When Does Foreign Investment Pay Off? State-Level and Firm-Level Spillovers in Malaysia*

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Abstract

This paper examines the state- and firm-level spillovers of foreign investment (FI) in Malaysia using a panel of 13 states and 1 federal territory matched with 890 publicly listed firms over 2002–2022. Approved foreign investment (AFI) is positively and significantly associated with state-level real gross domestic product (GDP), with an elasticity of 0.04–0.08 that is robust to additional controls, weighted regressions, and a block-permutation placebo test. Quantile estimates reveal substantial heterogeneity: the AFI–GDP relationship is most pronounced in middle-to-upper-middle quantiles, statistically weak at the lower tail, and flattens at the upper tail, consistent with absorptive capacity constraints in lagging states and diminishing marginal returns in the most industrialised ones. At the firm level, state-level FI exposure is positively associated with market value, profitability, dividends, capital expenditure, inventories, and employment, but negatively associated with in-house research and development, suggesting partial substitution between foreign technology and domestic innovation. Over the COVID-19 period, the state-level AFI–GDP elasticity is statistically stable, while firms in FI-intensive states exhibit lower payouts and slower employment growth. The developmental returns of FI in Malaysia are thus conditional on absorptive capacity, with implications for incentive targeting in lagging states.

Keywords: Foreign Investments, Foreign Direct Investments, State-Level Analysis, Firm-Level Analysis, Economic Spillovers, Malaysia

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1 Introduction

Over the past four decades, Malaysia has been among the largest recipients of foreign investment[1] (FI) in the Association of Southeast Asian Nations (ASEAN), with inflows helping to transform it from a commodity-based economy into one of the region's most export-oriented industrial hubs (Chen & Intal, 2017; MIDA, 2025; OECD, 2013; UNCTAD, 2023; World Bank, 1993;). As a key source of external capital, technology, and know-how, FI has helped upgrade Malaysia's industrial base, enhance productivity, and integrate domestic firms into global value chains (UNCTAD, 2023; World Bank, 1993). Yet, these gains have been strikingly uneven across states. Investment inflows are heavily concentrated in developed states such as Selangor, Penang, and Johor, which benefit from better infrastructure, skilled labour, and access to major ports and urban centres. In contrast, lagging states, including parts of East Malaysia and the northern peninsular states, continue to attract relatively little FI. These spatial imbalances raise critical questions about the determinants of FI spillovers and whether current policy frameworks adequately address the structural and institutional challenges faced by underdeveloped states.

While extensive literature examines national-level drivers and impacts of foreign direct investment (FDI), much of it overlooks the regional heterogeneity that shapes investment dynamics within countries. A state-level perspective is essential to identify the determinants of FI distribution and evaluate the extent to which FI generates economic spillovers in different regional contexts (Blomström & Kokko, 2003; Moran et al., 2005). These spillovers, ranging from technology transfer and productivity gains to supplier upgrading and labour mobility, can significantly enhance domestic capabilities. However, their magnitude and direction are contingent on factors such as the absorptive capacity of local firms, sectoral composition of FI, institutional quality, and geographical proximity between foreign and domestic enterprises (Crespo & Fontoura, 2007; Görg & Greenaway, 2004; Lessman, 2012). In some cases, weak complementary capacities may limit or even negate the benefits of FI, thereby reinforcing regional inequalities.

Despite the extensive literature on the macroeconomic effects of FDI, three important gaps remain. First, most existing studies treat countries as homogeneous units and overlook

[1] This study analyses approved foreign investment (AFI), defined as the value of foreign investment (FI) projects reported by the Malaysian Investment Development Authority (MIDA). The term FI is used here in a broader sense to capture all foreign investments. In contrast, foreign direct investment (FDI) refers specifically to investments involving at least 10% equity participation. Further details are provided in Box 1A of Appendix A.

substantial within-country heterogeneity in FI distribution and spillovers. Second, firm-level evidence on how state-level FI exposure translates into micro-level outcomes, i.e. productivity, investment, and innovation, remains scarce, particularly for ASEAN economies. Third, the interplay between state-level absorptive capacity and firm-level performance has rarely been examined jointly within a single empirical framework. This paper addresses these gaps by bringing together state-level and firm-level evidence from Malaysia.

In emerging market economies, the determinants of FDI typically fall into four broad categories: (i) economic factors, such as market size, growth potential, and resource availability; (ii) institutional and policy factors, including political stability, regulatory transparency, and ease of doing business; (iii) infrastructure and technological readiness, encompassing transport, energy, and digital infrastructure; and (iv) sociocultural factors, such as language, education, and skills availability (da Silva-Oliviera et al., 2021). These factors interact with the strategic motivations of multinational corporations (MNCs), whether resource-seeking, market-seeking, or efficiency-seeking (Dunning, 1993; Reyes, 2017), and their relative importance varies across regions. Understanding how these determinants influence FI inflows and their associated spillovers at the subnational level is therefore critical for formulating more inclusive policies.

The question of how to maximise the developmental benefits of FI is particularly timely for Malaysia. Recent policy initiatives, including the New Investment Policy (NIP), the National Energy Transition Roadmap (NETR), and the New Industrial Master Plan (NIMP) 2030 have explicitly emphasised the importance of high-quality investments that enhance economic complexity, create skilled jobs, and promote inclusive, regionally balanced growth (MITI, 2023). Achieving these objectives requires not only attracting FI but also ensuring that its spillovers are equitably distributed across states. These policy ambitions can only be realised if FI spillovers reach firms and states beyond Malaysia's traditional industrial core, an issue this paper directly addresses.

This paper addresses these gaps by conducting a state-level empirical analysis of FI determinants and spillovers in Malaysia. Using a panel dataset comprising state-level Approved Foreign Investment (AFI), the study evaluates both the drivers of FI distribution and the conditions under which FI translates into meaningful spillovers. By examining the interplay between regional economic fundamentals, institutional capacity, and firm-level absorptive capabilities, this paper provides evidence-based insights for policymakers.

Our main findings can be summarised as follows. At the state level, a 1% increase in AFI is associated with a 0.04–0.08% rise in state-level real GDP, a relationship that remains robust across a battery of robustness checks including weighted regressions, placebo tests, and quantile regressions. At the firm level, firms located in FI-intensive states record higher market value, profitability, capital expenditure, inventories, employment, and exports, but lower R&D expenditure, suggesting that while FI stimulates productive capacity, its innovation spillovers remain limited without complementary policy support. Overall, our results underscore that maximising the developmental benefits of FI requires not only attracting foreign capital but also strengthening the regional and firm-level conditions that enable its diffusion. The findings inform more inclusive and performance-driven investment policies, ultimately strengthening Malaysia's ability to harness FI for broad-based regional development.

This paper makes three contributions to literature. First, we provide novel dual-level evidence on the drivers and spillovers of FI in Malaysia by combining a panel of 13 states and 1 federal territory with firm-level data on publicly listed Malaysian firms. Second, we document that state-level FI intensity is positively associated with firm market value, profitability, capital expenditure, employment, and export growth, but negatively associated with in-house R&D, revealing a crowding-out effect on domestic innovation. Third, we show that the AFI–GDP relationship is heterogeneous across the conditional distribution of state output, with weaker effects in lagging states, consistent with absorptive-capacity constraints.

The remainder of the paper is structured as follows. Section 2 reviews the literature on the determinants and spillovers of FI, with emphasis on regional heterogeneity in emerging economies. Section 3 outlines the data and methodology employed, while Section 4 presents the empirical findings. Section 5 discusses the policy implications, and Section 6 concludes.

2 Literature review

2.1 Relationship between FI and GDP: direct impact

FI is widely regarded as one of the critical external catalysts for economic growth, particularly in developing and emerging market economies where domestic savings and technological capabilities are often limited. Theoretically, FI contributes to gross domestic product (GDP) growth through multiple channels. It supplements domestic capital formation, facilitates the transfer of advanced technologies, enhances managerial practices, and improves access to

international markets. Collectively, these mechanisms foster capital accumulation, boost productivity, and support sustained economic expansion (Borensztein et al., 1998). These mechanisms are grounded in both neoclassical growth theory, which emphasises capital deepening, and endogenous growth models, which stress the role of technology diffusion and human capital accumulation (Romer, 1990; De Mello, 1997).

Among the various forms of FI, FDI is the most significant and most widely studied. Following the IMF Balance of Payments Manual (BPM5) definition, FDI involves cross-border investments in which a foreign investor acquires a lasting interest, typically at least 10% of voting power, in a domestic enterprise, often through the establishment of new operations (greenfield investment) or the acquisition of substantial equity stakes (brownfield investment) in existing firms (Hintošová, 2021). Unlike portfolio flows, FDI is long-term in nature and carries managerial, technological, and organisational spillovers that extend well beyond the initial capital transfer.

Empirical literature supports a positive relationship between FI and GDP growth, though the magnitude and consistency of this relationship vary across countries and regions. For instance, Albulescu (2015) finds that both inward and outward FI positively affects long-term growth in Central and Eastern Europe. Similarly, Okwu et al. (2020), Yusuf et al. (2020), and El Menyari (2020) provide evidence of FI's growth-enhancing effects in leading global economies, West Africa, and Morocco, respectively. Alfaro et al. (2004) argue that the benefits of FI are more pronounced in countries with well-developed financial systems, while de Mello (1999) highlights the importance of sound macroeconomic policies and institutional quality in amplifying FI's impact on long-run growth. In the context of Sub-Saharan Africa, Anyanwu (2012) underscores the significance of directing FI toward infrastructure and manufacturing to maximise its contribution to GDP growth. Nevertheless, the evidence is not uniformly positive: Carkovic and Levine (2005) and Herzer (2012) find that the growth effects of FDI are weak or conditional on host-country characteristics, highlighting that the FI–GDP nexus is shaped by the quality of absorptive capacity and institutional environment.

Recent evidence from ASEAN economies reinforces this positive association. Sijabat (2023), using panel cointegration and causality tests across ten ASEAN countries from 2009 to 2020, finds a bidirectional relationship between FDI and GDP, as well as between foreign portfolio investment (FPI) and GDP. These findings suggest that FI not only stimulates

economic growth, but is also attracted by expanding economic activity, indicating a mutually reinforcing dynamic.

In the Malaysian context, the growth-enhancing effects of FI are well-documented. Lean and Tan (2011) find that FI significantly contributes to Malaysia's economic growth, particularly in the manufacturing sector. Tan and Tang (2016) further demonstrate that the positive relationship between FI and GDP is more robust in the long run, implying that the benefits of FI may take time to fully materialise. However, Yusof and Bhattasali (2008) caution that the growth effects of FI are not automatic. They argue that complementary factors, such as infrastructure, human capital, and governance, are essential to fully harness the potential of FI. These factors influence the host country's capacity to absorb and leverage foreign knowledge and technology, giving rise to indirect benefits commonly referred to as spillovers. Malaysian firm-level studies corroborate this conditional view: Zhang and Yang (2022) show that FI spillovers in Malaysian manufacturing are concentrated in industries with high foreign presence, while Yunus and Abdullah (2022) find that FI-related productivity gains are uneven and weaker outside technologically advanced segments. Taken together, the Malaysian evidence confirms a positive direct effect of FI on aggregate growth but also suggests that this effect is conditional on regional and structural factors that remain underexplored at the subnational level, an issue this paper examines.

The next section explores these spillover effects in greater detail, examining how they shape the broader developmental impact of FI.

2.2 FDI spillovers and linkages: indirect impact

Beyond its direct contribution to aggregate output, FDI is widely argued to generate indirect benefits through productivity spillovers to domestic firms. Such spillovers arise when local firms benefit from the presence of foreign affiliates through knowledge transfer, technology diffusion, labour mobility, and improved managerial practices (Newman et al., 2015). In the literature, these externalities are commonly classified into two broad channels: horizontal (intra-industry) spillovers and vertical (inter-industry) linkages, each operating through distinct mechanisms and yielding different empirical signatures.

Horizontal spillovers arise when domestic firms benefit from the presence of foreign firms operating within the same industry (Iršová and Havránek, 2013). Three main mechanisms are typically identified. First, demonstration effects occur when local firms imitate the technologies,

products, or business practices of foreign affiliates. Second, competition emerges when the entry of foreign firms intensifies market pressure, forcing domestic incumbents to become more efficient and productive. Third, labour mobility effects arise when workers trained by foreign firms move to domestic firms, bringing in technical and managerial know-how with them. Empirical evidence supports the relevance of these channels: for instance, Arif-Ur-Rahman and Inaba (2021) show that Bangladeshi manufacturers gained significant productivity improvements through horizontal linkages with foreign entrants.

Vertical spillovers capture inter-industry interactions between foreign and domestic firms and typically operate through supplier–customer relationships (Kohpaiboon, 2006). They are usually decomposed into backward and forward linkages. Backward linkages arise when domestic suppliers upgrade their capabilities in response to the more demanding quality, reliability, and delivery standards imposed by foreign buyers. Jordaan et al. (2020) emphasise that such linkages can significantly enhance the productivity of local suppliers through technology transfer, training, and improved production practices. Forward linkages, in contrast, occur when domestic firms benefit from access to higher-quality or cheaper intermediate inputs supplied by foreign affiliates, thereby improving downstream productivity. Empirically, Javorcik (2004) provides seminal evidence of strong backward spillovers in Lithuania, while more recent work confirms the importance of vertical linkages in ASEAN and other emerging economies.

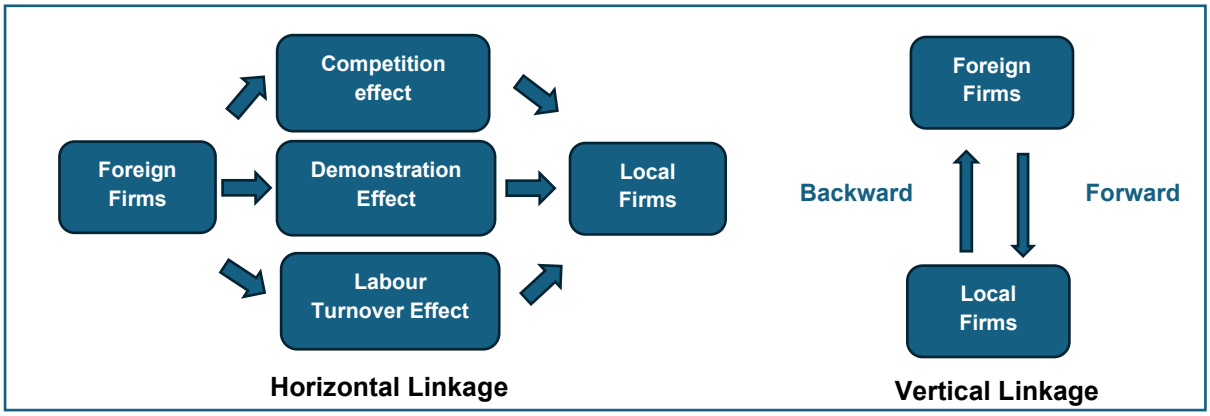
Despite a rich theoretical foundation, the empirical evidence on FDI spillovers remains mixed. While numerous studies document significant positive effects on domestic firms' productivity, others find weak, insignificant, or even negative effects. This heterogeneity has been attributed to several moderating factors, including the absorptive capacity of domestic firms (i.e. technological sophistication, skill endowments, R&D intensity), the sectoral composition of FDI, the geographical proximity between foreign and domestic firms, and the overall level of development and institutional quality of the host country (Eden, 2009; Zamani and Tayebi, 2022).

For instance, a study on the Economic Cooperation Organization (ECO) countries[2] finds that FDI spillovers significantly contribute to economic growth and sustainable development. However, the effectiveness of these spillovers often depends on the host country's policies and

[2] The Economic Cooperation Organization is the Eurasian union between Azerbaijan, Afghanistan, Turkey, Pakistan, Kyrgyzstan, Kazakhstan, Iran, Turkmenistan, Tajikistan, and Uzbekistan. It was initially formed as the Regional Cooperation for Development in 1964 by Iran, Turkey, and Pakistan.

institutional framework. This further highlights the role of the Government in maximising the benefits of FDI spillovers. Policies that enhance the absorptive capacity of domestic firms such as investing in education and training, improving infrastructure, and fostering innovation, can help domestic firms better leverage the advantages brought by FI. Beyond this, creating a conducive business environment that encourages linkages between foreign and domestic firms can further amplify the positive effects of FDI (Jordaan, J. et al., 2020). These insights are particularly relevant for a country such as Malaysia, where marked regional disparities in infrastructure, human capital, and industrial structure are likely to translate into substantial heterogeneity in the magnitude and direction of FI spillovers across states. This issue motivates the empirical investigation pursued in this paper.

Figure 1: Visual representation of FDI linkages



Source: Author's compilation

2.3 Drivers of FI in Emerging Market Economies (EMEs)

Understanding the determinants of FI in emerging market economies (EMEs) is crucial for designing policies that create a conducive environment for attracting and retaining foreign capital. The literature broadly identifies four categories of drivers (see e.g., da Silva-Oliveira et al., 2021), which are not mutually exclusive but interact in shaping the locational decisions of MNCs.

First, from an economic perspective, market size, growth prospects, and resource endowments constitute first-order determinants of FI. EMEs with expanding middle classes and rising consumer demand typically offer attractive market opportunities, whereas resource-rich economies such as Brazil and Russia continue to attract substantial inflows into extractive sectors (Nazzal et al., 2025). Second, these economic fundamentals translate into realised inflows only when underpinned by credible institutional and policy environments. Political stability, regulatory transparency, protection of property rights, and ease of doing business are

widely recognised as essential preconditions for mitigating investor risk and fostering long-term commitments. Third, equally decisive are infrastructure and technological conditions, including the quality of transport, energy, telecommunications, and digital networks, as well as the depth of the domestic innovation ecosystem, which are particularly salient for attracting knowledge-intensive and high-technology investments. Fourth, socio-cultural factors, such as language proficiency, cultural affinity, educational attainment, and the availability of skilled labour, influence both the attractiveness of host economies to foreign investors and the capacity of domestic actors to engage productively with them. Importantly, these four dimensions should not be viewed in isolation. They interact in non-trivial ways: weaknesses in one dimension can offset advantages in another, such as market size or resource endowment. This interdependence helps explain the heterogeneity in FI inflows and their impacts observed both across countries and across regions within the same country, thereby motivating a closer examination of FI determinants and spillovers at the subnational level.

Through the spillover linkages discussed earlier, numerous studies have analysed the drivers of FDI in EMEs and subsequently assessed the efficacy of these FDI spillovers at both the national and subnational levels. A critical determinant of FDI spillovers is geographical proximity between foreign firms (providers of FDI) and local firms (recipients). In the context of Indonesia, FDI spillovers are statistically insignificant at the national level, primarily due to the country's vast land area, dispersed islands, and underdeveloped transportation and communication infrastructure (Urata and Baek, 2023). In contrast, at the provincial level, forward FDI spillovers are statistically significant, attributed to the closer geographical proximity between foreign and local firms. This proximity facilitates domestic firms' procurement of intermediate goods, such as parts and components, from foreign firms, thereby enabling the acquisition of technological expertise during the procurement process (Lin and Kwan, 2015; Yue et al., 2022).

A second key moderator of FDI spillovers is the absorptive capacity of domestic firms, that is, their ability to identify, assimilate, and commercially exploit knowledge transferred from foreign affiliates (Cohen and Levinthal, 1990; Aldaba and Quejada, 2022). In the Philippines, empirical evidence indicates that FDI, through both horizontal and vertical linkages, fails to generate significant benefits for domestic firms. This phenomenon can be attributed to several factors. First, an influx of foreign firms can crowd out less competitive domestic firms. Secondly, domestic firms often exhibit a deficiency in absorptive capacity, which hampers their ability to assimilate the advanced knowledge and technology disseminated by foreign firms.

This lack of capacity is a critical barrier that prevents domestic firms from fully benefiting from FDI.

To address these challenges, it is imperative that policymakers implement strategies which enhance the absorptive capacity of domestic firms. This includes investing in education and vocational training to build a skilled workforce, fostering innovation and technological advancement, and creating a supportive regulatory environment that facilitates knowledge transfer and collaboration between foreign and domestic firms. By strengthening these areas, domestic firms can better leverage the benefits of FDI spillovers and contribute to sustainable economic growth.

The drivers of FDI in EMEs are closely tied to the strategic motivations of MNCs themselves (Dunning, 1993; Reyes, 2017). These motivations are typically classified into three categories: (i) resource-seeking investments, aimed at accessing minerals, oil, gas, or other natural endowments; (ii) market-seeking investments, motivated by the opportunity to serve fast-growing domestic markets and expanding middle-class consumers; and (iii) efficiency-seeking investments, driven by cost minimisation through access to competitive labour, energy, services, and strategic geographic positioning within regional and global value chains.

Empirical evidence suggests that, aside from resource-seeking investments, FDI spillovers are significant through both horizontal and vertical linkages. These spillovers often translate into higher job creation and increased sales growth rates for firms within host economies. However, this positive outcome predominantly benefits high-growth firms that possess the requisite absorptive capacity to internalise and capitalise on the knowledge and technology transfers from foreign firms. Conversely, less competitive domestic firms may struggle to capture these gains, as intensified competition from foreign entrants can erode their market share and limit their ability to innovate. This dynamic underscores the critical importance of enhancing the absorptive capacity of domestic firms to ensure that the broader economy can effectively leverage the advantages of FDI.

Overall, these insights suggest that the drivers and effects of FI in EMEs are strongly mediated by subnational heterogeneity in economic structure, infrastructure, and absorptive capacity, factors that are particularly salient in the Malaysian context, where substantial disparities across states shape both the location of FI inflows and their developmental impact.

3 Data and methodology

3.1 Data

This study relies on an original dual-level panel dataset combining state-level and firm-level information for Malaysia over the period 2002–2022. The dataset is compiled from multiple official and publicly accessible sources and covers a broad range of economic, demographic, and investment-related indicators, enabling a joint analysis of regional and micro-level determinants of FI and its spillovers.

State-level data are drawn primarily from the Department of Statistics Malaysia (DOSM), Bank Negara Malaysia (BNM), and the Malaysian Investment Development Authority (MIDA), supplemented by information from other official agencies when necessary[3]. All variables were harmonised and standardised[4] to ensure comparability across states and over time. Given the central role of FI in our empirical design, the construction and interpretation of the AFI indicator are discussed in detail in Box 1A in Appendix A.

Table 1 summarises the composition of the samples used throughout the state-level and firm-level analyses and is organised into three panels. *Panel A* of Table 1 reports the composition of the state-level sample, listing the 13 Malaysian states and one federal territory included in the analysis alongside the number of state-year observations available for the state-level regressions, the number of unique firms headquartered in each state, and the corresponding firm-year observations. The panel highlights a pronounced geographic concentration of corporate activity. In particular, Selangor and Wilayah Persekutuan Kuala Lumpur jointly account for the majority of firm-year observations (2,082 out of 2,928, or roughly 71%), whereas less industrialised states such as Kelantan, Perlis and Pahang contribute only a small number of observations. Wilayah Persekutuan Putrajaya and Wilayah Persekutuan Labuan are excluded from the sample due to insufficient longitudinal data on inward investment flows and firm-level coverage. This state-level concentration mirrors the well-documented spatial clustering of FI in Malaysia and motivates the weighted-regression robustness checks reported later in our analyses.

Panel B of Table 1 reports the yearly distribution of firm-year observations and the number of unique firms covered each year over the 2002–2022 sample period. Coverage is most dense

[3] When the same indicator was available from multiple sources, preference was given to the most comprehensive and methodologically consistent series.

[4] Variables at the state and firm levels are expressed in natural logarithms, as defined in Table 2. Growth variables are constructed as changes in logarithms, while binary indicators are left untransformed. Variables are harmonised using consistent definitions and units across data sources, states, and years to ensure comparability over time.

in the early years of the sample, peaks in 2005, then declines sharply between 2007 and 2013, reflecting both delistings and reduced disclosure during this period. Coverage recovers progressively from 2014 onwards as Datastream coverage of Bursa Malaysia-listed firms expands. The panel also documents that 134 firm-year observations fall within the 2020–2022 COVID-19 window, providing a sufficient basis for the pandemic-period analysis.

Panel C of Table 1 reports the industry composition of the firm sample. The sample spans nine sectors, with Industrials (930 firm-year observations), Consumer Staples (627) and Consumer Discretionary (565) accounting for the largest shares, while Telecommunications (61) and Health Care (98) are the most thinly represented. This sectoral mix is consistent with the structure of the Malaysian listed market and supports the inclusion of industry fixed effects in the firm-level specifications. Taken together, the three panels document a state-level panel of 208 state-year observations and a firm-level panel of 2,928 firm-year observations covering 890 unique publicly listed Malaysian firms.

Table 1. Sample composition

Panel A. State-level composition

No.	State	Observations	Firms	Observations
1	Johor	16	59	171
2	Kedah	15	6	18
3	Melaka	15	16	51
4	Negeri Sembilan	15	11	25
5	Pahang	16	5	13
6	Penang	15	67	209
7	Perak	16	37	133
8	Perlis	5	3	9
9	Sabah	16	19	54
10	Sarawak	16	36	140
11	Selangor	16	283	887
12	Terengganu	15	6	21
13	Kelantan	15	1	2
14	WP Kuala Lumpur	16	341	1,195
	Total	208	890	2,928

Notes: This table reports the composition of the state- and firm-level samples. Column (3) shows the number of state-year observations, column (4) the number of unique publicly listed firms headquartered in each region, and column (5) the corresponding firm-year observations. The final sample comprises 208 region-year observations and 2,928 firm-year observations across 890 firms over the 2002–2022 period. State-level data are sourced from the Department of Statistics Malaysia (DOSM) and the Malaysian Investment Development Authority (MIDA).

Panel B. Yearly distribution of firm-year observations

Year	Observations	Firms
2002	282	282
2003	396	145
2004	431	82
2005	445	56
2006	245	30
2007	60	9
2008	29	4
2009	37	9
2010	20	8
2011	20	6
2012	27	9
2013	19	3
2014	39	19
2015	49	13
2016	82	44
2017	99	15
2018	106	24
2019	123	35
2020	134	34
2021	164	30
2022	121	33
Total	2,928	890

Notes: This panel reports the yearly distribution of firm-year observations and the number of unique publicly listed Malaysian firms covered in each year. The firm-level sample comprises 2,928 firm-year observations across 890 firms over the 2002–2022 period. Firm-level data are sourced from Thomson Reuters Datastream.

Panel C. Industry composition of the firm sample

Industry Name	Frequency
Basic Materials	255
Consumer Discretionary	565
Consumer Staples	627
Energy	107
Health Care	98
Industrials	930
Real Estate	174
Technology	111
Telecommunications	61
Total	2,928

Notes: This table reports the industry distribution of the firm sample, classified using The Refinitiv Business Classification (TRBC) sector taxonomy.

Firm-level financial data are obtained from Thomson Reuters Datastream, covering publicly listed Malaysian firms over the sample period. Following standard practice in the literature, firms operating in heavily regulated sectors such as utilities and financial services are excluded to preserve comparability across industries and to avoid biases arising from sector-specific policy interventions. In addition, firm-year observations with missing values for

key variables or with implausible growth rates (e.g., assets or sales growth exceeding 100% in absolute value) were also dropped. Consequently, the final firm-level panel dataset comprises 890 unique firms and 2,928 firm-year observations spanning across all Malaysian states.

Table 2 reports descriptive statistics for the variables used in the empirical analysis, disaggregated by *Panel A* (state-level data) and *Panel B* (firm-level data). The figures highlight substantial variation across both states and firms.

At the state level (*Panel A*), annual real GDP averages approximately 10.89 in logarithmic terms (≈RM54 billion) and ranges from 7.99 (≈RM3 billion) in less developed states to 12.91 (≈RM400 billion) in high-income states such as Selangor and Kuala Lumpur, reflecting Malaysia's pronounced regional disparities. AFI displays even greater dispersion, with a mean of 7.21 in logarithmic terms (≈RM1.4 billion) and a standard deviation of 1.72, consistent with the well-documented concentration of FI in industrialised and trade-intensive states. By contrast, private investment (PINVEST) and public investment (PPINVEST) exhibit considerably less variation, suggesting a more uniform geographical distribution of domestic capital formation relative to AFI. Labour force participation (LABOURFP) and unemployment (UNEMPLOY) also vary substantially across states, pointing to structural differences in labour market conditions. Exports and imports display high variability, in line with Malaysia's export-oriented growth model and the spatial clustering of trade-intensive activities in coastal states such as Penang, Johor, and Selangor.

At the firm level (*Panel B*), market value (LogMV) and profitability (LogProfit) exhibit wide spreads, underscoring substantial heterogeneity in firm size and financial performance. Research and development expenditure (R&D) (LogRD) is notably low, and the dummy variable DRD indicates that only a small proportion of firms report positive R&D activity. This pattern is consistent with the relatively low innovation intensity of the Malaysian corporate sector and broadly aligns with concerns that FI may crowd out in-house R&D among domestic firms. Capital expenditure (LogCapex), inventories (LogINV), and dividends (LogDIV) also display considerable variation, reflecting differences in firms' investment and payout behaviour across industries and over time.

Table 2. Descriptive statistics

Variables	Definition	Source	N	Mean	Std.Dev	p25	p50	p75
Panel A. State-level data								
GDP	The logarithm of real GDP. Real GDP is total value of goods and services produced, adjusted for inflation.	Department of Statistics, Malaysia (DOSM).	208	10.891	0.763	10.419	10.838	11.345
AFI	The logarithm of Approved Foreign Investments. Approved investments are the value of investment projects approved by Malaysian Investment Development Authority (MIDA).	Malaysian Investment Development Authority (MIDA).	208	7.213	1.723	6.494	7.499	8.343
PINVEST	The logarithm of nominal private investment. Private investment is the capital spent by businesses and individuals.	DOSM.	208	11.797	0.485	11.279	11.788	12.285
PPINVEST	The logarithm of nominal public investment. Public investment is the government spending on infrastructure and other development projects.	DOSM.	208	11.249	0.206	11.099	11.180	11.402
LABOURFP	The logarithm of labour force participants (person thousand).	DOSM.	208	6.740	0.651	6.197	6.741	7.181
UNEMPLOY	The logarithm of unemployment (person thousand).	DOSM.	208	3.303	0.842	2.760	3.258	3.892
EXPORTS	The logarithm of nominal exports.	DOSM.	208	9.948	1.903	8.871	9.941	11.794
IMPORTS	The logarithm of nominal imports.	DOSM.	208	9.721	1.712	8.856	9.388	11.572
Panel B. Firm-level data								
LogMV	The logarithm of market capitalisation of the company.	Thomson Reuters Datastream.	2,928	5.962	1.840	0.916	4.543	5.710
LogProfit	The logarithm of net income.	Thomson Reuters Datastream.	2,928	10.749	2.029	2.565	9.419	10.636
LogDIV	The logarithm of total dividends.	Thomson Reuters Datastream.	2,928	8.140	4.301	0.000	7.151	9.164
LogCapex	The logarithm of capital expenditure.	Thomson Reuters Datastream.	2,928	10.069	2.189	0.000	8.640	9.997
LogINV	The logarithm of inventory.	Thomson Reuters Datastream.	2,928	10.914	2.535	0.000	9.892	11.107
LogRD	The logarithm of R&D expenditure.	Thomson Reuters Datastream.	2,928	1.022	2.792	0.000	0.000	0.000
DRD	Dummy equals one if a firm reports R&D and zero otherwise.	Thomson Reuters Datastream.	2,928	0.127	0.333	0.000	0.000	0.000
LogSGA	The logarithm of selling, general and administration expenses.	Thomson Reuters Datastream.	2,928	7.548	4.080	0.000	8.413	10.000

dEMP	The change in the logarithm of employment.	Thomson Reuters Datastream.	2,928	0.030	0.227	-3.564	-0.040	0.012
logSalary	The logarithm of salary expenditure.	Thomson Reuters Datastream.	2,928	9.464	1.653	0.000	9.561	10.000
dLogExports	The change in the logarithm of exports.	Thomson Reuters Datastream.	2,928	8.873	2.981	0.000	7.691	9.253
LogTAX	The logarithm of income tax.	Thomson Reuters Datastream.	2,928	5.971	2.355	1.099	3.664	6.956
LogAFI	The logarithm of AFI.	Thomson Reuters Datastream.	2,928	1.895	0.680	1.099	1.386	1.609
LogAGE	The logarithm of the firm's age.	Thomson Reuters Datastream.	2,928	13.699	1.752	9.371	12.268	13.463
SIZE	The logarithm of total assets.	Thomson Reuters Datastream.	2,928	12.555	1.894	6.553	11.085	12.316
LogPPE	The logarithm of property, plant and equipment.	Thomson Reuters Datastream.	2,928	10.641	4.240	0.000	9.603	11.474
LogDEBT	The logarithm of total debt.	Thomson Reuters Datastream.	2,928	11.214	2.221	0.000	9.724	11.180
LogCASH	The logarithm of cash holdings.	Thomson Reuters Datastream.	2,928	5.962	1.840	0.916	4.543	5.710

Notes: This table reports descriptive statistics for the variables used in the analysis. *Panel A* presents state-level statistics for Malaysia's states over the sample period, including real GDP (GDP), approved foreign investment (AFI), private investment (PINVEST), public investment (PPINVEST), labour force participation (LABOURFP), unemployment (UNEMPLOY), and exports and imports (EXPORTS, IMPORTS). *Panel B* presents firm-level statistics for a sample of publicly listed Malaysian firms. For each variable, the number of observations (N), mean, standard deviation, 25th percentile, median, and 75th percentile is reported.

Table 3 reports pairwise Pearson correlation coefficients for the state-level (*Panel A*) and firm-level (*Panel B*) variables used in the empirical analysis. Several patterns are worth noting.

At the state level (*Panel A*), AFI is positively and significantly correlated with state-level GDP, indicating that states attracting larger volumes of FI tend to generate higher economic output. AFI is also positively and significantly correlated with exports and imports, underscoring the role of FI in promoting trade integration and anchoring Malaysian states within global value chains. Private investment (PINVEST) displays a robust positive correlation with GDP, while public investment (PPINVEST) shows a weaker and less stable relationship, suggesting that private capital is a more effective complement to FI in supporting regional growth. Labour force participation is positively and strongly correlated with GDP, reinforcing the importance of human capital for economic performance, while the positive correlation between unemployment and GDP likely reflects urban concentration and compositional effects rather than a causal relationship.

At the firm level (*Panel B*), AFI is negatively correlated with R&D-related variables (LogRD and DRD), providing preliminary descriptive support for the hypothesis that FI may crowd out in-house innovation among domestic firms. By contrast, AFI is positively associated with capital expenditure and inventory accumulation, suggesting that firms located in FI-intensive states tend to expand productive capacity rather than invest in R&D. Taken together, these patterns highlight the dual nature of FI spillovers: while FI appears to stimulate output, capital formation, and trade integration, its effects on domestic innovation remain limited in the absence of complementary policy support. Although these correlations are purely descriptive, they are broadly consistent with our subsequent regression findings and provide a useful first overview of the data.

Table 3. Correlation matrix

Panel A. State-level data

	Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1)	GDP	1.000							
(2)	AFI	0.254***	1.000						
(3)	PINVEST	0.449***	0.096	1.000					
(4)	PPINVEST	0.313***	-0.035	0.652***	1.000				
(5)	LABOURFP	0.763***	0.274***	0.187**	0.152*	1.000			
(6)	UNEMPLOY	0.669***	0.186**	0.191**	0.058	0.880***	1.000		
(7)	EXPORTS	0.169*	0.679***	0.053	0.023	0.375***	0.302***	1.000	
(8)	IMPORTS	0.162*	0.729***	0.062	0.027	0.348***	0.235***	0.949***	1.000

Panel B. Firm-level data

	Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1)	LogMV	1.000										
(2)	LogProfit	0.310***	1.000									
(3)	LogDIV	0.383***	0.604***	1.000								
(4)	LogCapex	0.377***	0.546***	0.568***	1.000							
(5)	LogINV	0.172***	0.294***	0.305***	0.497***	1.000						
(6)	LogRD	0.124***	0.146***	0.230***	0.242***	0.225***	1.000					
(7)	DRD	0.100***	0.115***	0.197***	0.202***	0.185***	0.954***	1.000				
(8)	LogSGA	0.046**	0.092***	0.081***	0.102***	0.121***	0.012	0.021	1.000			
(9)	dEMP	0.025	0.139***	0.109***	0.148***	0.024	0.020	0.018	0.018	1.000		
(10)	logSalary	0.061***	0.133***	0.128***	0.247***	0.174***	0.086***	0.085***	-0.015	0.025	1.000	
(11)	dLogExports	-0.018	0.007	-0.024	0.017	0.029*	-0.039**	-0.046**	0.003	0.003	-0.000	1.000
(12)	LogTAX	0.308***	0.653***	0.550***	0.528***	0.350***	0.142***	0.109***	0.068***	0.083***	0.141***	-0.019
(13)	LogAFI	-0.105***	-0.112***	-0.106***	-0.187***	-0.103***	-0.134***	-0.131***	-0.024	-0.001	-0.080***	0.018
(14)	LogAGE	0.251***	0.242***	0.296***	0.368***	0.302***	0.127***	0.099***	0.069***	0.016	0.035*	0.016
(15)	SIZE	0.408***	0.483***	0.490***	0.783***	0.598***	0.285***	0.227***	0.102***	0.021	0.218***	-0.009
(16)	LogPPE	0.123***	0.155***	0.154***	0.268***	0.223***	0.131***	0.116***	0.025	0.020	0.163***	-0.007
(17)	LogDEBT	0.073***	0.095***	0.042**	0.271***	0.284***	0.113***	0.093***	0.081***	0.013	0.144***	0.027
(18)	LogCASH	0.173***	0.224***	0.242***	0.318***	0.234***	0.145***	0.124***	0.031*	0.034*	0.161***	0.012

	Variables	(12)	(13)	(14)	(15)	(16)	(17)	(18)
(12)	LogTAX	1.000						
(13)	LogAFI	-0.148***	1.000					
(14)	LogAGE	0.281***	-0.157***	1.000				
(15)	SIZE	0.551***	-0.276***	0.442***	1.000			
(16)	LogPPE	0.149***	-0.138***	0.476***	0.302***	1.000		
(17)	LogDEBT	0.101***	-0.152***	0.431***	0.356***	0.851***	1.000	
(18)	LogCASH	0.238***	-0.146***	0.514***	0.363***	0.955***	0.787***	1.000

Notes: This table reports pairwise Pearson correlation coefficients for the variables used in the analysis. *Panel A* presents correlations among the state-level variables for Malaysia's states. *Panel B* presents correlations among the firm-level variables for a sample of publicly listed Malaysian firms. Variable definitions and sources are provided in Table 2. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Despite rigorous data compilation, several limitations must be acknowledged. First, the availability of certain indicators varies across states and years, resulting in an unbalanced panel for some variables. Notably, those related to state-level policy implementation and sector-specific outcomes, which are not consistently reported across jurisdictions. Second, differences in data collection methodologies and reporting standards across government agencies may introduce minor measurement inconsistencies; for instance, definitions of employment or investment occasionally differ between sources or evolve over time, which can potentially affect cross-sectional and temporal comparability. Third, some indicators, particularly those capturing governance quality, informal economic activity, or social attitudes, are either unavailable at the state level or measured with limited precision. We address these issues by relying on the most comprehensive and methodologically consistent sources, and by conducting extensive robustness checks to mitigate concerns about omitted-variable bias.

3.2 Methodology

To empirically investigate the relationship between FI and economic performance in Malaysia, we estimate a series of panel regressions at both the state and firm levels. The empirical framework is grounded in standard FDI–growth models and extended to capture heterogeneity across Malaysian states and firms. At the state level, we specify the following baseline model:

$$GDP_{jt} = \alpha + \beta_1 FI_{jt-1} + \beta_2 X_{jt-1} + \theta Trend_t + \varepsilon_{jt}$$

where GDP_{jt} is the logarithm of real GDP in state j and year t. FI_{jt} represents AFI. X_{jt} is a vector of control variables including private investment (PINVEST), public investment (PPINVEST), labour force participation (LABOURFP), unemployment (UNEMPLOY), exports, and imports. $Trend_t$ is the trend term, and ε_{jt} is the idiosyncratic error term. The parameter of interest, β_1, captures the elasticity of state-level GDP with respect to AFI, reflecting its aggregate economic contribution.

The state-level models are estimated using Ordinary Least Squares (OLS) with robust standard errors. The model is progressively augmented to include additional covariates and state-specific time trends to isolate the marginal contribution of FI to state-level GDP growth, mitigate omitted variable bias and capture long-term structural shifts. To account for heteroskedasticity and differences in state size, we complement the OLS estimates with two Weighted Least Squares (WLS) specifications. Two weighting schemes are employed. WLS1 weights each observation by the inverse of the state's population, thereby attenuating the

influence of large, densely populated states such as Selangor and Kuala Lumpur. WLS2 uses the inverse of state-level GDP as the weight, ensuring that economically dominant states do not disproportionately drive the aggregate estimates. Moreover, to assess potential distributional heterogeneity, we complement the mean regressions with quantile regressions, which estimate the impact of FI across different points of the GDP distribution. This allows us to identify whether FI has stronger effects in low- or high-income states.

In addition, we perform firm-level analysis. For that, we estimate the following model to assess the extent of FI spillovers on domestic firms' productivity:

$$Y_{ijt} = \alpha + \theta_1 LogAFI_{it-1} + \theta_2 Z_{ijt} + \mu_{ind} + \delta_t + \eta_{ijt}$$

where Y_{ijt} represents firm-level productivity outcomes related to financial, investment, and economic performance; LogAFI_{it} captures the state-level exposure to FI for firm i; and Z_{ijt} includes standard firm-level characteristics such as size (SIZE), age (LogAGE), tangible assets (LogPPE), leverage (LogDEBT), and cash holdings (LogCASH). μ_{ind} and δ_t represent industry and year fixed effects, respectively.

Dependent variables (Y_{ijt}) are grouped into three main dimensions: (i) **financial performance:** market value (LogMV), profitability (LogProfit), and dividend payout (LogDIV); (ii) **investment performance:** capital expenditure (LogCapex), inventory (LogINV), and R&D activity (LogRD, DRD), and (iii) **economic performance:** employment (dEMP), salary expenditure (logSalary), exports (dLogExports), and tax contributions (LogTAX).

At the firm level, all regressions include industry and year fixed effects to control for sectoral heterogeneity and macroeconomic shocks. Estimations are performed with clustered standard errors at the state level. The identification strategy assumes that variation in AFI intensity across states and time is exogenous to firm-specific shocks, conditional on controls and fixed effects.

4 Empirical results

4.1 Foreign investment and state-level growth

Table 4 presents regression estimates examining the relationship between AFI and state-level real GDP in Malaysia. Across nearly all specifications, the AFI coefficient is positive and statistically significant, providing strong support for the hypothesis that FI contributes to state-

level economic growth. In the baseline model (column 1), a 1% increase in AFI is associated with approximately a 0.10% rise in real GDP, a magnitude that is broadly consistent with theoretical expectations and with the international evidence documenting the growth-enhancing effects of foreign capital inflows (Borensztein et al., 1998; Alfaro et al., 2004).

After sequentially introducing controls for private and public investment, labour market variables, and trade openness (columns 2–6), the AFI coefficient remains positive and economically meaningful. This persistence indicates that the effect of FI is not merely a proxy for domestic investment or trade but reflects an independent contribution to state-level output. Similar findings are reported by Lean and Tan (2011) and Tan and Tang (2016) for Malaysia, who document that FDI continues to exert a long-run positive effect on GDP even after controlling for trade and domestic capital formation.

Among the control variables, private investment (PINVEST) and labour force participation (LABOURFP) emerge as the strongest predictors of GDP growth, underscoring the importance of domestic absorptive capacity and human capital as key complements to FI-driven growth (de Mello, 1999; Crespo & Fontoura, 2007). Public investment (PPINVEST), by contrast, exhibits a weaker and less stable association, echoing earlier observations by Yusof and Bhattasali (2008) that its growth effects depend critically on governance quality and project efficiency.

Table 4. AFI and state-level economic outputs: state-level evidence

	OLS	OLS	OLS	OLS	OLS	OLS
	GDP	GDP	GDP	GDP	GDP	GDP
	(1)	(2)	(3)	(4)	(5)	(6)
AFI	**0.2289*** **	**0.1975*** **	**0.2019*** **	**0.1249*** **	**0.1266*** **	**0.1293*** **
	(0.0308)	(0.0256)	(0.0264)	(0.0175)	(0.0209)	(0.0219)
PINVEST		0.6051***	0.5192***	0.3742***	0.3658***	0.3465***
		(0.0864)	(0.1284)	(0.0728)	(0.0715)	(0.0669)
PPINVEST			0.2990	0.1815	0.2070	0.1575
			(0.2982)	(0.1479)	(0.1766)	(0.1785)
LABOURFP				0.7871***	0.7417***	0.8888***
				(0.0612)	(0.1928)	(0.2471)
UNEMPLOY					0.0388	-0.0875
					(0.1231)	(0.1627)
TREND						2.1777***
						(0.4898)
Constant	9.2403***	2.3283**	-0.0532	-1.7720	-1.7925	-1.8604*
	(0.2290)	(1.0104)	(2.5036)	(1.2218)	(1.2474)	(1.0889)
Observations	208	208	208	208	208	208
R-Squared	0.267	0.410	0.413	0.814	0.814	0.842

Notes: This table reports estimation results examining the relationship between AFI and state-level economic performance in Malaysia. The dependent variable is real GDP by state (GDP), expressed in natural logarithm. Columns (1)-(6) report ordinary least squares (OLS) estimates with sequential inclusion of control variables. Independent variables include AFI, private investment (PINVEST), public investment (PPINVEST), labour force participation (LABOURFP), unemployment (UNEMPLOY), and trend. Robust standard errors are reported in parentheses. Variable definitions and sources are provided in Table 2. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Table 5 reports a series of additional specifications designed to assess the robustness of the AFI-GDP relationship reported in Table 4. The table is organised into three blocks: columns (1)-(3) augment the baseline specification with trade controls (exports and imports) and a state-specific time trend; column (4) introduces a COVID-19 interaction term to test whether the AFI–GDP elasticity changed during the pandemic; and columns (5)-(6) report WLS estimates designed to address the disproportionate influence of investment-dense states. Across all six specifications, the AFI coefficient remains positive and statistically significant, ranging from 0.037 to 0.082, confirming that the baseline finding is not sensitive to the choice of controls, the inclusion of the pandemic period, or the weighting scheme.

Trade-related variables, namely exports and imports, also show strong positive associations with GDP, consistent with Malaysia's export-oriented growth model. The significance of these variables reinforces the notion that FI tends to complement rather than substitute trade integration, as foreign firms often act as catalysts for export upgrading and participation in global value chains (see Newman et al., 2015; UNCTAD, 2023). The state-specific time trend (TREND) is positive and highly significant in column (3), capturing the long-run growth in state-level GDP that is not absorbed by the contemporaneous controls.

Column (4) of Table 5 tests whether the relationship between AFI and state-level GDP shifted during the COVID-19 period. The interaction term AFI×COVID, where COVID is a dummy equal to one for 2020–2022 and zero otherwise, is positive (0.0079) but statistically insignificant, while the main AFI coefficient remains positive and significant at 0.040. This indicates that the elasticity of state-level GDP with respect to AFI did not change in a statistically meaningful way during the pandemic, suggesting that the contribution of FI to state-level output was broadly resilient to the COVID-19 shock. This stability is consistent with the view that AFI captures longer-term commitments that are relatively resilient to short-run cyclical disruptions, although the limited number of pandemic-period observations warrants caution.

The final two columns of Table 5 present WLS estimates that down-weight the influence of large, investment-dense states such as Selangor and Kuala Lumpur. WLS1 weights observations by the inverse of state population, while WLS2 uses the inverse of state-level GDP. In both specifications, the AFI coefficient remains positive and significant (0.082 and 0.061, respectively), indicating that the link between FI and state-level growth is not driven by a small number of dominant states. A similar robustness approach is adopted in Chizema (2025), who applies Feasible Generalised Least Squares (FGLS), a weighted-regression estimator, to validate FDI's positive impact on growth in South and Southeast Asia.

Table 5. AFI and state-level economic outputs: additional specifications

	Additional controls			Covid Period	Alternative specifications	
	OLS	OLS	OLS	OLS	WLS1	WLS2
	GDP	GDP	GDP	GDP	GDP	GDP
	(1)	(2)	(3)	(4)	(5)	(6)
AFI	**0.0764*****	**0.0370****	**0.0412****	**0.0402****	**0.0823*****	**0.0612*****
	(0.0162)	(0.0182)	(0.0171)	(0.0172)	(0.0198)	(0.0220)
AFI*COVID				0.0079		
				(0.0109)		
PINVEST	0.3647***	0.3338***	0.3158***	0.2951***	0.3092***	0.3123***
	(0.0609)	(0.0545)	(0.0487)	(0.0523)	(0.0552)	(0.0513)
PPINVEST	0.1961	0.2465*	0.1990	0.2221*	0.2776*	0.2376*
	(0.1447)	(0.1269)	(0.1207)	(0.1300)	(0.1592)	(0.1390)
LABOURFP	0.5836***	0.4047***	0.5506***	0.5631***	0.7663***	0.6535***
	(0.1586)	(0.1354)	(0.1883)	(0.1829)	(0.1948)	(0.2060)
UNEMPLOY	0.0546	0.1750**	0.0528	0.0442	-0.0293	0.0135
	(0.0926)	(0.0794)	(0.1154)	(0.1121)	(0.1318)	(0.1272)
EXPORTS	0.1108***	0.0156	0.0143	0.0148	0.0082	0.0114
	(0.0172)	(0.0157)	(0.0165)	(0.0167)	(0.0153)	(0.0157)
IMPORTS		0.1635***	0.1616***	0.1605***	0.1138***	0.1388***
		(0.0285)	(0.0313)	(0.0314)	(0.0260)	(0.0327)
TREND			2.0768***	2.0947***	2.0709***	2.0751***
			(0.3328)	(0.3344)	(0.4031)	(0.3634)
Constant	-1.3855	-1.1368	-1.2136	-1.2813	-2.9840***	-2.0697*
	(1.1097)	(1.0815)	(0.9042)	(0.9356)	(1.0777)	(1.1060)
Observations	208	208	208	208	208	208
R-Squared	0.856	0.882	0.906	0.907	0.948	0.919

Notes: This table reports estimation results examining the relationship between approved foreign investments (AFI) and state-level economic performance in Malaysia. The dependent variable is real gross domestic product (GDP) by state, expressed in natural logarithm. Columns (1)–(3) report ordinary least squares (OLS) estimates with sequential inclusion of exports, imports and trend. Column (4) includes an interaction between AFI and a COVID-19 dummy, which equals one for the years 2020–2022 and zero otherwise. Columns (5)–(6) report weighted least squares (WLS) estimates, where observations are weighted by the inverse of state population (WLS1) and the inverse of state GDP (WLS2). Robust standard errors are reported in parentheses. Variable definitions and sources are

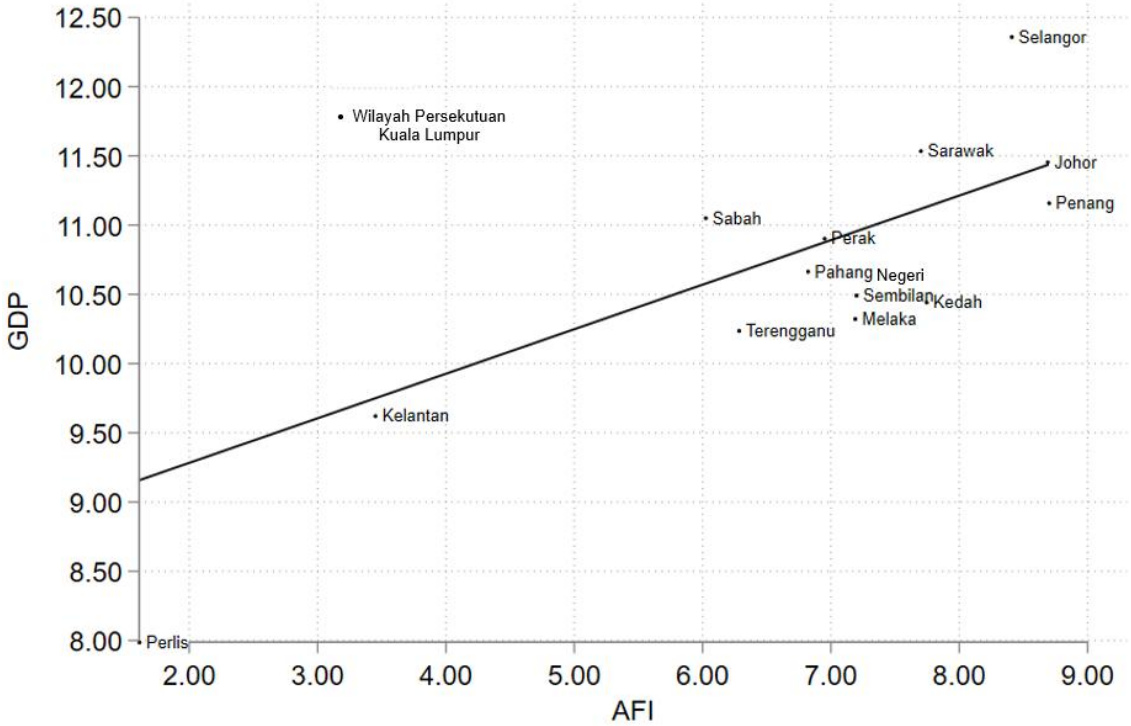
provided in Table 2. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Figure 2 provides a first descriptive look at the AFI-GDP relationship across Malaysian states over the 2002–2022 period. Each point corresponds to a state-year observation, with the natural logarithm of AFI on the horizontal axis and the natural logarithm of real GDP on the vertical axis. The fitted line displays a clear positive slope, indicating that states attracting larger volumes of FI also tend to record higher levels of state-level output. The pattern is broadly linear across the bulk of the distribution, suggesting that the AFI–GDP association is not confined to a particular range of investment intensity but holds across the full spectrum of Malaysian states.

The figure also reveals substantial heterogeneity. A cluster of high-AFI, high-GDP observations sit in the upper-right region of the plot, dominated by Selangor, Kuala Lumpur, Penang and Johor, the industrialised, trade-intensive states that have historically captured the largest share of Malaysia's FI inflows. At the other end, less developed states such as Perlis, Kelantan and Sabah cluster in the lower-left, exhibiting both modest AFI and lower state-level output. A small number of observations sit visibly off the regression line, in particular high-GDP states, such as Kuala Lumpur, that record temporarily low AFI in specific years. This most likely reflects the lumpy, project-based nature of AFI data rather than a structural break in the relationship.

While Figure 2 is purely descriptive, the visible positive slope is consistent with the formal estimates reported in Tables 4 and 5. In particular, the elasticity implied by the fitted line aligns in sign and order of magnitude with the AFI coefficients in the baseline OLS specifications (Column 3 of Table 5), providing reassurance that the regression results are not an artefact of a particular control set but are anchored in a genuine first-order pattern in the data. The figure therefore serves as a useful visual benchmark for the conditional relationships estimated in Tables 4 and 5.

Figure 2. Distribution of Approved Foreign Investments and Real GDP Across Malaysian States



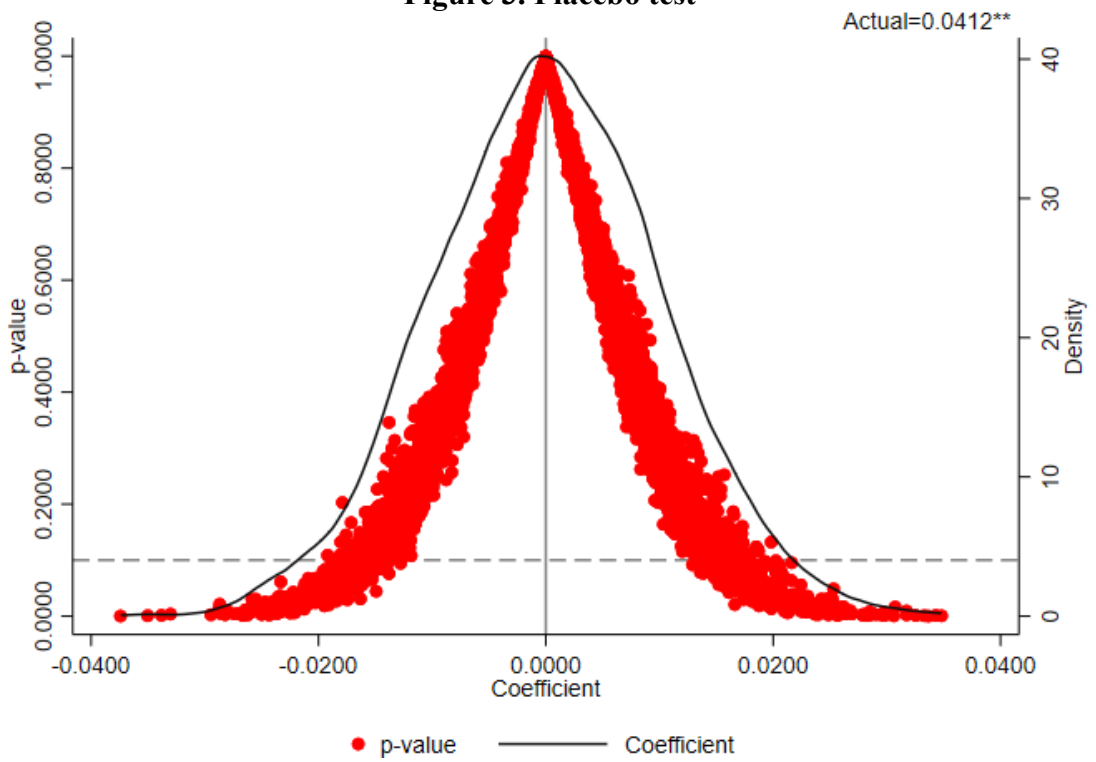
Notes: This figure plots the bivariate relationship between AFI and real GDP across Malaysian states over the 2002–2022 period. Each observation corresponds to a state-year, with AFI on the horizontal axis and real GDP on the vertical axis (both in natural logarithms). The fitted line indicates the linear relationship between the two variables. Variable definitions and sources are provided in Table 2.

To ensure that our findings are not artefacts of random chance or spurious correlation, we implement a falsification (placebo) test, reported in Figure 3. Specifically, we randomly shuffle entire AFI time-series blocks across states, thereby preserving the temporal structure of AFI within each series while severing its true cross-state association with GDP. We then re-estimate Equation (1), holding all other covariates unchanged. For each iteration, the placebo coefficient and its associated p-value are recorded and this procedure is repeated 2,000 times. This block-permutation design is more conservative than a cell-level shuffle, as it preserves within-state serial correlation in AFI while eliminating any systematic mapping between AFI and state-level output. Under the null hypothesis of no structural relationship, the resulting coefficient distribution should therefore be centred around zero and exhibit no systematic association with GDP.

Consistent with this expectation, Figure 3 shows that the placebo coefficients are tightly clustered around zero, substantially smaller in magnitude than the baseline estimate reported in Table 5 (column (3)), and largely statistically insignificant across replications. The clear separation between the placebo distribution and the actual estimate provides strong evidence

that our results are not driven by random assignment, sampling variation, or spurious correlation. Instead, they reflect a systematic underlying relationship between AFI and state-level output, reinforcing the validity of the empirical strategy.

Figure 3. Placebo test



Notes: This figure presents the results of a falsification (placebo) test based on 2,000 replications. In each iteration, entire AFI time-series blocks are randomly reassigned across states, preserving within-state temporal structure while breaking the original cross-state association with GDP. The baseline specification (Equation (1)) is reestimated for each replication. The histogram plots the distribution of the resulting placebo AFI coefficients, with the vertical dashed line indicating the AFI estimate from Table 5 (column (3)). Variable definitions and sources are provided in Table 2.

Table 6 presents the quantile regression estimates of AFI on state GDP across nine deciles of the GDP distribution (Q10 to Q90). The results reveal a clear and economically meaningful pattern of distributional heterogeneity in the growth impact of FI.

At the lower quantiles of the GDP distribution (Q10 to Q30), the AFI coefficient is positive but statistically insignificant, with estimates ranging from 0.018 to 0.024. This suggests that FI generates limited growth benefits for lagging Malaysian states, likely reflecting binding constraints in absorptive capacity, infrastructure, and institutional quality that prevent these states from translating foreign capital inflows into sustained output gains. These findings are consistent with Crespo and Fontoura (2007), who show that structural weaknesses in host economies can significantly mute FI spillovers.

Moving toward the middle of the distribution (Q40 to Q60), the AFI coefficient becomes statistically significant and rises in magnitude, reaching 0.039 at the median (Q50) and peaking at 0.055 at Q60. This suggests that middle-income Malaysian states, those with moderate infrastructure and institutional capacity, are better positioned to capture the productive benefits of FI, consistent with the absorptive capacity threshold identified in de Mello (1999) and Alfaro et al. (2004).

At the upper quantiles (Q70 to Q90), the AFI coefficient remains positive and significant at Q70 (0.043) and Q90 (0.024), though it declines somewhat at Q80 (0.025, insignificant). This pattern is consistent with a non-linear relationship between FI and GDP at the top of the distribution, where highly developed states such as Selangor and Penang may have already reached a degree of saturation in terms of FI absorption. Overall, these results corroborate the finding from Figure 4 that the AFI–GDP relationship is heterogeneous across the conditional income distribution, with the strongest and most consistent effects concentrated in the middle-to-upper quantiles. Lagging states therefore require complementary policy interventions, including infrastructure investment, human capital development, and institutional strengthening, to improve their capacity to benefit from FI inflows.

Among the control variables, private investment (PINVEST) is positive and highly significant across all quantiles, reinforcing its role as the primary domestic complement to FI-driven growth. Labour force participation (LABOURFP) is similarly positive and significant across most quantiles, consistent with the importance of human capital in mediating economic performance. Unemployment (UNEMPLOY) is negatively associated with GDP in the middle quantiles, likely reflecting structural underutilisation of labour in less competitive states. Imports display a consistently positive and significant association with GDP across all quantiles, in line with Malaysia's trade-driven growth model, while exports become significant only at higher quantiles (Q60 and above), consistent with the concentration of export-oriented activity in the more developed, industrialised states.

Table 6. AFI and state-level economic outputs: quantile regression

	Q10	Q20	Q30	Q40	Q50	Q60	Q70	Q80	Q90
	GDP	GDP	GDP	GDP	GDP	GDP	GDP	GDP	GDP
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
AFI	0.0183	0.0211	0.0243	**0.0300***	**0.0387****	**0.0554*****	**0.0426***	0.0247	**0.0236***
	(0.0251)	(0.0170)	(0.0151)	(0.0152)	(0.0165)	(0.0189)	(0.0247)	(0.0236)	(0.0120)
PINVEST	0.3053**	0.3669***	0.4027***	0.4345***	0.4340***	0.4085***	0.4138***	0.3726***	0.2725***
	(0.1201)	(0.0720)	(0.0578)	(0.0477)	(0.0396)	(0.0298)	(0.0555)	(0.0471)	(0.0609)
PPINVEST	0.1272	-0.0380	-0.0676	-0.1172	-0.1153	-0.0632	0.0082	0.0022	0.1150
	(0.2759)	(0.1473)	(0.1370)	(0.1212)	(0.1000)	(0.0863)	(0.0967)	(0.1302)	(0.1875)
LABOURFP	0.8658**	1.0346***	0.9857***	0.9898***	1.0156***	0.9650***	0.9288***	0.7862**	0.4660
	(0.3666)	(0.2344)	(0.1344)	(0.0956)	(0.0668)	(0.0906)	(0.1689)	(0.3082)	(0.3229)
UNEMPLOY	-0.1681	-0.2766*	-0.2370**	-0.2282***	-0.2146***	-0.1860***	-0.1656*	-0.0875	0.0775
	(0.2370)	(0.1652)	(0.0974)	(0.0737)	(0.0504)	(0.0581)	(0.0956)	(0.1744)	(0.1853)
EXPORTS	-0.0304	-0.0140	-0.0104	-0.0088	-0.0032	0.0260**	0.0710***	0.0938***	0.0699***
	(0.0195)	(0.0109)	(0.0122)	(0.0106)	(0.0111)	(0.0132)	(0.0183)	(0.0196)	(0.0213)
IMPORTS	0.2226***	0.1566***	0.1579***	0.1399***	0.1166***	0.0790***	0.0332	0.0352	0.1013**
	(0.0633)	(0.0417)	(0.0272)	(0.0234)	(0.0234)	(0.0256)	(0.0242)	(0.0422)	(0.0507)
TREND	2.8580***	2.9044***	2.5560***	2.3153***	2.1040***	2.1354***	2.5325***	2.7838***	3.2141***
	(0.4657)	(0.3634)	(0.3175)	(0.2787)	(0.2492)	(0.2701)	(0.3545)	(0.4372)	(0.4704)
Constant	-1.9879	-1.1015	-0.9849	-0.6581	-0.7104	-0.7427	-1.3299	-0.1542	1.0316
	(1.7890)	(1.1155)	(1.0793)	(1.0849)	(0.9146)	(0.9179)	(0.9009)	(1.2513)	(1.0750)
Observations	208	208	208	208	208	208	208	208	208
R-Squared	3.20%	3.20%	3.20%	3.20%	3.20%	3.20%	3.20%	3.20%	3.20%

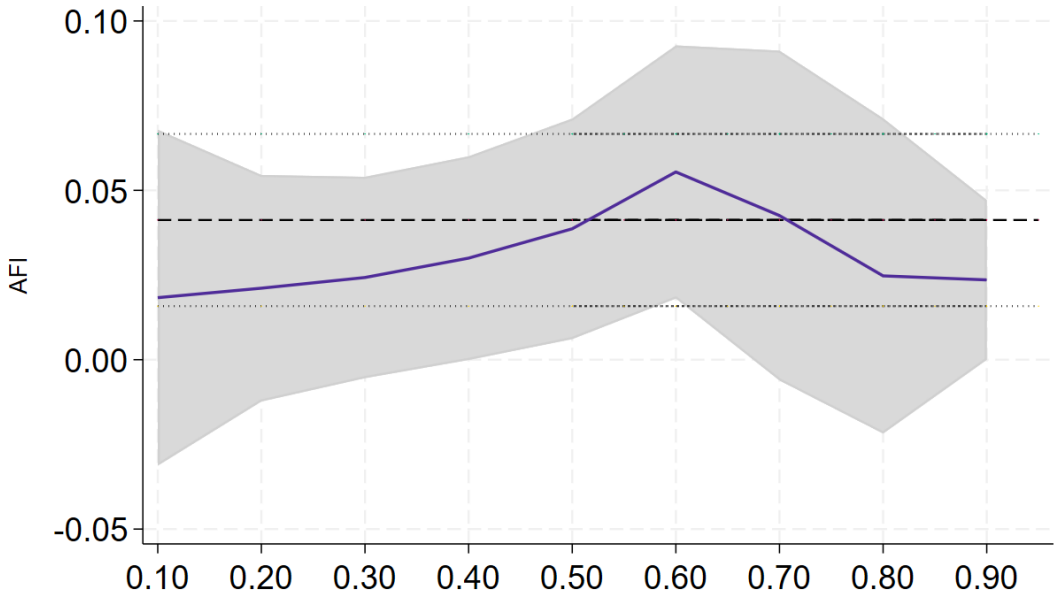
Notes: This table reports quantile regression estimates of the relationship between AFI and state-level real GDP across nine deciles of the GDP distribution (Q10 to Q90). The dependent variable is real GDP by state, expressed in natural logarithm. The main explanatory variable is AFI. Independent variables include private investment (PINVEST), public investment (PPINVEST), labour force participation (LABOURFP), unemployment (UNEMPLOY), exports, imports and a state-specific time trend (TREND). Robust standard errors are reported in parentheses. Variable definitions and sources are provided in Table 2. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Figure 4 plots the AFI coefficient estimates from the quantile regressions in Table 6 across the conditional distribution of real GDP. The solid purple line represents the quantile-specific estimates from Q10 to Q90, while the gray shaded area depicts the 95% confidence interval. For comparison, the OLS estimate from Table 5 (column (3)) is shown as a horizontal reference line, allowing a direct comparison between the conditional mean effect and the quantile-specific impacts.

The figure reveals pronounced heterogeneity in the growth impact of AFI across Malaysian states. The AFI coefficient is small and statistically indistinguishable from zero at the bottom of the distribution (Q10–Q20), rises steadily through the lower-middle quantiles, and reaches its largest and most precisely estimated values in the middle-to-upper-middle range, with peaks around Q40 (0.064) and Q70 (0.043). At the very top of the distribution (Q80–Q90), the coefficient declines and becomes less stable, suggesting a flattening of the marginal effect once states reach high levels of state-level output. The OLS reference line sits within the band of quantile estimates around the middle of the distribution, indicating that the average effect documented in Tables 4 and 5 is broadly representative of mid-income states but masks meaningful variation at the tails. Importantly, confidence intervals exclude zero across much of the upper half of the distribution, while lower-tail estimates consistently straddle zero, mirroring the inference drawn from Table 6.

These results carry clear policy implications. The muted response at the lower quantiles indicates that the least-developed states do not mechanically benefit from FI inflows, with absorptive capacity constraints, including weaker infrastructure, lower human capital, and thinner industrial bases, limiting the translation of AFI into measurable GDP gains (Crespo and Fontoura, 2007; Iršová and Havránek, 2013). Conversely, the flattening at the very top of the distribution is consistent with diminishing marginal returns in highly developed, investment-saturated states such as Selangor and Kuala Lumpur, where the marginal foreign project may add proportionately less to aggregate output than in states still on the steeper part of the development curve. Taken together, the quantile evidence suggests that the distributional gains from FI in Malaysia are concentrated in the middle of the regional development spectrum, and that policies targeting absorptive-capacity gaps in lagging states are likely to yield higher marginal returns than additional incentives targeted at already saturated investment hubs.

Figure 4. Quantile Regression Estimates of AFI Effects on GDP



Notes: This figure plots the coefficient estimates of approved foreign investments (AFI) on real GDP across different quantiles of the GDP distribution, obtained from quantile regressions of the baseline specification (Table 6). The horizontal axis denotes the GDP quantile, while the vertical axis reports the estimated AFI coefficient. The solid line represents point estimates, and the shaded area indicates the 95% confidence interval. For comparison, the OLS estimate from Table 5 (column (3)) is shown as a horizontal reference line. Variable definitions and sources are provided in Table 2.

4.2 How state-level foreign investment shapes firm performance? Firm-level evidence

Firm-level estimations (Tables 7–9) shed light on the microeconomic mechanisms through which FI influences productivity, investment, and broader firm performance. The results reveal significant and economically meaningful spillovers, though with notable heterogeneity across dimensions.

4.2.1 Financial performance

Table 7 shows that state-level FI intensity (LogAFI) is positively and significantly associated with all three financial-performance measures in the baseline specifications (columns 1–3): firm market value (LogMV: 0.0267), profitability (LogProfit: 0.0291), and dividend payout (LogDIV: 0.1025). The point estimates imply that a 1% increase in AFI at the state level is associated with roughly a 0.03% increase in firm market value and profitability, and a substantially larger 0.10% increase in dividend distributions. These findings suggest that domestic firms in FI-rich states tend to gain superior financial outcomes, possibly due to knowledge transfers, improved managerial practices, and enhanced access to international supply chains.

This finding is consistent with Newman et al. (2015), who report that FDI generates positive productivity spillovers through technology diffusion and better management in developing countries. Similarly, Reyes (2017) and Jordaan et al. (2020) document that firms exposed to foreign presence tend to exhibit higher sales and profitability due to linkage effects and improved production standards. These studies corroborate our finding that FI exposure enhances firm financial outcomes, particularly when domestic firms possess strong absorptive capacity. Evidence from meta-analysis by Iršová and Havránek (2013) further shows that horizontal spillovers, via demonstration and competition effects, significantly raise firm productivity when absorptive capacity is strong. In the ASEAN context, Aldaba and Quejada (2022) highlight that firms embedded in foreign-dominated clusters experience faster financial performance gains, underscoring the importance of innovation readiness and institutional support. The Malaysian context mirrors these dynamics: FI-rich states such as Penang and Selangor host dense manufacturing ecosystems where local suppliers learn from and co-locate with MNCs.

Columns (4)–(6) of Table 7 augment the baseline financial performance specifications with the interaction term LogAFI×COVID, where COVID is a dummy equal to one for the years 2020–2022 and zero otherwise, to test whether the firm-level financial response to state-level FI exposure shifted during the pandemic. The interaction term is positive and statistically significant for both market value (LogMV: 0.0404) and profitability (LogProfit: 0.0445), indicating that firms located in FI-intensive states recorded relatively stronger valuations and higher profits during the COVID period than otherwise comparable firms in lower-FI states. A plausible interpretation is that exposure to foreign investors brought with it stronger supply-chain linkages, diversified export markets, and easier access to capital, which together cushioned firms in FI-rich states against the demand and liquidity shocks. This aligns with Alfaro and Chor (2023), who document GVC firms' financial resilience via diversification. By contrast, the interaction term for dividend payout (LogDIV: -0.0844) is negative and significant, suggesting that firms in FI-intensive states curtailed dividend distributions more sharply during 2020–2022, a pattern consistent with precautionary cash retention amid heightened uncertainty over shock duration, as in Ding et al. (2021). Taken together, the COVID-period evidence indicates that state-level FI exposure was associated with greater firm-level resilience in valuations and earnings, but with more conservative payout behaviour, during the pandemic.

Table 7. FI and firm-level productivity: financial performance measures

	LogMV	LogProfit	LogDIV	LogMV	LogProfit	LogDIV
	(1)	(2)	(3)	(1)	(2)	(3)
LogAFI	**0.0267****	**0.0291****	**0.1025****	**0.0267****	**0.0291****	**0.1025****
	(0.0090)	(0.0109)	(0.0419)	(0.0090)	(0.0109)	(0.0419)
LogAFI#COVID				**0.0404*****	**0.0445****	**-0.0844****
				(0.0101)	(0.0150)	(0.0334)
LogAGE	-0.3819***	-0.0911	0.3503	-0.3819***	-0.0911	0.3503
	(0.1032)	(0.1486)	(0.2246)	(0.1032)	(0.1486)	(0.2246)
SIZE	0.6470***	0.7827***	0.5564**	0.6470***	0.7827***	0.5564**
	(0.0897)	(0.0652)	(0.2311)	(0.0897)	(0.0652)	(0.2311)
LogPPE	0.0012	0.0440	0.2592	0.0012	0.0440	0.2592
	(0.0189)	(0.0437)	(0.1704)	(0.0189)	(0.0437)	(0.1704)
LogDEBT	-0.0475***	-0.0241***	-0.2319***	-0.0475***	-0.0241***	-0.2319***
	(0.0078)	(0.0067)	(0.0223)	(0.0078)	(0.0067)	(0.0223)
LogCASH	0.0905*	0.1370***	0.5836***	0.0905*	0.1370***	0.5836***
	(0.0479)	(0.0402)	(0.1145)	(0.0479)	(0.0402)	(0.1145)
Constant	-2.8905***	-1.8388*	-8.0272**	-2.8905***	-1.8388*	-8.0272**
	(0.7627)	(0.8575)	(2.6893)	(0.7627)	(0.8575)	(2.6893)
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
N	2,928	2,928	2,928	2,928	2,928	2,928
Firms	890	890	890	890	890	890
Adjusted.R2	0.6390	0.7490	0.3790	0.6390	0.7490	0.3790

Notes: This table reports estimation results examining the effect of state-level foreign investment (FI) intensity on firm-level financial performance for a sample of publicly listed Malaysian firms. The dependent variables are firm market value (LogMV) in column (1), profitability (LogProfit) in column (2), and dividend payout (LogDIV) in column (3), all expressed in natural logarithms. The main explanatory variable is the natural logarithm of approved foreign investments at the state level (LogAFI). Firm-level controls include firm age (LogAGE) and size (SIZE), tangible assets (LogPPE), leverage (LogDEBT), and cash holdings (LogCASH). All specifications include industry and year fixed effects. Standard errors, clustered at the state level, are reported in parentheses. Variable definitions and sources are provided in Table 2. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

4.2.2 Investment performance

In Table 8, FI exposure is strongly associated with increases in capital expenditure (LogCapex) and inventory accumulation (LogINV). This suggests that firms in high-FI states expand productive capacity to meet new demand or supply chain integration opportunities generated by foreign investors. These patterns corroborate with our finding that FI stimulates investment upgrading through supply-chain linkages, echoing evidence in Kohpaiboon (2006) and Jordaan et al. (2020), who show that backward linkages between domestic suppliers and foreign firms drive local investment growth.

Interestingly, the coefficient on R&D expenditure (LogRD) is negative and significant, implying that FI may crowd out in-house innovation among domestic firms. This is consistent with the "demonstration" and "crowding-out" effects discussed by Iršová and Havránek (2013), where local firms imitate rather than innovate, depending on foreign partners' technologies. Similar substitution effects were also found in ASEAN contexts by Aldaba and Quejada (2022), who attribute them to limited domestic absorptive capacity and insufficient innovation incentives.

Columns (5)-(8) augment the baseline specifications with an interaction between LogAFI and a COVID-19 dummy (equal to one for 2020–2022) to test whether the firm-level response to state-level FI exposure shifted during the pandemic. The interaction term is positive and statistically significant for inventory accumulation (LogINV: 0.0735), suggesting that firms in FI-intensive states accumulated additional inventories during the COVID period, plausibly as a precautionary buffer against supply-chain disruptions. This pattern is consistent with Javorcik (2020), who notes that COVID exposed vulnerabilities in global value chains, leading firms to consider precautionary adjustments like inventory buildup and diversified sourcing strategies. The interaction is statistically insignificant for capital expenditure (LogCapex), R&D expenditure (LogRD), and the R&D dummy (DRD), indicating that the broader investment patterns observed during normal times persisted through the pandemic. The negative R&D effect was not amplified by COVID-19, consistent with the structural rather than cyclical nature of the crowding-out mechanism.

Table 8. FI and firm-level productivity: investment performance measures

	LogCapex	LogINV	LogRD	DRD	LogCapex	LogINV	LogRD	DRD
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
LogAFI	**0.0477*** **	**0.0849*** **	**-0.0669***	-0.0087	**0.0477*** **	**0.0849*** **	**-0.0669***	-0.0087
	(0.0115)	(0.0131)	(0.0327)	(0.0053)	(0.0115)	(0.0131)	(0.0327)	(0.0053)
LogAFI#COVID					0.0087	**0.0735** **	-0.0547	0.0016
					(0.0165)	(0.0252)	(0.0400)	(0.0054)
LogAGE	0.0226	0.7965**	0.2787	0.0273	0.0226	0.7965**	0.2787	0.0273
	(0.0608)	(0.3134)	(0.7327)	(0.0873)	(0.0608)	(0.3134)	(0.7327)	(0.0873)
SIZE	0.0437	0.7294***	0.1962	0.0164	0.0437	0.7294***	0.1962	0.0164
	(0.0801)	(0.0854)	(0.1117)	(0.0104)	(0.0801)	(0.0854)	(0.1117)	(0.0104)
LogPPE	0.7223***	0.1980	0.3013**	0.0339**	0.7223***	0.1980	0.3013**	0.0339**
	(0.0982)	(0.1232)	(0.1195)	(0.0153)	(0.0982)	(0.1232)	(0.1195)	(0.0153)
LogDEBT	0.0272*	0.0668**	-0.0126	-0.0026	0.0272*	0.0668**	-0.0126	-0.0026
	(0.0146)	(0.0272)	(0.0338)	(0.0043)	(0.0146)	(0.0272)	(0.0338)	(0.0043)
LogCASH	0.1762***	-0.0263	0.1460**	0.0157**	0.1762***	-0.0263	0.1460**	0.0157**
	(0.0190)	(0.0188)	(0.0494)	(0.0059)	(0.0190)	(0.0188)	(0.0494)	(0.0059)
Constant	-2.1975***	-4.0493***	-7.0405***	-0.6739**	-2.1975***	-4.0493***	-7.0405***	-0.6739**
	(0.4427)	(0.7739)	(1.6666)	(0.2299)	(0.4427)	(0.7739)	(1.6666)	(0.2299)
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	2,928	2,928	2,928	2,928	2,928	2,928	2,928	2,928
Firms	890	890	890	890	890	890	890	890
Adjusted.R2	0.7460	0.4560	0.1670	0.1320	0.7460	0.4560	0.1670	0.1320

Notes: This table reports estimation results examining the effect of state-level foreign investment (FI) intensity on firm-level investment outcomes for a sample of publicly listed Malaysian firms. The dependent variables are capital expenditure (LogCapex) in column (1), inventories (LogINV) in column (2), R&D expenditure (LogRD) in column (3), and a dummy equal to one if the firm reports positive R&D spending (DRD) in column (4). The main explanatory variable is the natural logarithm of approved foreign investments at the state level (LogAFI). Firm-level controls include firm age (LogAGE), size (SIZE), and additional firm characteristics. All specifications include industry and year fixed effects. Standard errors, clustered at the state level, are reported in parentheses. Variable definitions and sources are provided in Table 2. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

4.2.3 Economic performance

Table 9 examines labour and trade outcomes. FI exposure has a positive and significant impact on employment (dEMP) and export growth (dLogExports), indicating that FI contributes to job creation and export diversification. These results align with Anyanwu (2012) and Sijabat (2023), who find that FDI stimulates employment and export performance in emerging economies through vertical supply-chain linkages.

However, effects on wages (logSalary) and tax payments (LogTAX), while positive, are weaker and less stable. This pattern suggests that FI-led growth is not uniformly inclusive, as benefits may be concentrated among higher-skilled workers or capital-intensive sectors. Similar findings are reported by Zamani and Tayebi (2022), who note that while FDI promotes macroeconomic growth, its distributional impacts often depend on the host country's labour policies and institutional settings.

Columns (5)–(8) of Table 9 introduce a COVID-19 interaction term to assess whether the effect of state-level FI exposure on firm-level economic outcomes was altered by the pandemic. The interaction is negative and statistically significant for employment growth (dEMP: -0.0088), indicating that firms in FI-intensive states experienced a relative slowdown in employment dynamics during 2020–2022. This pattern is consistent with the heightened sensitivity of FI-linked firms to global supply-chain disruptions and foreign demand contractions, consistent with Ulate, Vasquez and Zarate Vasquez (2023), who document labour market contractions from pandemic-era trade shocks. The interaction terms for selling, general and administrative expenses (LogSGA), salary expenditure (logSalary), and tax payments (LogTAX) are not statistically significant, suggesting that the cost structure and fiscal contributions of these firms remained relatively stable. Taken together, the COVID-period evidence indicates that the pandemic's firm-level impact operated mainly through the labour-adjustment margin rather than through wages or fiscal channels, while the macro-level AFI-GDP relationship documented in Table 5 was broadly resilient.

Overall, firm-level evidence supports the presence of positive but selective spillovers. Firms with greater financial resources, stronger governance, and higher technological readiness are better positioned to benefit from FI, while less competitive firms may struggle to capture similar gains. This result is consistent with the concept of absorptive capacity advanced by Crespo and Fontoura (2007) and Aldaba and Quejada (2022). Iršová and Havránek (2013) confirm that productivity gains from foreign presence are most pronounced when domestic

firms can internalise knowledge transfers, while Eden (2009) emphasises the role of institutional frameworks in facilitating linkages between foreign and local firms.

Table 9. FI and firm-level productivity: economic performance measures

	LogSGA	dEMP	logSalary	LogTAX	LogSGA	dEMP	logSalary	LogTAX
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
LogAFI	-0.0178	-0.0000	-0.0055	-0.0058	-0.0178	-0.0000	-0.0055	-0.0058
	(0.0520)	(0.0012)	(0.0210)	(0.0211)	(0.0520)	(0.0012)	(0.0210)	(0.0211)
LogAFI#COVID					0.0923	**-0.0088****	0.0082	-0.0496
					(0.0557)	(0.0032)	(0.0199)	(0.0324)
LogAGE	0.3169	-0.0347**	-0.1365	0.0620	0.3169	-0.0347**	-0.1365	0.0620
	(0.3491)	(0.0130)	(0.1112)	(0.1469)	(0.3491)	(0.0130)	(0.1112)	(0.1469)
SIZE	-0.0456	-0.0188***	0.0363	0.7360***	-0.0456	-0.0188***	0.0363	0.7360***
	(0.4779)	(0.0051)	(0.0988)	(0.1103)	(0.4779)	(0.0051)	(0.0988)	(0.1103)
LogPPE	-0.2180	0.0070*	0.1776*	-0.1736	-0.2180	0.0070*	0.1776*	-0.1736
	(0.2795)	(0.0033)	(0.0915)	(0.1026)	(0.2795)	(0.0033)	(0.0915)	(0.1026)
LogDEBT	0.2435***	0.0044**	0.0062	-0.0615***	0.2435***	0.0044**	0.0062	-0.0615***
	(0.0573)	(0.0019)	(0.0117)	(0.0134)	(0.0573)	(0.0019)	(0.0117)	(0.0134)
LogCASH	0.1909**	0.0075**	0.0424	0.3028***	0.1909**	0.0075**	0.0424	0.3028***
	(0.0837)	(0.0030)	(0.0397)	(0.0722)	(0.0837)	(0.0030)	(0.0397)	(0.0722)
Constant	5.6169*	0.1407***	6.4811***	-1.8175	5.6169*	0.1407***	6.4811***	-1.8175
	(2.7094)	(0.0361)	(0.8251)	(1.0671)	(2.7094)	(0.0361)	(0.8251)	(1.0671)
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	2,928	2,928	2,928	2,928	2,928	2,928	2,928	2,928
Firms	890	890	890	890	890	890	890	890
Adjusted.R2	0.0896	0.0261	0.1080	0.4180	0.0896	0.0261	0.1080	0.4180

Notes: This table reports estimation results examining the effect of state-level foreign investment (FI) intensity on firm-level economic outcomes for a sample of publicly listed Malaysian firms. The dependent variables are selling, general and administrative expenses (LogSGA) in column (1), employment growth (dEMP) in column (2), salaries (logSalary) in column (3), export growth (dLogExports) in column (4), and tax payments (LogTAX) in column (5). The main explanatory variable is the natural logarithm of approved foreign investments at the state level (LogAFI). Firm-level controls include firm age (LogAGE), size (SIZE), and additional firm characteristics. All specifications include industry and year fixed effects. Standard errors, clustered at the state level, are reported in parentheses. Variable definitions and sources are provided in Table 2. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

5 Discussion and Policy Implications

The analysis highlights regional divergences in FI distribution and its economic impact across Malaysian states. Despite high investment intentions in developed states, spillovers to the wider economy remain limited. This underscores the uneven realisation of FI benefits, with underdeveloped states constrained by structural and institutional weaknesses. Identifying the determinants of investment decisions and assessing institutional capacities across states are thus essential for designing more inclusive and regionally balanced policies. This emphasis aligns with Crespo and Fontoura (2007) and Moran et al. (2005), who show that absorptive capacity and institutional quality are critical for ensuring that FI translates into broad-based regional development.

Integrating evidence from both state- and firm-level analyses yields three central insights. First, FI stimulates regional and firm-level growth, confirming that FI acts as a catalyst for productivity, investment, and trade expansion. This aligns with classic growth models (e.g., Borensztein et al., 1998; Alfaro et al., 2004) and ASEAN-specific evidence (e.g., Lean & Tan, 2011; Sijabat, 2023). Second, FI's benefits are unevenly distributed. Developed states and financially stronger firms experience larger benefits, consistent with Lin & Kwan (2016) and Urata & Baek (2023), due to superior infrastructure, institutional quality, and absorptive capacity. Third, spillovers are real but conditional. FI enhances capital formation and exports but may displace domestic R&D, reinforcing the need for complementary policies that strengthen innovation and human capital. This supports Malaysia's policy emphasis under NIMP 2030 and NIP (MITI, 2023), which seek to deepen linkages between MNCs and local enterprises.

A key policy direction is to leverage the comparative advantages of individual states to strengthen their investment attractiveness. Border states such as Perlis and Kelantan are strategically positioned to serve as logistics and transport hubs. Realising this potential requires state governments and regional investment promotion agencies (IPAs) to invest in supporting infrastructure such as warehousing facilities, cross-border logistics hubs, and integrated transport networks, while simultaneously scaling up targeted investment promotion and marketing for domestic firms in these industries.

Equally critical is the governance and monitoring of investment incentives. While Malaysia offers a wide array of tax and non-tax incentives, their effectiveness hinges on systematic evaluation of outcomes rather than focusing solely on their ability to attract FI. This gap is

particularly evident in several states where high levels of approved investments do not translate into corresponding GDP growth. A stronger results-based approach, embedded within the incentive framework, is needed. Investments attracted through national incentive schemes should be strategically aligned with the National Investment Aspirations (NIA) to ensure that FDI outcomes contribute effectively to economic development, such as increasing economic complexity, creating high-value job opportunities, extending domestic linkages, developing new and existing clusters, improving inclusivity, and enhancing ESG practices. Establishing robust monitoring mechanisms and strengthening institutional oversight will be essential to maximise these spillovers.

In addition, the strength of investment promotion institutions is a decisive factor. Effective FDI realisation relies on strong coordination between federal and regional IPAs, particularly the Malaysian Investment Development Authority (MIDA). Clear role delineation enhanced institutional linkages and collaborative investor engagement strategies will ensure efficiency along the entire investment journey, from initial investor interest to project implementation. A well-coordinated approach not only improves execution but also amplifies the geographic and developmental spread of FDI benefits.

Finally, evidence from the COVID-19 period suggests that while FI continues to support overall state-level economic output, its spillover effects on firm-level outcomes such as employment and firms' ability to adjust their operations are more fragile during periods of economic disruption. This suggests that investment attraction strategies alone are insufficient and should be complemented with policies that strengthen firm resilience, including access to liquidity, supply-chain diversification, and labour market flexibility during periods of external shocks.

Collectively, these measures, capitalising on regional strengths, embedding performance-based incentive governance, and reinforcing institutional coordination – are pivotal to broadening the distribution of FDI. These will help Malaysia move towards a more balanced and inclusive growth trajectory, ensuring that FDI spillovers are not confined to a few states but comprehensively contribute to national development.

6 Conclusion

This paper highlights notable disparities in the distribution of FI across Malaysian states, with a pronounced concentration in economically developed regions. While these states continue to attract the bulk of foreign capital, the associated spillovers appear limited, suggesting that the broader developmental impact of FI is constrained. This underscores the uneven realisation of FI benefits, as underdeveloped states continue to face structural and institutional challenges that restrict their ability to attract investment and maximise returns. The analysis contributes to a more granular understanding of FI in Malaysia, particularly its spatial dynamics and implications for regional development.

The findings suggest that regional heterogeneity in economic structures, institutional capacities, and governance arrangements necessitate differentiated policy approaches. A uniform, one-size-fits-all strategy is unlikely to deliver equitable outcomes. Moreover, firm-level evidence points to a negative association between FI and domestic R&D activity, suggesting potential trade-offs for long-term innovation capacity. In light of this, a more nuanced framework that accounts for the unique comparative advantages and institutional readiness of each state is critical to fostering inclusive and balanced investment-led growth.

To broaden the geographic spread of FI and maximise its developmental impact, three interrelated policy priorities are essential. First, states should pursue state-specific, regionally tailored investment strategies that harness their comparative advantages whether in logistics, natural resources, or high-value services, supported by adequate infrastructure, human capital, and promotional efforts. Second, governance and monitoring of investment incentives must be strengthened, with performance-based criteria aligned to the NIAs to ensure that incentives translate into higher economic complexity, quality jobs, stronger linkages and sustainability outcomes. Third, the role of IPAs should be reinforced through clearer delineation of responsibilities, stronger federal–state coordination, and institutional capacity-building, so that investment intentions can be effectively converted into realised projects with meaningful spillovers across regions.

Taken together, these measures provide critical insights into the structural constraints shaping Malaysia's regional investment capabilities and offer forward-looking strategies for policymakers. By capitalising on regional strengths, enhancing institutional oversight of incentives, and reinforcing coordination across IPAs, Malaysia will be better positioned to attract sustainable investment flows and amplify their spillover impacts. This will not only

broaden the geographic spread of FI but also support a more balanced, inclusive, and resilient trajectory of economic development. Looking ahead, future research should examine sectoral heterogeneity in FI spillovers, particularly in high-tech and green industries, and assess how digital infrastructure and environmental, social and governance (ESG) compliance shape investment-led growth outcomes.

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Appendix A

Box 1A. Approved Foreign Investments: definition, scope, and caveats

Approved Foreign Investments (AFI) refer to the value of foreign investment (FI) projects reported by the Malaysian Investment Development Authority (MIDA), which consolidates data across 61 Ministries and Agencies, including MIDA itself. AFI captures investment projects for new, expansion, or diversification activities that have been granted licences, incentives, permits, statuses, grants, or soft loans by the relevant Ministries and Agencies. These approved investments reflect the ex-ante investment intentions of foreign firms across the primary, manufacturing, and selected services subsectors. Crucially, AFI is systematically reported at the state level, making it uniquely well-suited for subnational analyses of FI dynamics in Malaysia.

State-level foreign direct investment (FDI) flows are not publicly available in Malaysia, as official FDI statistics follow international standards based on the IMF's Balance of Payments and International Investment Position Manual and are reported only at the national level. In light of this, AFI is a proxy that would be most consistent with the state-level investment indicator over our sample period (2002–2022). This allows us to examine regional determinants and spillovers of FI and to observe early signals of investors' location choices. The use of AFI offers several key advantages for our empirical strategy:

- Provides state-level granularity needed to model regional heterogeneity, relevant to our study.
- Offers a long, balanced time series (2002–2022) that can be extended further in future analysis.
- Reflects firms' intended project location and size, which are reasonably correlated with domestic investment activity.

Nevertheless, AFI reflects the approved value of FI rather than realised inflows. Approved projects may not always translate into actual disbursements, and the extent of realisation can vary considerably across states and industries. AFI therefore differs conceptually from FDI as defined by the IMF Balance of Payments framework (equity participation of at least 10%). Accordingly, our estimates should be interpreted as capturing the economic effects of FI commitments, rather than realised capital flows.