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Does FDI Source Matter for Growth? Evidence from Asian FDI Inflows in ASEAN Countries

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Abstract
This study examines whether the source of foreign direct investment (FDI) matters for economic and productivity growth in ten Association of South East Asian Nations (ASEAN) countries from 1995 to 2022. In recent years, the ASEAN countries have increasingly benefited from Chinese foreign investment, yet questions have been raised about the political motives of Chinese FDI. While the politicisation of foreign aid and investment to forward strategic goals, the capital and investment received may not necessarily be growth-enhancing due to lack of knowledge transfer and quality. Meanwhile, recent empirical studies have raised doubts on the growth gains from foreign investment, which has had mixed findings. Against this backdrop, we disaggregate ASEAN FDI data to examine the impact of foreign investment from Japan, China, India, Korea, Hong Kong and Taiwan and its impact on the productivity and growth of the region. Using the system GMM estimator to control for endogeneity, our estimated results show that overall FDI has a positive and significant impact on economic growth, while this effect is insignificant for productivity growth. Furthermore, we find evidence that FDI from Japan, Korea and Hong Kong has a positive and significant impact on both productivity and economic growth. Meanwhile, FDI from China, India and Taiwan is insignificant. Policymakers should ensure that growth from FDI is not only driven by capital input, but through knowledge and technology transmission from foreign firms that are not politically driven.

Keywords Economic growth · Foreign direct investment · ASEAN · FDI · Dynamic panel data

JEL Codes C33 · O47 · O53 · F21

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Introduction

The recent *World Investment Report 2022* showed that FDI rose to an all-time high in Asia for the third consecutive time, despite the recent pandemic (United Nations, 2022). This is unsurprising for many countries in Asia, such as the ASEAN region. The ASEAN countries have implemented several measures to promote FDI and regional integration policies, such as the ASEAN Economic Community Blueprint 2025, and various free trade agreements such as the Regional Comprehensive Economic Partnership, to promote economic development in the region (Maria et al., 2018). Earlier concerns about the rise of China competing with ASEAN countries for FDI are becoming less of an issue, as initiatives such as the Belt and Road Initiative have seen ASEAN as one of the largest receivers of Chinese FDI (Ma et al., 2020).

Yet, it is suggested that Chinese FDI is politically driven since the majority of Chinese FDI are funded by state-owned enterprises that are aligned with the government's national objectives (Shi et al., 2021). In fact, the politicisation of foreign aid and investment for strategic consolidation is well established in the literature (Blackwill & Harris, 2016; Bräutigam & Tang, 2012; Dreher et al., 2018). Thus, while the empirical literature on the impact of FDI on growth is substantial, there is much to be learned on whether the source of FDI matters for growth in the context of ASEAN countries.

Consequently, this study examines whether FDI from Asian countries can promote economic and total factor productivity (TFP) growth using a panel of 10 ASEAN countries from 1995 to 2022. We focus on FDI inflows from Japan, China, India, Korea, Hong Kong and Taiwan into the ASEAN countries. This is of interest for several reasons. First, we disaggregate our data to examine FDI inflows from specific Asian countries and examine its impact on growth. In the context of the ASEAN region, the US, EU and Japan have traditionally been the main trading partner of the region. Yet, China's economic rise has seen large inflows of foreign investment into the region. Second, the ASEAN countries have continued to pursue an export-led and FDI-led oriented strategy. Consequently, it is important to differentiate whether FDI-led growth is sustainable for long-run growth and whether the source of FDI matters.

Our work provides several innovations to the literature. First, there is substantial empirical literature examining the role of FDI on economic and productivity growth (Haini et al., 2023; Haini & Tan, 2022; Iamsiraroj, 2016; Lin, 2016; Makiela & Ouattara, 2018; Seyoum et al., 2015; Wang, 2010). However, many previous studies have inconclusive findings and find prerequisites for economies to benefit from FDI. For example, Ho and Saadaoui (2022) examine the importance of the financial sector in promoting the growth gains from foreign investment, while Taşdemir (2023) shows that financial integration encourages growth only in countries that are less open. Other recent research also finds that the effect of FDI is dependent on income, inflation volatility, budget deficit and other factors (Cavallaro & Villani, 2022; Yolcu Karadam & Öcal, 2022).

This study focuses on whether the source of FDI matters for growth. While Tang and Tan (2018) are closely related to our work, they disaggregate their data into regional FDI inflows while we disaggregate our data further into country-level FDI inflows. This allows us to specifically examine foreign aid and investment from certain countries of interest such as China. As a result, we extend further empirical evidence on the effectiveness of foreign investment by countries that may be using foreign assistance as a strategic move (Blackwill & Harris, 2016; Dreher et al., 2018; Terman & Byun, 2022).

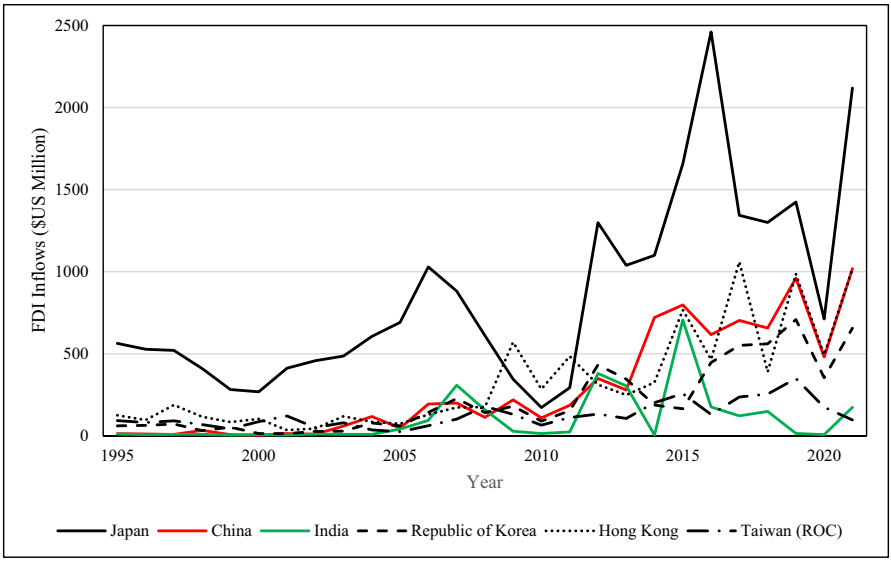
Finally, we examine the impact of our disaggregated FDI inflows on both economic and productivity growth. This is important as recent studies have raised concerns that FDI affects growth through capital accumulation as opposed to TFP growth channels (Makiela & Ouattara, 2018). Growth in the ASEAN countries has been criticised to be mainly driven by capital inputs and lack productivity growth (Haini, 2020). Thus, we provide new evidence on whether FDI source matters for economic and productivity growth.

Our framework allows us to capture the dynamic aspects of FDI inflows from various countries into the ASEAN region. We employ the system generalised method of moments (GMM) estimator to account for this while capturing the pooled country characteristics and time-series dynamics. This is important as the ASEAN countries are varied in their economic development across countries and over time, while FDI inflows are also dynamic and uneven across time and countries. The use of the system GMM estimator can control for this endogenous and simultaneous effect. We ensure that our estimates are robust by specifying two models, one that examines the impact of FDI on economic growth, measured by the rate of change in real GDP per capita, as well as the impact of FDI on productivity growth, measured by the TFP growth rates. We employ control variables that are standard in the literature to ensure our estimates are reliable.

We hypothesise that Chinese FDI is not as effective compared to FDI from other Asian countries. Although Chinese-led initiatives, such as the Belt and Road Initiative, have seen ASEAN receive large amounts of FDI inflows from China, recent studies have claimed that Chinese FDI is politically motivated in nature (Ma et al., 2020; Shi et al., 2021). In general, several studies have shown that Chinese aid and investment may be strategic in nature as it aims to extend its political and economic goals, as opposed to the transfer of knowledge and capital to host countries (Bräutigam & Tang, 2012; Dreher et al., 2018).

While this does not necessarily imply that it is ineffective for economic or productivity growth, political motives are beyond the traditional location and ownership motives of FDI (Dunning, 1977). Figure 1 presents the annual FDI inflows from various source countries from 1995 to 2022. The ASEAN countries have received large amounts of FDI inflows from Japan, followed by China, Hong Kong and Korea. Subsequently, we hypothesise that FDI inflows from Japan, Hong Kong and Korea are more effective at promoting growth from the politically driven Chinese FDI. Meanwhile, the low levels of FDI from India and Taiwan imply that it is insignificant for growth in the region.

The rest of the study is organised as follows. ‘Economic Development and Foreign Direct Investment’ provides a review on the relationship between FDI and



Source: Author's compilation and constructed using data from ASEANStats (ASEAN Secretariat)

Fig. 1 Annual FDI flows by source country from 1995 to 2022. Source: Author's compilation and constructed using data from ASEANStats (ASEAN Secretariat)

economic growth. This section briefly highlights the channels of growth from FDI, followed by a discussion on previous empirical studies. 'Materials and Methods' describes the data and variables employed as well as the econometric strategy while 'Results and Discussion' presents the results alongside a discussion. 'Conclusion' concludes the study with policy implications and providing directions for future research.

Economic Development and Foreign Direct Investment

FDI can be loosely defined as the movement of capital stock flowing across international borders, beyond the firm's location (Marwah & Tavakoli, 2004). More specifically, as it involves investment from a firm in a home country into a host country, FDI can be a form of international inter-firm cooperation that includes an equity stake and the transfer of management decision in ownership control to foreign enterprises (De Mello, 1997). While exporting is a relatively straightforward strategy to internationalise, the motives to transfer capital and equity to a foreign or host country is more complex.

Dunning's (1977) seminal paper on the eclectic paradigm summarises the reasons on international economic activity into two main motives: ownership-specific and location-specific. It is assumed that firms that engage in international economic activity have superior productive knowledge and capabilities and are underutilised, in the sense that it can supply goods and services for both home

and foreign markets. This distinctive endowment can be location-specific to the host country or ownership-specific to a specific firm, which includes access to markets or raw materials, intangible assets and the transfer of costs. As such, foreign firms can promote an efficient distribution of resources as they promote capital flows and transfer technology across borders (Dunning, 1977).

In the context of growth theories, it can be assumed that recipients of foreign investment are likely to experience economic growth. Neo-classical growth models, such as the Solow (1957) model, assumes substitutability between capital and labour in a Cobb-Douglas production function with a constant savings rate, where countries with a higher level of capital can achieve higher output through an increase in savings rate. Since neo-classical models assume that this output will eventually reach its steady state and that technology is exogenous, we can assume foreign investment into domestic technology is a driving force of growth.

Furthermore, modern growth theories also support the role of FDI on growth. Modern theories reject the exogenous notion of technological progress and emphasise on the role of human capital. Human capital refers to the skill of individual workers who use physical capital, where more skilled workers are suggested to be more productive. Accumulated knowledge and learning-by-doing prevent the marginal effect of physical capital to be diminishing and promoting long-run growth (Romer, 1986). Since foreign firms transfer economic activity, in the form of equity capital and management, recipients of FDI benefit from capital and knowledge transfer (Lee & Tan, 2006; Marwah & Tavakoli, 2004).

Empirical studies examine this further by investigating the channels at which FDI affects growth. Earlier research highlights the role of FDI in promoting long-run growth through technological progress and spillovers, where FDI can act as a conduit for the absorption of foreign technology (De Mello, 1997). These spillovers can occur through various channels within the economy: horizontal intra-industry, backward and forward vertical inter-industry FDI linkages between domestic and foreign firms (Wang, 2010). Thus, the superior knowledge embedded in foreign firms can enhance the productivity of domestic firms over time. As a result, when foreign firms transfer these intangible assets to domestically owned firms, it can potentially lower the cost curve of domestic firms and improve its productivity for long-run growth (Doytch & Uctum, 2011). Finally, other research highlights the role of FDI as a source of capital when demand is low, particularly during times of crisis (Lee & Tan, 2006).

On the other hand, there is contrasting research that suggests that the impact of FDI may be transitory as it only affects output in the short run rather than permanently. This opposing view implies that FDI only affects growth through capital accumulation, which eventually reaches its steady state, as opposed to the TFP growth channel (Makiela & Ouattara, 2018). Consequently, other studies questioned whether the gains from FDI may be conditional on other factors. For example, Wang and Wong (2011) emphasise the importance of the quality and quantity of education, as a measure of the absorptive capability of an economy to fully absorb, internalise and utilise foreign technology for productive growth. Others highlight the role of foreign firms to explicitly demonstrate superior knowledge to domestic firms to transfer technological progress (Seyoum et al., 2015).

Meanwhile, Dunning (1977) also stresses on the fact that foreign firms can be a major distorting force in resource allocation, especially since these firms can bypass market mechanism and government regulation. In theory, while foreign firms have superior knowledge that can spillover to domestic firms, it can also give them a competitive advantage over domestically owned firms (Wang, 2010). This issue is exacerbated when domestic firms in imperfectly competitive markets face these superior foreign firms, as domestic firms will face larger cost curves leading to a reduction in productivity (Doytch & Uctum, 2011).

In addition to the competition effect, foreign firms also crowd the domestic sector as they compete with domestic firms for scarce resources in the form of skilled labour and domestic investment (Herzer, 2012). Herzer (2012) also emphasise that FDI in the form of mergers and acquisition will only lead to a transfer of assets from domestic to foreign firms and result in the transfer of profits to foreign firms, thus, decreasing welfare. Others highlight the fact that foreign firms in developing countries are unequally favoured, where they can exploit natural resources, distort political processes and labour markets, as well as undermine local culture (Seyoum et al., 2015; Tang & Tan, 2018).

While previous research shows that FDI can be beneficial or detrimental to economic development, the empirical literature provides substantial evidence on the growth-enhancing impact of FDI, including studies on the ASEAN countries. Recent studies show that FDI can promote growth in high-income and middle-income countries (Lin, 2016) and that FDI is positively associated to growth as it provides host countries a platform for exports and distribution (Iamsiraroj, 2016). Other empirical studies find that the impact of FDI is conditional on the level of corruption (Delgado et al., 2014), income levels (Cavallaro & Villani, 2022), financial development (Alfaro et al., 2004; Ho & Saadaoui, 2022), trade openness (Taşdemir, 2023), production structure (Haini et al., 2023) and education levels or the absorptive capacity of human capital (Wang, 2010; Wang & Wong, 2011; Wogbe Agbola, 2014; Yolcu Karadam & Öcal, 2022).

In terms of researches on the ASEAN countries, Marwah and Tavakoli (2004) find that FDI has a significant relationship with growth for the founding members of the ASEAN countries, and Lee (2009) finds that FDI inflows are positive but only in the short-run, while individual studies on Vietnam (Anwar & Nguyen, 2010; Vu, 2008), Malaysia (Ahmed, 2012), Philippines (Wogbe Agbola, 2014), Indonesia (Lindblad, 2015) and others also find a positive relationship between FDI and growth.

It is unsurprising to observe that previous empirical studies find a positive relationship between FDI and growth in the ASEAN economies. Historically, the ASEAN countries have pursued an increasingly outward-oriented, export-led and FDI-led strategy by introducing economic reforms on deregulation, privatisation, export manufacturing and FDI (Yue, 1999). On the one hand, earlier research criticised the institutional capacity of the region, by stressing the fact that many ASEAN countries, with the exception of Singapore, face state activism, poor property rights and underdeveloped corporate governance (Huang et al., 2004).

Yet, the ASEAN countries continued to develop and have established a network of free-trade agreements with a continued policy of liberalising the economy (Wogbe

Agbola, 2014) and have developed strong trading links with Japan, the EU and the USA (Marwah & Tavakoli, 2004). Recently, the ASEAN member states are committed towards global integration with initiatives such as the ASEAN Economic Community Blueprint 2025, the ASEAN-led Regional Comprehensive Economic Partnership and the partnership with China on the Belt and Road Initiative (Maria et al., 2018).

While previous studies have warned that the rise of China will shift foreign investment away from the region (Huang et al., 2004), we have seen that the ASEAN region is one of the largest recipients of Chinese FDI and a major partner of the Belt and Road Initiative (Maria et al., 2018). However, some research questions the motives of Chinese investment. It is suggested that Chinese outward FDI has political motives, especially with the involvement of state-owned enterprises in many Chinese FDI projects (Shi et al., 2021). This goes beyond the traditional eclectic paradigm introduced by Dunning (1977). Other studies also claim that Chinese foreign investment is heavily aligned with national development objectives, where state-owned enterprises focus on identifying production bases with low labour costs (Ma et al., 2020), especially when China expects to lose its cost advantages when it continues to develop (Lin, 2016).

The strategic role of foreign investment is not new as previous studies have shown that countries seek to gain strategic economic and political goals. These foreign aid and investments are a reward mechanism to gain political alignment or strategic objectives (Fershtman & Weiss, 1998). In fact, many studies have provided empirical evidence of such strategic foreign investment and assistance to foreign hosts (Blackwill & Harris, 2016; Bräutigam & Tang, 2012). For example, the US and China have been found to provide aid and investment to many African countries to align with their foreign policy (Dreher et al., 2018). However, this is more aggressive for countries such as China, as the country has faced increasing politicisation of human rights issues (Terman & Byun, 2022).

Thus, this raises an interesting avenue for research. While Tang and Tan (2018) have questioned the source of FDI, their research disaggregates their FDI data into regional inflows and only examines this in the context of Malaysia. Since Tang and Tan (2018) find that FDI from North America and Asia contribute more to growth, we disaggregate this further and focus on FDI from various Asian countries, namely, Japan, China, India, Korea, Hong Kong and Taiwan. Moreover, we examine this in a panel of ASEAN countries using a framework that allows us to control for endogeneity of FDI and growth as well as across the sample dataset and time since FDI inflows can be dynamic in nature. This can provide new evidence on the relationship between FDI and economic growth using disaggregated data and highlight whether Chinese FDI has indeed promoted growth or crowded the domestic market out.

Materials and Methods

Dynamic Panel Estimator

The empirical literature has demonstrated that there are various approaches to model the relationship on the impact of FDI on economic and TFP growth. Since we are

interested in examining this relationship in the context of the ASEAN economies, panel analysis is suitable. The relationship between FDI and growth is most likely to be dynamic which suggests the need to control for endogeneity and simultaneity (Iamsiraroj, 2016). Consequently, we employ a dynamic panel estimator, namely, the system GMM estimator.

It is suggested that the flow of FDI particularly at the disaggregated level, such as the sectoral or source country level, is also dynamic in nature. Consequently, the system GMM estimator allows one to capture the dynamic aspects of this and allows us to control for country and year effects, exploiting both time-series and country characteristics (Doytch & Uctum, 2011). Thus, following Doytch and Uctum (2011) and Lin (2016), we employ a Barro (1991) styled regression augmented with FDI indicators and control variables that are standard in the growth literature, presented in Eq. 1.

$$y_{it} = \alpha + \gamma y_{i,t-1} + \beta_1 \mathrm{FDI}^{j}_{it} + \beta_2 X_{it} + \mu_i + \nu_{it} \tag{1}$$

In Eq. 1, the error terms are assumed to be $\mu_i \sim i.\ i.\ d\ (0, \sigma_\mu)$, $\nu_{it} \sim i.\ i.\ d\ (0, \sigma_\nu)$ and that $E[\mu_i \nu_{it}] = 0$. Since we examine the ASEAN economies from 1995 to 2022, in each cross-section, there are $i = 1, \ldots, 10$ across $t = 1, \ldots, 28$. The vector y_{it} represents economic and TFP growth, and FDI^{j}_{it} represents our measures of FDI, where superscript j is an FDI index from various sources (j = Various FDI sources), while X_{it} is a vector of control variables. The vectors of parameters are denoted by α, β and γ, while the error terms μ_i and ν_{it} denote the country-specific time-invariant errors and time-varying errors, respectively.

In general, a dynamic panel estimator includes the lagged dependent variable on the right-hand side denoted as $y_{i,\,t-1}$. Estimating Eq. 1 using the ordinary least squares estimator will result in omitted variable bias, as μ_i is unobserved and may be correlated with one of the independent variables because it is fixed over time, causing serial correlation. In addition, $y_{i,\,t-1}$ will also lead to bias since this will depend on $\nu_{i,\,t-1}$ and also since $y_{i,\,t-1}$ is a function of the independent variables.

$$\Delta y_{it} = \gamma \Delta y_{i,t-1} + \beta_1 \Delta \mathrm{FDI}^{j}_{it} + \beta_2 \Delta X_{it} + \Delta \nu_{it} \tag{2}$$

Thus, the system GMM estimator overcomes these issues by building on the first-difference estimator. Taking the first difference of Eq. 1 eliminates the country-specific effects μ_i, producing Eq. 2. The system GMM estimator is based on the following moment conditions and assumptions that ν_{it} is not serially correlated and that the independent variables, FDI^{j}_{it} and X_{it}, are weakly exogenous (Arellano & Bover, 1995).

The system GMM estimator simultaneously employs the lagged levels as instruments for the difference equation and lagged differences as the instruments for the level equation. The system GMM is valid when there is no correlation between the country-specific errors μ_i and the differences of the variables. Thus, the system GMM estimator captures the joint endogeneity of the independent variables through

the use of internal instruments, avoiding the weak instruments problem in the traditional instrumental variable regression approach (Doytch & Uctum, 2011).

We employ the two-step system GMM estimator outlined by Roodman (2009) and report the robustness and sensitivity by reporting the Sargan and Hansen test of instrument validity and over-identifying restrictions. In addition, we report the Arellano-Bond test of no serial autocorrelation to satisfy the moment conditions imposed by the system GMM estimator. This is reported with the null hypothesis of no autocorrelation at the second order.

Data and Variables

This study employs annual-level panel data from a balanced panel dataset of 10 ASEAN countries from 1995 to 2022. The countries are Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand and Vietnam. While the income levels differ across the ASEAN countries, the countries have a certain degree of similarity in their patterns of growth and development, as the region is mostly export-oriented economies with a high level of dependence on FDI (Marwah & Tavakoli, 2004). Moreover, the ASEAN countries continued to commit towards further regional integration between the member states alongside a continued policy of economic liberalisation to promote foreign investment, through policies such as the ASEAN Economic Community Blueprint 2025 and other ASEAN Free Trade Agreements (Maria et al., 2018).

The sample time-period is chosen based on data availability, as our disaggregated FDI data from source countries were available from 1995 onwards. The data are compiled from various sources which includes the *World Development Indicators* (World Bank), the *World Governance Indicators* (World Bank), the *Penn World Table 10.0* (Feenstra et al., 2015) and the *ASEAN Statistics Division* (ASEAN Secretariat). The variables employed are summarised in Table 1, and Eqs. 3 and 4 represent the full specification of the estimated model.

$$\begin{aligned} y_{it} = {} & \alpha + \gamma y_{it-1} + \beta_1 fdi^{j}_{it} + \beta_2 inv_{it} + \beta_3 opn_{it} + \beta_4 \mathrm{inf}_{it} \\ & + \beta_5 gov_{it} + \beta_6 pop_{it} + \beta_7 fin_{it} + \beta_8 edu_{it} + \beta_9 law_{it} + \nu_{it} \end{aligned} \tag{3}$$

$$\begin{aligned} tfp_{it} = {} & \alpha + \gamma tfp_{it-1} + \beta_1 fdi^{j}_{it} + \beta_2 inv_{it} + \beta_3 opn_{it} + \beta_4 \mathrm{inf}_{it} \\ & + \beta_5 gov_{it} + \beta_6 pop_{it} + \beta_7 fin_{it} + \beta_8 edu_{it} + \beta_9 law_{it} + \nu_{it} \end{aligned} \tag{4}$$

We examine the impact of FDI on two dependent variables of interest. In Eq. 3, we employ the real GDP per capita growth rate as our dependent variable, denoted as y_{it}, while in Eq. 4, we examine the impact of FDI on TFP growth rate, denoted by tfp_{it}. Real GDP per capita is a traditional proxy for economic growth and is used in many studies examining the relationship between FDI and growth.

Table 1 Summary statistics

Variable	Definition	Source	Mean	SD	Min.	Max
y	GDP per capita growth rate (annual %)	WDI	3.56	4.08	−18.48	13.52
tfp	Total factor productivity growth rate (annual %)	PWT	0.93	0.11	0.71	1.28
fdi	FDI, net inflows (% of GDP)	ASEANstats	5.65	6.03	−2.76	32.69
fdi-Japan	FDI inflows from Japan (% of GDP)	ASEANstats	0.40	0.32	0.00	9.84
fdi-China	FDI inflows from China (% of GDP)	ASEANstats	0.17	0.25	0.00	4.88
fdi-India	FDI inflows from India (% of GDP)	ASEANstats	0.02	0.08	0.00	4.05
fdi-Korea	FDI inflows from South Korea (% of GDP)	ASEANstats	0.12	0.19	0.00	1.62
fdi-HK	FDI inflows from Hong Kong (% of GDP)	ASEANstats	0.18	0.22	0.00	2.48
fdi-Taiwan	FDI inflows from Taiwan (% of GDP)	ASEANstats	0.07	0.11	0.00	1.08
inv	Gross fixed capital formation (% of GDP)	WDI	25.85	6.59	10.47	43.59
opn	Trade (% of GDP)	WDI	130.34	89.06	11.86	437.33
inf	Inflation, consumer prices (annual %)	WDI	6.18	11.91	−2.31	125.27
gov	General government final consumption expenditure (% of GDP)	WDI	11.97	5.50	3.46	29.87
pop	Population growth (annual %)	WDI	1.43	0.79	−4.17	5.32
fin	Broad money (% of GDP)	WDI	74.33	40.13	7.70	148.95
edu	Human capital index	PWT	2.32	0.52	1.44	4.35
law	Rule of law index	WGI	−0.22	0.89	−1.74	1.87

$N = 280$ observations from the ASEAN economies from 1995 to 2022. The statistics presented are in levels. WDI refers to *World Development Indicators* (World Bank), WGI refers to *World Governance Indicators* (World Bank), ASEANstats refer to *ASEAN Statistics Division* (ASEAN Secretariat) and PWT refers to the Penn World Table 10.0 (Feenstra et al., 2015)

It accounts for both population and inflation between countries and is a standard comparison of economic performance. We also examine the impact of FDI on productivity following Liu (2016) and Wang (2010), since FDI is suggested to promote the diffusion of knowledge and technological progress and spillovers. We employ the TFP growth rates provided by Feenstra et al. (2015), which is a standard Malmquist measure of productivity growth rates that are comparable across the ASEAN countries. It will be interesting to examine if FDI inflows from the Asian countries can promote both growth and productivity rates and whether the impact differs across the sources of FDI.

Focusing on our independent variables, we employ a standard measure to capture the impact of FDI on growth and productivity. The variable fdi_{it}^{j} measures the total value of FDI inflows divided by the GDP of the respective country. This is commonly used to measure the impact of FDI as it controls for differences in economic development across countries and is also known as FDI intensity (Lee & Tan, 2006). While FDI can be measured as a stock, which estimates the total

collective value of FDI in a country, we focus on FDI inflows, which measure the value of new capital into a host country and allow us to identify the impact of new capital inflows on growth and productivity (Iamsiraroj, 2016).

More importantly, we are also interested in whether the source of FDI matters. Consequently, we disaggregate the data and employ FDI inflows from Japan, China, India, Korea, Hong Kong and Taiwan. While this is similar to Tang and Tan (2018), which disaggregates FDI data into regional inflows, we disaggregate our data into country-level inflows and focus on the FDI inflows from Asia. We focus on Asian countries as it is well established that ASEAN trade and FDI with US and EU are a major source of growth in recent and previous studies (Tang & Tan, 2018; Yue, 1999).

Meanwhile, the ASEAN economies are increasingly receiving more FDI from neighbouring countries such as China, particularly with the recent implementation of the Belt and Road Initiative (Maria et al., 2018). In theory, all FDI inflows should promote growth as multinational corporations, regardless of where it is from, will engage in internationalisation strategies based on location or ownership advantages (Dunning, 1977). Yet, recent studies have suggested that the key motive of Chinese foreign investment focused more on fulfilling national development objectives, as their FDI in ASEAN countries is channelled through state-owned enterprises, thus bearing more political motivation rather than the conventional theory (Shi et al., 2021).

We include various control variables that are commonly used in the empirical literature. These include the share of gross fixed capital formation to GDP as the investment rate (inv_{it}), the share of imports plus exports to GDP as a measure of trade openness (opn_{it}), inflation rate measured by annual change in the consumer price index (inf_{it}), the share of government final consumption expenditure to GDP as a measure of government size (gov_{it}), the population growth rate (pop_{it}), the share of broad money to GDP as a proxy for financial development (fin_{it}), the human capital index proposed by Feenstra et al. (2015) denoted by (edu_{it}) and the rule of law index proposed by the *World Governance Indicators*, denoted by (law_{it}).

We employ the human capital index as it is based on the average years of schooling as well as the assumed rate of return for primary, secondary and tertiary schooling, thus considering both the quantity and quality of education in a host country. This is important to consider as recent research has found that the quality of education can increase the growth-enhancing impact of FDI (Wang & Wong, 2011). Moreover, it is equally important to consider institutional quality such as the rule of law in the FDI-growth relationship, as low institutional quality is found to disrupt the free flow of human and capital resources to its most effective use (Delgado et al., 2014). Finally, we include country and year-fixed effects to control for the differences across countries and over time. However, we do not report the individual coefficients due to space constraints.

Results and Discussion

This section begins with a brief discussion of the summary statistics and correlation matrix, followed by a discussion of the system GMM model coefficients for economic growth and productivity growth rates.[1]

The summary statistics in levels are presented in Table 1. On average, the per capita growth rate of the ASEAN countries is around 3.56 percent with some level of variation, suggesting that economic growth varies across the region and over time. The ASEAN countries contracted during the Asian Financial Crisis during the late 90s and suffered during the recent 2008 Global Financial Crisis. More specifically, Indonesia, Malaysia, Thailand and Singapore suffered heavily during the Asian Financial Crisis. Meanwhile, the recent newcomers such as Myanmar, Cambodia and Vietnam have benefited from high growth rates particularly in the early 2000s. On the other hand, the average TFP growth rate is at 0.93 percent with low levels of variation, suggesting that technological progress is slow in the region. This is well established in the literature, which suggests that the ASEAN countries are extremely dependent on capital inputs for growth (Haini, 2020).

In terms of FDI, on average, total FDI inflows account for 5.65 percent of GDP across the sample size with some level of variation. Countries such as Singapore and Brunei report a high level of FDI intensity, while Myanmar did not receive any FDI inflows during the late 90s. On average, we find that FDI from Japan is the largest, in terms of FDI inflow intensity followed by China, compared to other FDI from Asian countries. This is unsurprising as Japan is one of the largest trading partners for the ASEAN region, while China has recently stepped up its foreign investment efforts into the region as part of the Belt and Road Initiative. Finally, the control variables display acceptable amounts of variation except for inflation rates, as countries such as Lao PDR, Indonesia and Myanmar experienced episodes of high inflationary pressures.

The estimated correlation matrix is presented in Table 2. The correlation matrix measures a simple linear relationship between two variables and is bounded between $+1$ and -1, where the former presents two perfectly positively correlated variables while the latter presents two perfectly negatively correlated variables. Consequently, this only provides a brief insight since the correlation matrix is a simple linear relationship prior to the system GMM estimations. Interestingly, while overall FDI has a positive correlation with both economic and TFP growth, the strength of the correlation is stronger between FDI and TFP growth. This may imply that FDI promotes productivity growth through its knowledge transmission channels (Haini et al., 2023; Haini & Tan, 2022).

Focusing on the correlations with economic growth, FDI inflows from the Asian countries have a weakly moderate correlation to growth with mixed signs. The

[1] As a robustness check, we estimate a Driscoll-Kraay estimation in addition to our dynamic system GMM estimator in Appendix. While we do not account for the direct spatial effects of trade and foreign investment such as (Mahmood, 2022), we account for potential cross-sectional dependence between the ASEAN economies using the Driscoll-Kraay estimator.

Table 2 Correlation matrix

Variables	*y*	*tfp*	*inv*	*opn*	*inf*	*gov*	*pop*	*fin*	*edu*	*law*	*fdi*	*fdi*-Japan	*fdi*-China	*fdi*-India	*fdi*-Korea	*fdi*-HK	*fdi*-Taiwan
y	1.000																
tfp	0.170	1.000															
inv	0.001	0.531	1.000														
opn	−0.098	0.526	0.053	1.000													
inf	−0.321	−0.180	−0.055	−0.259	1.000												
gov	−0.077	0.113	0.345	−0.030	−0.256	1.000											
pop	−0.205	0.089	−0.052	0.356	0.026	−0.342	1.000										
fin	−0.276	0.251	0.068	0.618	−0.368	0.482	0.053	1.000									
edu	−0.247	0.274	0.086	0.568	−0.318	0.305	0.058	0.772	1.000								
law	−0.217	0.477	0.188	0.861	−0.330	0.214	0.224	0.789	0.837	1.000							
fdi	0.143	0.545	0.006	0.767	−0.220	−0.176	0.105	0.310	0.359	0.587	1.000						
fdi-Japan	−0.103	−0.091	0.166	−0.012	−0.209	0.352	−0.066	0.346	0.344	0.266	−0.234	1.000					
fdi-China	0.334	0.113	0.043	−0.072	0.037	−0.204	−0.166	−0.382	−0.392	−0.317	0.248	−0.607	1.000				
fdi-India	−0.327	0.345	0.069	0.483	0.280	−0.080	0.450	0.198	0.217	0.372	0.315	−0.214	−0.082	1.000			
fdi-Korea	0.106	−0.143	−0.140	−0.152	0.102	−0.301	−0.045	−0.285	−0.238	−0.267	−0.064	−0.354	0.056	−0.084	1.000		
fdi-HK	−0.218	−0.045	−0.015	−0.054	0.046	0.240	0.000	0.234	0.230	0.081	−0.130	−0.238	−0.202	0.007	−0.238	1.000	
fdi-Taiwan	0.092	0.195	−0.033	0.233	−0.072	−0.267	0.074	−0.035	−0.101	0.053	0.280	−0.256	0.155	0.054	0.054	−0.152	1.000

Definition of variables is in Table 1

strength of the correlations for the individual Asian FDI inflows is weaker with TFP growth and in some cases with opposing signs. We also observe that most of the control variables have a weak correlation with economic growth, while some of the control variables have a moderately strong correlation with TFP growth, in particular, trade openness and investment. Furthermore, most of the independent variables are moderately or weakly correlated with one another; thus, this is acceptable and does not raise any concerns on multicollinearity. We confirm this by reporting the average variance inflation factor and find that all estimated GMM specifications in Tables 3 and 4 do not suffer from multicollinearity as it is below the threshold level of 10.

The estimated model coefficients for the system GMM estimator with economic growth as the dependent variable are reported in Table 3, while Table 4 reports the system GMM model coefficients with TFP growth as the dependent variable. Prior to the interpretation and discussion of the estimated results, we ensure that our estimates satisfy the moment conditions imposed by the system GMM estimator. In terms of instrument validity, we find that both estimated models have robust instrument choices as both the Sargan and Hansen tests reject the null hypothesis that the instruments are over identified. This is consistent even with the alternative specifications with different measures of FDI across both models. We employ the lagged dependent variable as our GMM instrument in both levels and differences and collapse this to reduce the instrument count. Moreover, all specifications in Tables 3 and 4 satisfy the Arellano-Bond test of no autocorrelation as it fails to reject the null hypothesis of autocorrelation at the second order for all specifications.

Focusing on Table 3, the estimated results show that overall FDI has a positive and significant impact on economic growth, supporting the strand of literature that postulates the growth-enhancing role of foreign investment on economic growth. Our estimates suggest that a 10 percent increase in overall FDI intensity can potentially promote growth by 0.26 percent for the ASEAN countries. The estimated magnitude is comparable to previous studies that examine the impact of FDI on growth. For example, Marwah and Tavakoli (2004) find that FDI generates around 0.5 percent of growth for four of the ASEAN founding members, while cross-country examinations by Delgado et al. (2014) find that a 10 percent increase in net FDI inflows can increase growth by 0.11 to 4.00 percent.

In general, our findings support the empirical literature on the positive relationship between FDI and economic growth for the ASEAN countries (Ahmed, 2012; Anwar & Nguyen, 2010; Wogbe Agbola, 2014). However, our measure of foreign investment considers FDI from all countries that include the US and EU, which are major trading partners for the ASEAN countries and have invested substantially. Thus, we examine the relationship between FDI and growth further by disaggregating the sources of FDI.

Consequently, we re-examine the impact of FDI inflows from Japan, China, India, Korea, Hong Kong and Taiwan. Interestingly, we only find that FDI from Japan, Korea and Hong Kong are positive and significant to growth. More specifically, we find that a 10 percent increase in FDI inflows from Japan, Korea and Hong Kong leads to a 0.60, 0.33 and 0.15 increase in growth rates, respectively. It is unsurprising to observe that Japanese FDI has the largest magnitude in terms of the

Table 3 System GMM coefficients and associated parameters (economic growth)

Dependent variable: GDP per capita growth rate (annual %)							
Variable	FDI	FDI-Japan	FDI-China	FDI-India	FDI-Korea	FDI-Hong Kong	FDI-Taiwan
$y_{i,t-1}$	0.935***	0.902***	0.919***	0.735***	0.821***	0.814***	0.890***
	(0.070)	(0.145)	(0.097)	(0.103)	(0.094)	(0.092)	(0.146)
fdi	0.026***	0.060**	0.010	0.004	0.033**	0.015**	0.005
	(0.004)	(0.027)	(0.009)	(0.011)	(0.014)	(0.007)	(0.003)
inv	0.082***	0.082***	0.080***	0.084***	0.083***	0.084***	0.080***
	(0.007)	(0.017)	(0.013)	(0.018)	(0.020)	(0.006)	(0.012)
opn	0.100***	0.105***	0.104***	0.102***	0.112***	0.100***	0.104***
	(0.011)	(0.014)	(0.022)	(0.024)	(0.016)	(0.011)	(0.012)
inf	−0.021**	−0.018**	−0.018**	−0.024**	−0.022**	−0.026**	−0.023**
	(0.010)	(0.009)	(0.007)	(0.011)	(0.011)	(0.012)	(0.013)
gov	0.040***	0.032***	0.048**	0.038**	0.073**	0.033**	0.039**
	(0.010)	(0.010)	(0.029)	(0.016)	(0.035)	(0.017)	(0.016)
pop	−0.050**	−0.054**	−0.042**	−0.067***	−0.036**	−0.041***	−0.031***
	(0.021)	(0.018)	(0.015)	(0.012)	(0.011)	(0.011)	(0.012)
fin	0.033***	0.031***	0.030***	0.032***	0.025***	0.031***	0.027***
	(0.006)	(0.005)	(0.003)	(0.006)	(0.006)	(0.004)	(0.003)
edu	0.155**	0.152**	0.195**	0.124**	0.145**	0.188***	0.174**
	(0.068)	(0.069)	(0.061)	(0.065)	(0.066)	(0.043)	(0.062)
law	0.214**	0.209**	0.205**	0.266**	0.196**	0.228**	0.282**
	(0.094)	(0.085)	(0.085)	(0.094)	(0.085)	(0.094)	(0.096)
Constant	0.048**	0.040**	0.040**	0.059**	0.047**	0.041**	0.083**
	(0.024)	(0.017)	(0.019)	(0.024)	(0.021)	(0.020)	(0.034)
VIF	4.39	3.97	4.09	3.96	3.88	3.83	3.84
p value F-statistics	0.000	0.000	0.000	0.000	0.000	0.000	0.000
No. of instruments	33	33	33	33	33	33	33
p value of Sargan test	0.336	0.369	0.210	0.424	0.273	0.520	0.298
p value of Hansen test	0.159	0.464	0.258	0.180	0.307	0.608	0.420
p value of AR (1) test	0.073	0.000	0.078	0.081	0.004	0.033	0.025
p value of AR (2) test	0.393	0.579	0.852	0.898	0.328	0.776	0.750

Definition of variables are in Table 1. *, ** and *** denote statistical significance at the 10%, 5% and 1% levels, respectively. Standard errors are in parenthesis. We employ the lagged dependent variable as our GMM instrument in both levels and differences and we collapse this to reduce the instrument count. This allows us to satisfy the Sargan and Hansen test of overidentifying instruments. The system GMM models are estimated using fixed country and year effects; however, individual coefficients are not reported

growth-enhancing impact of FDI. Japan is well known to be a major trading partner

Table 4 System GMM coefficients and associated parameters (TFP growth)

Dependent variable: Total factor productivity growth rate (annual %)							
Variable	FDI	FDI-Japan	FDI-China	FDI-India	FDI-Korea	FDI-Hong Kong	FDI-Taiwan
$y_{i,\,t-1}$	0.989***	0.897***	0.977***	0.925***	0.819***	0.934***	0.826***
	(0.115)	(0.173)	(0.126)	(0.124)	(0.197)	(0.155)	(0.157)
fdi	0.014	0.061***	0.037	0.020	0.046**	0.010**	0.042
	(0.010)	(0.012)	(0.084)	(0.018)	(0.022)	(0.004)	(0.057)
inv	0.026***	0.031***	0.025***	0.038***	0.026***	0.024**	0.027***
	(0.006)	(0.002)	(0.002)	(0.010)	(0.002)	(0.009)	(0.002)
opn	0.051***	0.051***	0.051***	0.053***	0.052***	0.052***	0.052***
	(0.011)	(0.011)	(0.010)	(0.011)	(0.010)	(0.010)	(0.010)
inf	−0.006	−0.001	−0.001	−0.002	−0.003	−0.003	−0.003
	(0.004)	(0.002)	(0.003)	(0.003)	(0.002)	(0.005)	(0.004)
gov	0.011**	0.011**	0.014**	0.020**	0.010**	0.010***	0.011***
	(0.005)	(0.005)	(0.007)	(0.007)	(0.003)	(0.003)	(0.003)
pop	−0.040	−0.049	−0.050	−0.038	−0.061	−0.026	−0.047
	(0.057)	(0.048)	(0.038)	(0.046)	(0.043)	(0.072)	(0.033)
fin	0.013***	0.011***	0.013***	0.018***	0.013***	0.012***	0.013***
	(0.002)	(0.001)	(0.000)	(0.004)	(0.001)	(0.003)	(0.001)
edu	0.120***	0.153***	0.147***	0.104***	0.110**	0.106**	0.100***
	(0.040)	(0.038)	(0.029)	(0.023)	(0.034)	(0.039)	(0.028)
law	0.154**	0.134**	0.140**	0.180*	0.139*	0.156**	0.127*
	(0.061)	(0.060)	(0.065)	(0.067)	(0.071)	(0.069)	(0.071)
Constant	0.047**	0.055**	0.049*	0.047*	0.054**	0.046*	0.054**
	(0.022)	(0.021)	(0.026)	(0.026)	(0.024)	(0.025)	(0.026)
VIF	5.42	4.89	4.98	4.83	4.70	4.70	4.71
p value F-statistics	0.000	0.000	0.000	0.000	0.000	0.000	0.000
No. of instruments	33	33	33	33	33	33	33
p value of Sargan test	0.116	0.510	0.320	0.750	0.159	0.184	0.157
p value of Hansen test	0.180	0.333	0.181	0.303	0.129	0.589	0.389
p value of AR (1) test	0.001	0.001	0.007	0.004	0.001	0.008	0.002
p value of AR (2) test	0.169	0.522	0.496	0.830	0.373	0.284	0.316

Definition of variables are in Table 1. *, ** and *** denote statistical significance at the 10%, 5% and 1% levels, respectively. Standard errors are in parenthesis. We employ the lagged dependent variable as our GMM instrument in both levels and differences and we collapse this to reduce the instrument count. This allows us to satisfy the Sargan and Hansen test of overidentifying instruments. The system GMM models are estimated using fixed country and year effects; however, individual coefficients are not reported.

of many ASEAN countries, since the early 90s, where ASEAN member states would import capital goods and intermediate inputs from Japan to manufacture for the US and EU markets (Yue, 1999). This process can theoretically promote knowledge spillovers, especially when Japanese firms that invest in ASEAN countries are expected to have superior knowledge embedded within the firms (Wang, 2010).

Meanwhile, we find FDI from China, India and Taiwan to be insignificant to growth for the ASEAN countries. This is surprising, especially in the case of China, which has increased foreign investment in the region in recent years as part of their Belt and Road Initiative. On the one hand, our results support the general findings from Tang and Tan (2018), who suggested that FDI from Asian countries contributed significant to growth compared to other regions. However, our findings contrast this, upon further disaggregation of the FDI source in terms of countries. We explain these findings intuitively following research that highlights the political motives of Chinese FDI. It is suggested that Chinese FDI into the ASEAN countries was politically motivated and aimed at promoting integration efforts within the region that were aligned with China's national development objectives (Shi et al., 2021).

Consequently, this is beyond the traditional location and ownership motives that FDI theory traditionally offers (Dunning, 1977), as Chinese money flowed into countries with low levels of institutional development, such as Myanmar and Lao PDR, to push their national interests. This was evidenced by Lim et al. (2021) who find that Chinese investment was more easily negotiated in ASEAN countries with top-down institutional arrangements lacking checks and balances. While there is a lack of research examining India, we can assume a similar behaviour exists in terms of FDI inflows from Indian firms, where there is a lack of superior knowledge transfer from the home to host country (ASEAN).

We investigate this issue further by examining the impact of FDI on TFP growth rates as shown in Table 4. In contrast to economic growth, the estimated results suggest that overall FDI has a positive but insignificant relationship to TFP growth. This supports recent findings that suggest that FDI mainly affects growth through input accumulation (capital) and not through TFP growth channels (Makiela & Ouattara, 2018). While there are studies that find evidence that FDI can have a significant impact on labour productivity growth (Ahmed, 2012; Vu, 2008), labour productivity can be increased through the input channels. This echoes earlier criticisms on the growth of the ASEAN countries, which is suggested to be mainly driven by capital inputs (Krugman, 1994).

Recent studies also find that ASEAN countries suffer from low levels of technological progress (Haini, 2020). Our estimates suggest that FDI in ASEAN countries promotes growth through the capital input channel, as opposed to the technology transfer of superior knowledge that can promote productivity (Seyoum et al., 2015). Other explanations point to the fact that foreign firms can crowd local markets out and reduce the productivity of local firms by increasing their cost curve (Doytch & Uctum, 2011). As a result, the overall impact on productivity may be negligible or even detrimental.

Similarly, we explore this further by examining our disaggregated FDI data from various Asian countries on TFP growth. Interestingly, we find that FDI from Japan, Korea and Hong Kong is significant to TFP growth. We find that a 10 percent increase in FDI inflows from Japan, Korea and Hong Kong leads to 0.61, 0.46 and 0.10 percent in TFP growth rates, respectively. The findings highlight the importance of disaggregating FDI inflows into its source country, as evidenced by our findings.

The results imply that Japanese, Korean and Hong Kong firms not only promote growth in ASEAN countries through the capital input channel but also through the transfer of nontangible assets embedded with technology (Doytch & Uctum, 2011; Seyoum et al., 2015). This also implies that the motives of these foreign firms to internationalise in ASEAN countries are a long-term investment, as it has a positive relationship with TFP growth. Firms play a vital role in promoting the transfer of technology through demonstration effects and developing human capital formation, which can promote productivity and long-term growth. On the other hand, we find that FDI from China, India and Taiwan has an insignificant relationship with TFP growth. The results are aligned with our findings on economic growth. In theory, some studies suggest that FDI has no relationship to productivity growth, especially when absorptive capacities, such as human capital, is at low levels (Ahmed, 2012; Wogbe Agbola, 2014).

However, there are studies which suggest that FDI can impede productivity growth. For example, Herzer (2012) suggests that foreign firms compete against domestic ones for scarce resources and crowds out investment for domestic firms. Others highlight the theory of dependency, whereby foreign firms enter to exploit natural resources and employ technology that can distort labour markets, political processes and the distribution of income (Seyoum et al., 2015). In context of China, this was evidenced in recent research. It was found that Chinese FDI inflows to ASEAN countries were mainly to exploit primary and secondary industry labour costs (Ma et al., 2020), especially when China expects to lose their cost advantages in the near future (Lin, 2016).

Overall, we find evidence that supports the role of FDI in promoting economic growth. However, upon closer examination and focusing on FDI inflows from Asian countries, we find our results to be varied. More specifically, FDI from Japan, Korea and Hong Kong promotes economic growth, while FDI from China, India and Taiwan is insignificant. Meanwhile, we also find mixed evidence on the role of FDI in stimulating TFP growth. We find that overall FDI is insignificant at promoting TFP growth in the context of the ASEAN countries, which supports the studies that criticised the ASEAN countries to be dependent on foreign capital for growth. On the other hand, when using disaggregated data, we find that FDI from Japan, Korea and Hong Kong promotes TFP growth, albeit at a lower magnitude when compared to its impact on growth rates. This may suggest that FDI in ASEAN is driven through the capital channel as opposed to the productivity growth channel. Similarly, it is established that TFP growth rates in ASEAN are low, where growth is mainly driven through capital inputs.

Our intuitive explanation for the insignificant results, especially for Chinese FDI, mainly revolves around the issue of political motives and the lack of technology

transfer due to firm's FDI motives. Thus, we contribute new evidence on the FDI-growth literature, particularly on the fact that disaggregated FDI data can provide deeper insights into the channels at how it promotes growth and productivity. While previous studies have done this using regional data (Tang & Tan, 2018) or disaggregate using industry level (Doytch & Uctum, 2011; Wang, 2010), we provide evidence using individual country-level FDI inflows in the context of the ASEAN countries.

This is interesting as the narrative on the region revolves around the China Belt and Road Initiative, where China is supposedly playing an important role in promoting the growth and development of the ASEAN countries. Yet, our results suggest otherwise. Our results also echo the literature on the politicisation of aid and investment. For example, recent studies have shown that foreign assistance in the form of aid or investment is a means of economic statecraft (Blackwill & Harris, 2016) and to consolidate strategic political goals (Bräutigam & Tang, 2012). These investments are suggested to be an avenue for countries to gain political alignment à la a reward mechanism (Fershtman & Weiss, 1998) as seen in recent years with the US and Chinese investments in many African countries (Dreher et al., 2018).

Conclusion

This study examines whether the source of FDI matters for the economic and productivity growth of the ASEAN countries. The ASEAN economies continue to pursue an export-led and FDI-led strategy for economic development. This is evident from the implemented policies outlined in the ASEAN Economic Community Blueprint 2025. Recently, ASEAN countries have become one of the largest receivers of Chinese FDI. Previous concerns that China would compete with ASEAN countries for foreign investment have become muted as ASEAN has become the frontline of the Chinese-led Belt and Road Initiative. Yet, others question the motives of Chinese FDI, which are aligned with national government objectives and are politically driven. Against this backdrop, there are very few studies that have questioned whether the source of FDI matters (Tang & Tan, 2018). However, Tang and Tan (2018) only disaggregate their data into regional sources and find that FDI inflows from Asia and US, as a region, benefit growth. We extend this further by disaggregating FDI data from various Asian countries, namely, Japan, China, India, Korea, Hong Kong and Taiwan, and examine whether the source of FDI matters for economic and productivity growth.

We test our hypotheses using a sample of 10 ASEAN countries from 1995 to 2022 using the system GMM estimator to control for the dynamic nature of FDI inflows and economic and productivity growth. This allows us to control for endogeneity and simultaneity, which is important as FDI inflows can be uneven across time and countries, while economic and productivity growth is dynamic in nature. We employ the growth rates of GDP per capita and the TFP growth rates as our dependent variables, allowing us to examine the channels at which FDI inflows affect growth. This is important to examine in the context of the ASEAN countries, as the growth in the region has been driven by capital inputs, which is unsustainable

for long-run growth as opposed to productivity growth. Meanwhile, the theory on FDI suggests that it affects growth exogenously, through capital and equity transfer, and endogenously, through the transfer of knowledge and technology. Our framework allows us to examine whether FDI inflows from these selected Asian countries affect these channels of growth.

Our results support the strand of literature that postulates a positive relationship between FDI inflows and economic growth. We find that overall FDI has a positive and significant relationship with economic growth. On the other hand, we find that overall FDI has an insignificant relationship with productivity growth, in line with previous findings (Makiela & Ouattara, 2018). In terms of FDI sources, the estimated results show that FDI from Japan, Korea and Hong Kong has a positive and significant relationship with both economic and productivity growth. However, the impact of FDI on productivity growth is lower in magnitude compared to its impact on growth. We find that FDI from China, India and Taiwan to be insignificant to both economic and productivity growth.

There are several policy implications. First, we find that overall FDI can promote economic growth, while its relationship with productivity growth is less convincing. Thus, policymakers should ensure that foreign investment and foreign firms should promote learning and demonstration to domestic firms to ensure that technological spillovers can occur to promote productivity growth. Second, although the results show that FDI from China, India and Taiwan is insignificant, policymakers should not discourage inflows from these countries. Rather, the host countries from the ASEAN economies must ensure that the FDI inflows bring substantial levels of technology and knowledge as capital-intensive growth is unsustainable in the long run. More specifically, policymakers should ensure that checks and balances are in place when receiving foreign investment from countries that may be investing for strategic purposes. Such screening processes can allow investment to be more growth enhancing as it encourages knowledge transfer as opposed to just receiving capital which is unsustainable in the long run.

Meanwhile, future work can extend this study as it is subject to several limitations. First, future studies can extend the work on Chinese foreign investment, especially in other developing countries such as those in Africa as well as South and Central Asia. China has made substantial infrastructure investments, and it would be interesting to examine whether the presence of Chinese investment has benefited these economies. Second, studies can specifically examine the nature of Chinese investment and whether countries change their foreign policy over time. The use of gravity model and spatial methodology can provide greater understanding on such issues which are not specifically examined in this study.

Appendix

See Table 5.
See Table 6.

Table 5 Driscoll-Kraay coefficients and associated parameters (economic growth)

Dependent variable: GDP per capita growth rate (annual %)							
Variable	FDI	FDI-Japan	FDI-China	FDI-India	FDI-Korea	FDI-Hong Kong	FDI-Taiwan
fdi	0.019***	0.055**	0.026	0.062	0.021**	0.010***	0.033**
	(0.003)	(0.026)	(0.019)	(0.056)	(0.009)	(0.003)	(0.017)
inv	0.086***	0.086***	0.084***	0.080***	0.084***	0.080***	0.085***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
opn	0.069***	0.097***	0.041***	0.087***	0.074***	0.065***	0.072***
	(0.006)	(0.006)	(0.005)	(0.006)	(0.006)	(0.007)	(0.006)
inf	−0.009***	−0.008***	−0.007**	−0.006**	−0.006**	−0.006**	−0.006**
	(0.003)	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
gov	0.036***	0.021***	0.053***	0.042***	0.042***	0.047***	0.042***
	(0.008)	(0.006)	(0.007)	(0.007)	(0.008)	(0.007)	(0.008)
pop	−0.010	−0.006	−0.001	−0.012	−0.006	−0.011	−0.017
	(0.026)	(0.020)	(0.027)	(0.020)	(0.025)	(0.025)	(0.024)
fin	0.015**	0.021**	0.017*	0.016**	0.016**	0.018**	0.015**
	(0.007)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.007)
edu	0.259**	0.292***	0.231**	0.251**	0.260**	0.256***	0.298***
	(0.095)	(0.085)	(0.080)	(0.093)	(0.088)	(0.082)	(0.105)
law	0.196**	0.113**	0.126**	0.135**	0.128**	0.129**	0.132**
	(0.058)	(0.037)	(0.046)	(0.042)	(0.040)	(0.041)	(0.045)
Constant	0.734***	0.621***	0.783***	0.778***	0.760***	0749***	0.653***
	(0.281)	(0.234)	(0.250)	(0.277)	(0.269)	(0.247)	(0.327)
VIF	4.39	3.97	4.09	3.96	3.88	3.83	3.84
p value F-statistics	0.000	0.000	0.000	0.000	0.000	0.000	0.000
R^2	0.743	0.757	0.734	0.737	0.732	0.737	0.740
CD-statistic	−1.821*	−1.912*	−1.893*	−1.939*	−1.886*	−2.034*	−2.002*

Definition of variables are in Table 1. *, ** and *** denote statistical significance at the 10%, 5% and 1% levels, respectively. Standard errors are in parenthesis. The CD-statistic refers to the Pesaran cross-sectional dependence test, where the null hypothesis is that errors are weakly cross-sectional dependent. All estimations include year and country fixed effects; however, the individual coefficients are not reported due to space constraints

Table 6 Driscoll-Kraay coefficients and associated parameters (economic growth)

Dependent variable: GDP per capita growth rate (annual %)							
Variable	FDI	FDI-Japan	FDI-China	FDI-India	FDI-Korea	FDI-Hong Kong	FDI-Taiwan
fdi	0.046	0.051***	0.007	0.004	0.032**	0.018**	0.039
	(0.032)	(0.014)	(0.014)	(0.029)	(0.015)	(0.007)	(0.027)
inv	0.009***	0.009***	0.009***	0.009***	0.008***	0.009***	0.008***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
opn	0.007*	0.008**	0.007*	0.007*	0.008**	0.007**	0.009**
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
inf	0.001	0.001	0.001	0.001	0.001	0.001	0.001
	(0.001)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
gov	0.004**	0.003*	0.003*	0.003*	0.003*	0.004**	0.004**
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
pop	−0.015	−0.013	−0.012	−0.011	−0.011	−0.013	−0.015
	(0.028)	(0.025)	(0.025)	(0.025)	(0.025)	(0.025)	(0.024)
fin	0.095**	0.103**	0.101**	0.102**	0.102**	0.108**	0.095**
	(0.039)	(0.045)	(0.046)	(0.047)	(0.043)	(0.048)	(0.042)
edu	0.128**	0.117***	0.117**	0.111**	0.114*	0.116**	0.117***
	(0.048)	(0.023)	(0.053)	(0.044)	(0.060)	(0.051)	(0.024)
law	0.092***	0.095***	0.083**	0.085**	0.067**	0.084**	0.081**
	(0.032)	(0.028)	(0.027)	(0.027)	(0.027)	(0.028)	(0.028)
Constant	0.355**	0.388*	0.391*	0.404*	0.399*	0.387*	0.391*
	(0.183)	(0.183)	(0.192)	(0.186)	(0.192)	(0.188)	(0.189)
VIF	5.42	4.89	4.98	4.83	4.70	4.70	4.71
p value F-statistics	0.000	0.000	0.000	0.000	0.000	0.000	0.000
R^2	0.493	0.489	0.489	0.492	0.492	0.491	0.495
CD-statistic	3.452**	4.895***	5.068***	5.348***	5.188***	5.107***	5.437***

Definition of variables are in Table 1. *, ** and *** denote statistical significance at the 10%, 5% and 1% levels, respectively. Standard errors are in parenthesis. The CD-statistic refers to the Pesaran cross-sectional dependence test, where the null hypothesis is that errors are weakly cross-sectional dependent. All estimations include year and country fixed effects, however, the individual coefficients are not reported due to space constraints

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Declarations

Competing Interests The authors declare no competing interests.

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