI and growth in Sri Lanka. The same observation was also shared by Alfaro and his colleagues (2010). Bissinger (2012) compared China with Myanmar and concluded that the sectors of FDI inflows matter. China had brought in enormous labour-intensive manufacturers for the export market and gradually became the world factory. In Myanmar however, the majority of investments were targeted at the extractive and power sectors, and accordingly, the benefits on long-term economic growth were very limited. Therefore, we hypothesize that:

H2. FDI inflows positively associate with the economic growth of a host country

Capital Mobility and Income Inequality

The competition for capital could also lead to domestic inequalities in developing nations (Hoyt, 1991; Ihori & Yang, 2009; Keen & Kotsogiannis, 2004; Sato, 2003). It may lead to lower tax revenue and undersupply of public goods, which will further increase the development gap and the inequalities. With limited resources, the governments are more likely

to give priority to urban areas' developments. Almost all the foreign investments would be located in urban areas with better infrastructure and public service. So, the gap between the rural areas and urban areas are widening. The imbalanced development in developing countries is becoming more and more alarming. A typical case is that the foreign investment has significantly driven China's economy during the past three decades. However, China has become one of the countries with the highest level of income inequality (Wildau & Mitchell, 2016). With a large number of rich cities like Shanghai and Beijing, China still has more than 70.17 million poor with a net income of less than one USD per day. China is not the only case. Almost all the developing nations are facing the same problem. However, there is a dearth of research addressing the effects of capital mobility on domestic economic inequalities in the Asia-Pacific region. Based on the discussion above, we hypothesize that:

H3. A country's FDI is positively related to its domestic income inequalities.

Case Study of Singapore

To understand the determinants of inbound FDI, we conduct a case study on Singapore. More specifically, this case study is to preliminarily examine the factors that facilitate Singapore's FDI inflows including corporate tax rate, how foreign investments influence domestic economic performance and domestic income distribution.

Singapore has been one of the most popular investment destinations in the Asia-Pacific region, though its population size is one of the smallest. Based on the data of 2017, Singapore was the third biggest FDI recipients in Asia. However, at the same time, the income inequality among its resident households (measured by the Gini coefficient), though is below its peak in 2007, remains elevated in the regional context (IMF, 2018). Singapore is thus chosen as a case study for this paper.

When Singapore became independent in 1965, it was a poor, small tropical island with few natural resources, rapid population growth, severe housing shortage and the high unemployment rate (OECD, 2010; LKYSPP, 2014). As a small, resource-scarce island state without a natural hinterland or a large domestic market to generate sufficient jobs and economic sustainability, industrialisation was identified then as one of the solutions to help Singapore achieved a more diversified economic base and to provide the much-needed jobs for its people. Implementation of an industrialisation programme would invariably require substantial FDI. Given that a conducive tax regime was one of the factors that investors would take into account when making their investment decisions, tax incentives were introduced as part of the government's efforts to promote the industrialisation programme. Due to Singapore's small size, there is no need to differentiate tax incentives according to geographical locations. While tax incentives were targeted more at industrial activities in the early development years, this has been changed over the years as the Singapore economy matures. In the 1970s and 1980s, a shift to more skill-intensive manufacturing led to an emphasis on technical fields. From the mid-1990s onwards, Singapore has sought to become a player in the global knowledge economy, encouraging more research and innovation (OECD, 2010). Apart from incentives which are used selectively and only targeted at substantive business activities, the corporate tax rate in Singapore was also reduced over the years to encourage investments, enterprise, and efforts.

Why Investors Chose Singapore as Their Investment Destination?

Based on the reply given to a parliamentary question on 20 July 2009, competitive corporate tax regime including one of the lowest taxation could be one of the most important factors why investors chose Singapore as their investment destination. Besides tax, other important factors mentioned in the reply include market access, regional connectivity, access to talent and political and economic stability. As shown in the upper left chart in Figure 1, the

headline corporate tax rate decreased significantly since the year of assessment 2000 from 26% to 17% in the year of assessment 2010. This corporate tax rate of 17% remains unchanged since then, which almost is the lowest one in Asia-Pacific region except Hong Kong (16.5%), Maldives (15%) and Timor-Leste (11.2%).

The second factor would be "Singapore's extensive connectivity to regional and global markets" (MPAS, 2018). Singapore is one of the top transportation hubs for air and sea cargo. For example, Changi airport connects with more than 400 cities from about 100 countries around the world. Every year, Changi airport serves more than 62.2 million passengers. According to Airport Council International, Changi is also one of the top 20 busiest airports handling air cargo in 2017. Moreover, Singapore's container ports are also the busiest in the world (Hiteshk, 2015). The statistics show that Singapore ports ranked the world number two in terms of the cargo handled (more than 626.2 million tonnes of cargo in 2017).

The third factor is Singapore's pro-investment environment with high political stability, strong rule of law, and zero tolerance to corruption. Ranked second based on the 2017 edition of the World Bank's Ease of Doing Business, Singapore's business-friendly institutions continue to be a major draw for MNCs seeking to establish a presence in Asia.

The fourth factor is that Singapore has a large pool of smart professionals (e.g., bankers, lawyers, engineers, researchers, etc.). Due to the high quality and diversity of higher education in Singapore, the majority of the workforce is well-educated which has been seen as central to building the economy growth. For example, although the population is only about 5.61 million, Singapore has five public universities (e.g., the National University of Singapore and Nanyang Technological University) and five polytechnics (e.g., Singapore Polytechnic, and Nanyang Polytechnic). The percentage of population attaining at least a Bachelor's or equivalent has increased from 12% in 2000 to 30% in 2017. The total enrolment ratio in tertiary education

(ISCED 5 to 8) has also increased from 45.3% in 2000 to 92.2% in 2016. The higher education institutions provide requisite smart professionals for foreign enterprises (OECD, 2010).

The following charts in Figure 1 show a trend that the FDI increased when the headline corporate tax rate went down from 2000 (i.e. year of assessment 2001) to 2016 (i.e. year of assessment 2017). The population size, political stability, and smart professionals show consistent trends with FDI inflows. However, corruption control has an opposite trend when FDI goes up and connectivity does not show a clear trend during the period from 2000 to 2016. In short, Figure 1 provides a preliminary support for our hypotheses except for the relationship between connectivity and FDI.

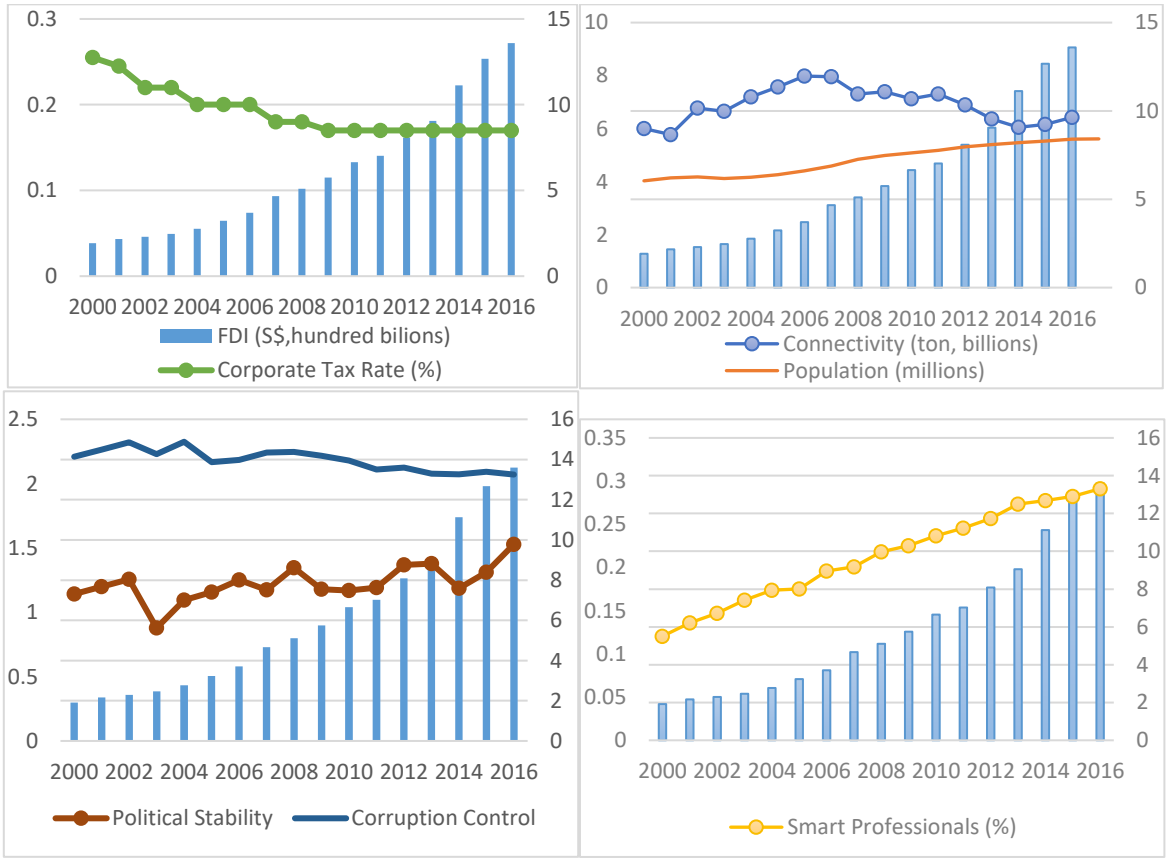

Figure 1. The determinants of FDI in Singapore

FDI and Economic Growth

The inward FDI in Singapore shows a rising trend, from S$191 billion in 2000 to S$1,359 billion in 2016. Recent estimates indicated that over 7000 MNCs had a presence in Singapore. According to a reply to a parliamentary question on 7 February 2018, MNCs have been an important driver of Singapore's economic growth. The chart in Figure 2 below shows a positive association between FDI and economic development measured by GDP per capita over the period from 2000 to 2016, except for the year 2001, 2007 to 2009. For those years where there was a decline in GDP per capita despite FDI inflows, it could be due to downturn brought about by dotcom crash and financial crisis.

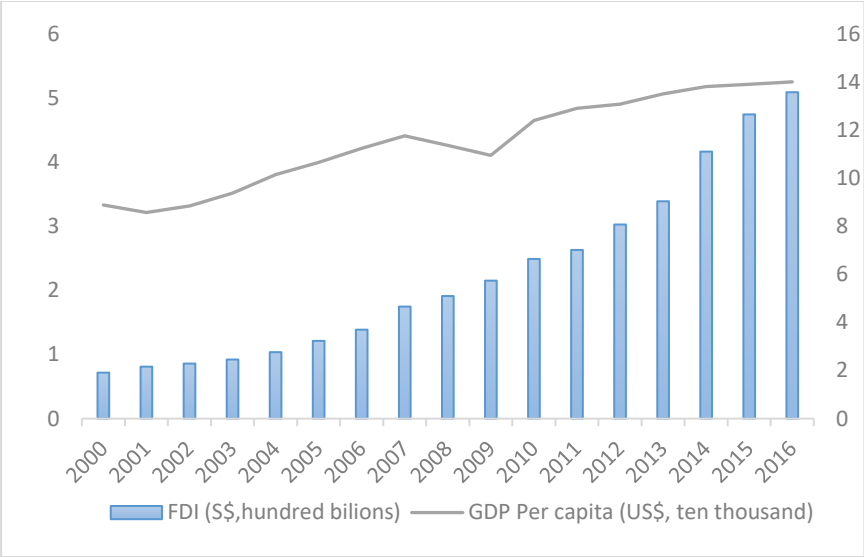

Figure 2. FDI and GDP per capita

FDI and Income Inequality

As the Singapore economy grows, income inequality also became one of the top challenges for policy makers. The Gini Coefficient increased from 0.386 in 2000 and peaked at 0.412 in 2007. After 2012, Singapore's Gini coefficient gradually decreased and it was 0.379 in 2016. Based on the chart in Figure 3, from 2000 to 2012, we could see a clear trend that the Gini coefficient increased when FDI rose. However, it is very difficult to conclude that higher

FDI inflows will lead to higher (or lower) income inequality since the Gini coefficient dropped after 2012 but FDI was still going up.

Based on the Singapore case study above, the analysis provides a basic understanding that how different variables related to each other and preliminarily supports our main hypotheses. However, it provides little basis for generalisation as it only uses one subject. Therefore, in the next section, we will collect empirical data from the 29 Asia-Pacific economies to statistically examine our hypotheses.

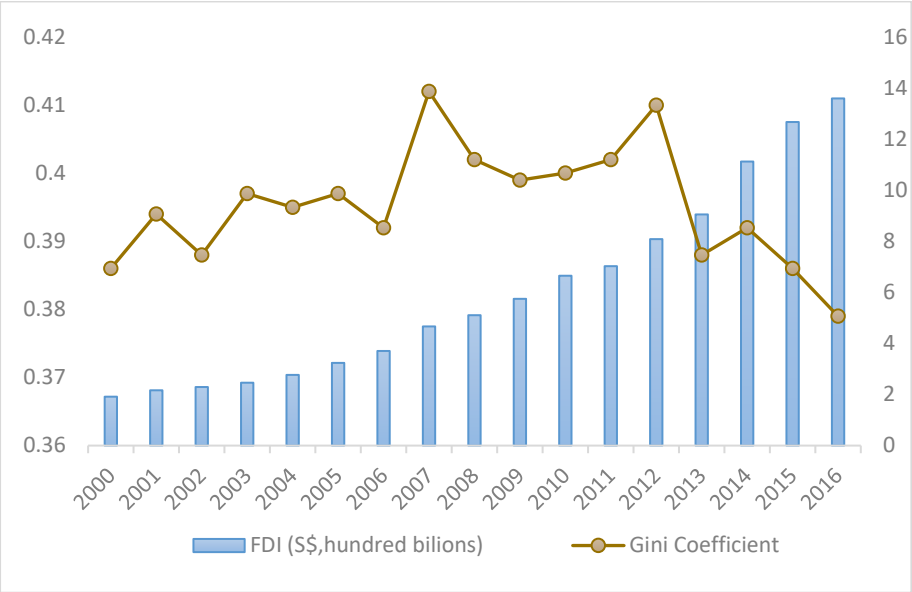

Figure 3. FDI and income inequality

Empirical Evidence from Asia-Pacific Economies

Data and Variables

To further examine the above hypotheses, we collected data from 29 Asia-Pacific economies including China, India, and ten ASEAN countries (Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Vietnam) (see Table 1). A panel dataset between 2000 and 2016 was built on the statistical data from each country's

government website, IMF statistics, World Bank statistics, Asian Development Bank website, OECD library, and the website of Department of Economic and Social Affairs of United Nations. The variables in present research include FDI, corporate tax rate, population, GDP per capita, GDP annual growth, GDP per capita growth, connectivity, smart professionals, tax-ruling certainty, corruption control, human capital (i.e., education) and income inequality.

Table 1

Selected Research Objects

Australia	Indonesia	Myanmar	Singapore
Bangladesh	Japan	Nepal	South Korea
Bhutan	Laos	New Zealand	Sri Lanka
Brunei	Macao	Pakistan	Taiwan
Cambodia	Malaysia	Papua New Guinea	Thailand
China	Maldives	Philippines	Timor-Leste
Hong Kong	Mongolia	Russia	Vietnam
India			

Measurements

FDI. Based on the World Bank's definition, FDI refers to direct investment from non-resident investors in a host country. It is a cross-border investment associated with "a resident in one economy having control or a significant degree of influence on the management of an enterprise that is resident in another economy"[†]. Inward FDI includes "all liabilities, and assets transferred between resident direct investment enterprises and their direct investors". It also includes "transfers of assets and liabilities between resident and non-resident enterprises, if the controlling parent is non-resident". In our analysis, we mainly use the FDI share of GDP as an indicator of FDI. However, in Model 1 where we test H1, we also used FDI net inflows as an indicator of FDI to compare the results. Data are in constant 2010 US dollars and the log term

[†] See as https://datahelpdesk.worldbank.org/knowledgebase/articles/114954-what-is-the-difference-between-foreign-direct-inve

of net FDI inflows was used in our analysis to reduce skewness of the dependent variable (Barthel, Busse, & Neumayer, 2010). Data were collected from the World Bank.

Corporate income tax. Most economists argued that a country's statutory tax rate was an imperfect measure to determine the impact of investment behaviour of multinational firms, as it ignored tax planning effects and special tax arrangements. Effective or average tax rates are thought to be a better approximation of the tax burden on foreign investments (De Mooij & Ederveen, 2003; Matthews, 2011). However, it is complex to work out the effective tax rate as variables such as the country's depreciation regimes, loss carry forward provisions and other factors have to be taken into account, and the view that the statutory tax rate is the only tax variable factored in by investors, continues to hold (Fletcher, 2002; OECD, 2007). The data of headline corporate tax rate were obtained from various sources, i.e., Ernst & Young worldwide corporate tax guides, PricewaterhouseCoopers worldwide tax summaries, the World Bank, www.tradingeconomics.com, www.theglobaleconomy.com, the IMF website, and the Asian Development Bank website.

Connectivity. Connectivity refers to transportation connectivity of a host country, which may have a significant influence on FDI inflows (Asiedu, 2002; Cheng & Kwan, 2000; Kumar, 2006). Due to data availability, we used a proxy variable to evaluate connectivity: the volume of goods transported by air transportation. Therefore, the present study measured connectivity by using the volume of goods (million ton) transported by air per kilometer. The data were collected from the World Bank website and its logarithm was used in the regression models.

Tax-ruling certainty. We used a proxy indicator to evaluate tax-ruling certainty: rule of law created by Kaufmann, Kraay, & Mastruzzi (2010). Rule of law is deemed as an important factor that has a significant effect on economic performance (Asiedu, 2006;

Globerman & Shapiro, 2002) and FDI inflows (Habib & Zurawicki, 2002). Rule of law refers to the investors' perceptions that to which extent they are confident in that the laws are clear, stable, fair and well abided by the society, the government and public officials are accountable under the law. And to which extent they are confident in "the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence" (Kaufmann, Kraay, & Mastruzzi, 2010). The data is from the Worldwide Governance Indicators. The values of rule of law ranged from -2.5 to 2.5.

Corruption control. Control of corruption captures the "perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as the capture of the state by elites and private interests" (Kaufmann, Kraay, & Mastruzzi, 2010). The data is from the Worldwide Governance Indicators. Values ranged from -2.5 to 2.5.

Smart professionals. The labour market is another important consideration for investors (Blomström, Fors, & Lipsey, 1997). Therefore, we included smart professionals as an exploratory variable. We used the gross enrolment ratio in tertiary education to evaluate the skilled labour. The higher ratio of enrolment in tertiary education represents better labour market quality. The data were from the UNESCO Institute for Statistics and the World Bank.

Economic performance. We used GDP per capita growth rate and GDP annual growth rate to evaluate countries' economic performance. GDP per capita growth was used since it better reflects a country's economy regardless of the country size. It is more comparable than the total GDP. GDP growth rate (annual %) is also regarded as the key indicators of government performance. Data of both variables were from the World Bank and based on constant 2010 USD.

Income inequality. Income inequality was measured by the GINI coefficient that indicates the extent to which the distribution of income among working people or households within a host economy deviates from a perfectly equal distribution. GINI coefficient varies from zero to 100 where a value of 0 represents perfect equality and 100 means perfect inequality. The data were mainly from the World Bank. But for countries such as Australia, China, Indonesia, Cambodia, Taiwan, and Japan the data of which were not available from the World Bank, we obtained data from various sources including local government websites, UNDP website, and existing publications.

Descriptive analysis

It is observed that the Asia-Pacific region had the most uneven economic development. There are eight developed economies whose GDP per capita has been over than 20,000 US dollars in 2016 (i.e., Australia, Hong Kong, Japan, Korea, Macao, Singapore, Taiwan, and New Zealand). Four economies' GDP per capita is between 8,000 to 10,000 U. S. dollars, including China (8123.181), Maldives (9875.278), Malaysia (9508.238), and Russia (8748.369). The inward FDI was also highly imbalanced among the 29 economies. For example, China, Hong Kong, and Singapore received 170.5, 117.1, and 61.5 billion US dollars respectively in 2017. But many countries received less than five billion, such as Indonesia, Myanmar, Pakistan, Philippines. Withdrawal of investments in several countries are even larger than the net FDI inflows (e.g., Brunei, Mongolia). As for the corporate tax rates, they range from 11.2% to 35.3%. Twenty countries have a corporate tax rate of lower than 25% (See Table 2). Table 3 shows the descriptive statistics of the main variables in our three regression models. Results indicate that connectivity and population size have a relatively high standard deviation, suggesting large differences in these two variables.

Table 2

The Profile of the Selected Economies

Country	P(million)	GDP (billion USD)	GDPPC	FDI of GDP(%)	FDI (million USD)	CIT
Australia	24.13	1204.62	49755.32	3.49	42049.40	0.30
Bangladesh	162.95	221.42	1358.78	0.86	1908.27	0.25
Bhutan	0.80	2.21	2773.55	0.36	8.08	0.35
Brunei	0.42	11.40	26939.42	-1.32	-150.55	0.19
Cambodia	15.76	20.02	1269.91	11.43	2287.03	0.20
China	1378.67	11199.15	8123.18	1.52	170556.53	0.25
Hong Kong	7.35	320.91	43740.99	36.49	117109.70	0.17
India	1324.17	2263.79	1709.59	1.96	44458.57	0.30
Indonesia	261.12	932.26	3570.30	0.44	4142.20	0.25
Japan	127.00	4940.16	38900.57	0.71	34904.74	0.23
Laos	6.76	15.81	2338.69	6.31	997.44	0.24
Macao	0.61	45.31	74017.18	0.69	310.52	0.12
Malaysia	31.19	296.54	9508.24	4.56	13515.80	0.24
Maldives	0.42	4.22	9875.28	10.61	448.01	0.15
Mongolia	3.03	11.18	3694.08	-37.17	-4156.41	0.25
Myanmar	52.89	63.23	1195.52	5.18	3278.10	0.25
Nepal	28.98	21.13	729.12	0.50	106.00	0.30
New Zealand	4.69	184.97	39412.16	1.05	1934.89	0.28
Pakistan	193.20	278.91	1443.63	0.83	2324.00	0.32
Papua New Guinea	8.08	20.21	2500.09	-0.20	-39.77	0.30
Philippines	103.32	304.91	2951.07	2.62	7979.57	0.30
Russia	144.34	1283.16	8748.37	2.54	32538.90	0.20
South Korea	51.25	1411.25	27538.81	0.77	10826.60	0.22
Sri Lanka	21.20	81.32	3909.99	1.10	898.08	0.28
Singapore	5.61	296.98	55243.00	20.74	61596.85	0.17
Taiwan	23.51	530.53	22561.00	0.02	8333.00	0.17
Thailand	68.86	407.03	5910.62	0.75	3063.24	0.20
Timor-Leste	1.27	1.78	1405.39	0.31	5.48	0.11
Vietnam	92.70	205.28	2170.65	6.14	12600.00	0.20

Note: Data are based on 2016. P= population size; CIT= Headline corporate tax rate (on profit/ income), 1 being 100%.

Table 3

Descriptive Statistics of the Variables Included in Model 1

Variable	Mean	Std. Dev.	Min	Max	Obs
FDI inflows	15	37.86	-25.09	290.93	464
CIT	0.26	0.08	0.01	0.42	464
GDP per capita	8.28	1.63	4.93	11.45	464

Population	133.24	314.98	0.29	1378.67	464
Connectivity	2424.13	3936.36	0	21304.59	464
Smart Professionals	38.16	28.28	0.21	99.66	386
Tax-ruling Certainty	2.54	0.97	0.76	4.51	463
Corruption Control	2.55	1.06	0.83	4.89	463

Model Estimation and Results

Model 1: Testing the effects of the corporate tax rate on FDI.

The empirical model. To test hypotheses H1, we built regression Model 1. The dependent variable was FDI net inflows and the main explanatory variable is the corporate tax rate. Control variables include population, GDP per capita, connectivity, tax ruling certainty, smart professionals, and corruption control. We adopted the regression formulation as follow:

$$FDI_{it} = c_0 + c_1 FDI_{it-1} + c_2 CIT_{it} + c_3 Control_{it} + \varepsilon_{it}$$

where FDI is measured by both FDI share of GDP and net FDI inflows in constant 2010 US dollars. FDI_{it-1} is lag one of the dependent variable (FDI). Control variables include GDP per capita, population size, connectivity, smart professional, and two policy variables (e.g., tax-ruling certainty, and corruption control).

The correlation matrix shows that CIT has a negative relationship with both the FDI share of GDP and net FDI inflows. Other variables have positive associations with FDI inflows. Taking reference from Wooldridge (2015), we ran Pearson correlation and drew scatterplots to test multicollinearity between different independent variables. Based on the correlations in Table 4, collinearity between independent variables was not a problem except corruption control. We also examined the scatterplots between dependent variables and independent variables and results showed that non-linear relationships did not exist, which supported the use of a linear regression model.

Table 4

Pearson Correlations

	1	2	3	4	5	6	7	8
1. FDI1	-							
2. FDI2	0.3048*	-						
3. CIT	-0.3754*	-0.0975*	-					
4. GDP per capita	0.2598*	0.1934*	-0.3884*	-				
5. Population	-0.1129*	0.6005*	0.1778*	-0.1800*	-			
6. Connectivity	0.2243*	0.6553*	-0.1853*	0.4931*	0.3183*	-		
7. Smart professionals	0.1811*	0.1298*	-0.3641*	0.7776*	-0.2049*	0.5047*	-	
8. Tax-ruling Certainty	0.2633*	0.1306*	-0.1647*	0.8467*	-0.1321*	0.4643*	0.6888*	
9. Corruption Control	0.2873*	0.1228*	-0.0927*	0.7710*	-0.1929*	0.3938*	0.5707*	0.9175*

**. Correlation is significant at the 0.05 level*. FDI1= FDI share of GDP; FDI2= FDI inflows.

We used a two-step System GMM (generalized method of moments) estimator to estimate the regression model (Windmeijer, 2005). According to Arellano and Bond (1991), the System GMM approach fit the current study better since we have larger panel units than time periods (compared to fixed-effects or random-effects estimators). This approach can address the endogeneity problem by adding lags one to three of the repressors as instrumental variables. Sargan test was employed to examine the overidentifying restrictions and the result supported the instrument validity. The Arellano-Bond test was employed to examine the autocorrelation problem and the result showed there was no autocorrelation.

Estimation results. As shown in Table 5, we reported four estimation results for comparative purpose. Column (1) and (3) only include control variables. Column (2) and (4) include our main predictor and present the estimation results. In Column (2), the dependent variable is the FDI share of GDP, while the dependent variable of Column (4) is net FDI inflows. Both regressions indicate a significant and negative effect of CIT on FDI. Therefore, our hypothesis H1 was supported. The control variables including population size, GDP per capita, connectivity, and tax ruling certainty also show significant effects on FDI share of GDP and net FDI inflows. Surprisingly, both smart professionals and corruption control show negative signs, though only the relationship with net FDI inflows is significant (see Column (4) in Table 5).

Table 5

The Impact of Corporate Income Tax on FDI Inflows

	(1)	(2)	(3)	(4)
	FDI1	FDI1	FDI2	FDI2
$FDI1_{t-1}$	0.735^{***}	0.710^{***}		
	(160.67)	(95.85)		

$FDI2_{t-1}$			0.868***	0.888***
			(862.62)	(856.62)
CIT_{t-1}		-12.37***		-35.17***
		(-3.49)		(-9.60)
GDP per capita(*log*)	3.489***	-0.907**	6.185***	7.077***
	(13.11)	(-2.02)	(5.99)	(10.76)
Population(*log*)	0.00168	-0.722***	3.676***	2.496***
	(0.01)	(-4.23)	(12.26)	(6.45)
Smart professionals	-0.0823***	-0.0194	-0.445***	-0.455***
	(-15.41)	(-1.40)	(-28.39)	(-30.10)
Connectivity(*log*)	0.939***	0.329***	1.424***	0.400***
	(6.54)	(5.56)	(7.34)	(3.63)
Corruption control	-1.075***	-0.333	-0.650	-2.770***
	(-2.70)	(-0.75)	(-1.39)	(-4.24)
Tax-ruling certainty	-0.0176	2.358***	10.77***	9.053***
	(-0.03)	(4.59)	(26.73)	(27.90)
Constant	-31.08***	13.30***	-53.25***	-40.97***
	(-12.79)	(4.04)	(-5.15)	(-5.23)
Sargan test	17.68931	15.83143	22.78283	22.76656
p-value	1.0000	1.0000	0.9999	1.0000
AR(2)	-1.3636	-1.3894	-.6837	-.66115
p-value	0.1727	0.1647	0.4942	0.5085
Observations	358	358	358	359

Note. *t* statistics in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. FDI1=FDI inflows/GDP; FDI2=FDI inflows. Sargan test is for over-restrictions (null hypothesis: overidentifying restrictions are valid). VR(2) is second-order autocorrelation test (null hypothesis: no autocorrelation).

Model 2: Effects of FDI on economic growth.

The regression Model 2 aimed to test the hypothesis H2. Building on Borensztein, Gregorio, and Lee's (1998) regression equation about the effect of FDI on economic growth, we adopted the following regression model:

$$G_{it} = c_0 + c_1 G_{it-1} + c_2 G_{it-2} + c_3 FDI_{it} + c_4 Control_{it} + \varepsilon_{it}$$

where G is measured by both GDP per capita growth rate (GDPPG) and GDP growth rate (GDPGR). G_{it-1} is a one-period lagged value and G_{it-2} is a two-period lagged value. FDI is inward FDI share of GDP (%). Control variables included human capital which was measured by gross enrolment ratio of lower secondary school, the log value of GDP per capita, the population size, and a policy variable measured by corruption control.

We used the same dataset mentioned above and system GMM estimation method to estimate our regression Model 2. The lag one to lag three repressors were included to address endogeneity issue. Sargan test supported the instrument validity. The Arellano-Bond test showed that there was no autocorrelation problem. As shown in column (2) and (4) in Table 5, FDI shows a positive and significant impact on GDP per capita growth rate and GDP growth rate. The results also indicate that the human capital and corruption control had positive effects on economic growth, while the log value of GDP per capita and the population had a negative impact on growth. **Therefore, the hypothesis H2 was supported.**

Table 6

The Impact of FDI on Economic Growth

	(1)	(2)	(3)	(4)
	GDPPG	GDPPG	GDPGR	GDPGR
L.GDPPG	-0.0833***	-0.0739***		
	(-5.31)	(-6.05)		
L2.GDPPG	-0.205***	-0.177***		
	(-15.68)	(-12.15)		
L.GDPGR			-0.0397***	-0.0448**

			(-5.80)	(-1.99)
L2.GDPGR			-0.157***	-0.144***
			(-51.51)	(-31.40)
FDI		0.409***		0.146***
		(10.11)		(6.16)
Population (*log*)	-3.391***	-3.248***	-3.354***	-1.765**
	(-4.95)	(-4.89)	(-9.77)	(-2.38)
Human capital	0.0331***	0.0469***	0.109***	0.0510**
	(2.76)	(2.74)	(4.54)	(2.20)
Corruption control	6.097***	8.578***	5.617***	3.821***
	(8.00)	(7.49)	(5.11)	(4.36)
GDP per capita (*log*)	-7.707***	-9.632***	-8.858***	-6.291***
	(-11.49)	(-8.64)	(-8.24)	(-5.85)
Constant	77.90***	89.54***	82.27***	60.12***
	(12.05)	(8.27)	(10.11)	(6.35)
Sargan test	25.20088	22.8656	24.899453	23.87755
p-value	1.0000	1.0000	1.0000	1.0000
AR(2)	|-.98697	-1.1612	-1.2258	-1.1055
p-value	0.3237	0.2456	0.2203	0.2689
N	350	350	350	350

Note. *t* statistics in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Sargan test is for over-restrictions (null hypothesis: overidentifying restrictions are valid). VR(2) is second-order autocorrelation test (null hypothesis: no autocorrelation).

Model 3: Effects of FDI on income inequality.

To examine the impact of FDI on income inequality, Choi (2006) proposed a linear equation model. We slightly adapted Choi's model as follows:

$$GINI_{it} = c_0 + c_1 GINI_{it-1} + c_2 FDI_{it} + c_3 Control_{it} + \varepsilon_{it}$$

where the GINI refers to the Gini index of a country. FDI is the ratio of FDI inflows to GDP. Control variables include GDP per capita, GDP annual growth rate, and GDP which was measured by the log of GDP in millions of 2010 constant US dollars. Education was also included as a control variable because it has been found to be significantly associated with income inequality (Checchi, 2001; Gregorio & Lee, 2002; Muller, 2002). Education was measured by total enrolment ratio in tertiary education. The data were from the World Bank databank from 2000 to 2016. Due to data availability of GINI, only 163 observations were used for analysis.

Then we used a two-step system GMM estimation to estimate our regression model (see Table 7). For comparative purpose, column (1) of Table 7 only includes control variables. Column (2) includes the main predictor. Column (3) includes another control variable: GDP. Both column (2) and (3) show the positive relationships between FDI and the Gini index. To address the endogeneity problem, we included lag one to lag three regressors as instrumentalal variables. Sargan test statistics support that all the instruments we used are valid. The Arellano-Bond tests show that there was no autocorrelation problem. Our empirical results indicate that FDI had a positive and significant impact on the GINI coefficient, which supports the **hypothesis H3** that FDI positively associates with the host economies' income inequality. The control variables show positive relationships with GINI coefficient except human capital which shows a negative relationship with the GINI coefficient.

Table 7

The Impact of FDI on Income Inequality

	(1)	(2)	(3)

	GINI	GINI	GINI
L.GINI	0.836***	0.888***	0.852***
	(34.93)	(24.12)	(23.53)
FDI		0.0264**	0.0441***
		(2.20)	(3.89)
GDP per capita (log)	0.592***	0.577***	0.685***
	(5.60)	(2.84)	(3.64)
GDP annual growth	0.0295*	0.0473**	0.0415**
	(1.77)	(1.99)	(2.43)
Education	-0.0441***	-0.0364***	-0.0563***
	(-5.23)	(-4.37)	(-4.82)
GDP(log)			0.223***
			(2.97)
Constant	2.686	0.356	-4.229**
	(1.57)	(0.32)	(-2.35)
Sargan test	12.47621	16.78433	13.94556
p-value	1.0000	1.0000	1.0000
AR(2)	-.17371	-.20078	-.17266
p-value	0.8621	0.8409	0.8629
N	163	163	163

Note. *t* statistics in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Sargan test is for over-restrictions (null hypothesis: overidentifying restrictions are valid). VR(2) is second-order autocorrelation test (null hypothesis: no autocorrelation).

Discussion

Findings

By using data collected from Asia-Pacific countries, our empirical results provide evidence that the corporate tax rate had a negative impact on a host country's FDI inflows. These results

could explain why tax competition became quite common among the global economies nowadays. We also examined other explanatory factors of FDI. Results show that richer and larger countries had attracted more FDI inflows than less developed and smaller countries. But the FDI share of GDP in a larger and richer economy was more likely to be lower. A country's better transportation connectivity and tax ruling certainty also had positive effects on its inward FDI. However, a higher percentage of smart or higher educated professionals of the whole population within a country had a negative association with net FDI inflows. One explanation is that smart professionals usually means higher wage cost (Feenstra & Hanson, 1997), which may have a negative effect on FDI from labor-intensive sectors (Cheng & Kwan, 2000). Since most of the foreign investors in Asia are engaging in labor-intensive activities such as mining, manufacturing, infrastructure, power, and so on (Bissinger, 2012; Hoang, Wiboonchutikula, & Tubtimtong, 2010; Li, 2013), they may not require a large number of higher educated professionals. Interestingly, corruption control also showed a negative impact on net FDI inflows. The explanation would be that corruption might also be beneficial to investors in certain circumstances, especially in those countries that are traditionally corrupted. This is consistent with Egger and Winner's (2005) findings based on 73 countries that corruption was positively correlated with FDI.

Second, we built an explanatory model based on Borensztein, Gregorio, and Lee's (1998) findings to examine the impact of FDI on economic growth. Results supported the positive effects of FDI on a country's economic growth (e.g., GDP per capita growth or GDP annual growth). Control variables also showed significant influence. Human capital and institutional factor (control of corruption) had positive associations with economic growth. The population had a negative relationship with both per capita GDP growth and annual GDP growth. It is not surprising that some existing studies also indicated similar results (Kelley & Schmidt, 1995). The lagged value of GDP per capita showed a negative effect on growth. This is consistent

with Borensztein, Gregorio, and Lee's (1998) research results that the richer countries tend to have a declining growth rate.

Lastly, we linked FDI with income inequality. The results based on system GMM estimation showed a positive relationship between FDI inflows and income inequality after controlling GDP per capita, GDP growth, GDP, and human capital. Our results confirmed the findings by Choi (2006) and Pan-Long (1995) that FDI is positively associated with "unequal income distribution" within host countries. All the control variables display significant associations with the GINI coefficient. Specifically, GDP, GDP growth, and GDP per capita showed positive signs. While the ratio of tertiary education was negatively associated with the GINI coefficient.

Theoretical Implications

The present study contributes to the literature in several ways. Firstly, the current research adds important supplements to the understanding of Asia-Pacific countries' economic phenomenon, especially when the global tax competition, slowing down economic growth has become the key challenges for global economies. Asia-Pacific region has attracted increasing attention in international governance and economic integration due to its impressive growth since the mid-1980s (Stone & Jeon, 2000). Many existing studies have paid attention to economic growth, but very few focused on how taxation policies influence capital inflows in the Asia-Pacific region. This study provides research finding in Asia Pacific context that lower taxation of a country would be one of the most important driving forces of capital inflows. Moreover, there is a dearth of studies focusing on foreign investments' negative impacts. Most existing studies conclude that the foreign investments would increase local residents' income but failed to investigate whether and how foreign capital promotes unequal income distribution. Therefore, the present research adds significant value to existing literature that foreign

investments have positive impacts on income inequality. However, the present study also has limitations. For example, due to limited resources, we used the headline tax rate but not effective tax rate to represent tax burdens which merit refinement for any future research.

Policy Implications

Our findings may provide important policy implications for practitioners. First, pro-investment taxation policy would still be a very important policy instrument to promote foreign investments. The countries with a lower tax rate would be more attractive to investors. After the US significantly cut the corporate tax rate, Australia and several EU countries are also considering reducing tax rates. Therefore, we could predict that the game of "racing to bottom" is still going on. However, tax competition has unequal influences on countries from the different developmental stage. Our findings show that the richer countries with better infrastructure or larger population size have an advantage in attracting FDI inflows over less-developed and smaller countries. For those developing countries, improving transportation connectivity should still be their policy priority. The central government of a country should allocate more resources for the less developed area to develop local transportation infrastructure. In addition, developing countries should also keep reforming their system to provide tax and governance certainty.

Additionally, although foreign investments do have a positive impact on domestic economic development, it may also increase income inequality, which would be hazardous for social cohesion and long-term development. Many empirical studies found that income inequality is one of the main causes of violent crime (e.g., Kennedy et al., 1998; Brush, 2007). However, we should not blame FDI for inequality but to understand what led to the uneven distribution of FDI within a country (Wei, Yao, & Liu, 2009). Therefore, the lessons for national policy makers would be how to reduce the negative effects of foreign investments. One of our recommendations is that the governments of the host countries should make sure

that the investments could be evenly distributed in both developed and less-developed regions. For many less-developed countries, they are more likely to locate the investments in those regions with better infrastructures when they initially opened up their market. To attract investments, the local governments usually would provide many benefits for investors such as tax relief, free land use, cheaper electricity, transportation, and so on. Other investors would follow suit and they would also prefer these better-developed regions and would be less likely to invest in those under-developed regions. This is one of the main reasons for regional unequal development and income inequality (Wei, Yao, & Liu, 2009). Therefore, it is necessary to purposefully incentivise the investors to locate their factories and workplaces in those less-developed regions to narrow the development gap. For example, scholars provided recommendations that, to reduce inequality in China, "FDI has to be directed toward the west and central regions through preferential policies and government intervention to create a better environment for absorbing FDI in these relatively backward areas" (Wei, Yao, & Liu, 2009).

Conclusion

Using empirical data from Asia-Pacific economies and two-step system GMM estimation approach, the present study provides evidence that competitive taxation policy would promote the inward FDI after controlling other determinants of FDI (e.g., GDP per capita, population size, transportation connectivity, smart professionals, corruption, and tax-ruling certainty). Consistent with the majority of existing studies, FDI inflows show positive effects on economic growth in Asia-Pacific host economies. However, at the same time, inward FDI is positively associated with income inequality. The present research adds important evidence in relation to Asia-Pacific economies for the existing literature about tax competition, capital mobility, and economic development. The findings from the current research may also provide meaningful insights and policy implications for the national leaders from Asia-Pacific region (e.g., the developing countries in transition) especially when the inward FDI of Asian-Pacific economies

started to decrease since 2016 and when the global economies are now facing more intensified pressure of tax competition after the US tax reform in 2017.

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