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Assessing Investment Dynamics of the Johor–Singapore Special Economic Zone

Jingting Liu* Qi Xiang Ma†

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Abstract

Special economic zones are widely used to attract foreign direct investment, but evidence on their spatial spillovers comes mostly from single-jurisdiction zones and remains limited for Southeast Asia. This paper estimates the impact of the Johor–Singapore Special Economic Zone using a continuous-exposure difference-in-differences design, where we use a state's distance to Johor Bahru as the treatment exposure. We estimate both the dynamic effect of the announcement and the actual implementation of the JS-SEZ. Using greenfield FDI data for Malaysia from 2022 to 2026, we find that investment increased significantly in states closer to Johor relative to those further away. Specifically, post-announcement investment in Johor exceeds that of the farthest states by 2.60 log points, and investments in the nearest group of non-Johor states increased by 1.15 log points. The response is broad-based, extending to sectors the zone does not explicitly promote, though the point estimate is larger for promoted sectors. On the Singapore side, we do not find evidence for an increase in inward greenfield investment, in either the manufacturing or hub-services sectors. However, we do show that Singapore-sourced projects into Johor rose sharply, suggesting that Singapore gains through its firms' location decisions rather than through investment drawn into Singapore itself. Taken together, these patterns may illustrate the asymmetric gains of a zone spanning jurisdictions at different levels of development.

JEL codes: F21, O14, R11, R38.

Keywords: special economic zones, greenfield FDI, spatial spillovers, difference-in-differences, Malaysia, Singapore.

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1 Introduction

With more than 7,000 special economic zones (SEZs) across 145 economies in 2022 (UNCTAD, 2022), SEZs are one of the most widely used instruments of place-based development policy. SEZs are primarily implemented to attract investment, create jobs, promote exports, and expand productive capacity within targeted regions, with potential benefits extending to surrounding areas (Frick and Rodríguez-Pose, 2019). Evidence from China suggests that SEZs can generate substantial economic gains, including higher output, capital investment, employment, productivity, and wages (Alder et al., 2016; Lu et al., 2019; Wang, 2013). At the same time, their wider spatial effects remain disputed. While some studies find positive spillover effects from SEZs and related place-based policies (Alder et al., 2016; Zheng et al., 2015), others suggest that part of the gains generated in targeted regions reflect the diversion of economic activity from elsewhere (Wang, 2013; Kline and Moretti, 2013). This raises a broader policy question for policymakers considering such zones: to what extent do SEZs generate additional economic activity rather than simply reshaping its spatial distribution?

The Johor-Singapore Special Economic Zone (JS-SEZ) provides a timely setting to examine the spatial dimension of this question. Jointly announced by Malaysia and Singapore in October 2023 (Prime Minister's Office Singapore, 2023), and formally established on January 7, 2025 (Ministry of Trade and Industry Singapore, 2025), the JS-SEZ is a cross-border economic initiative centred on a zone of more than 3,500 km^2 in Johor (Enterprise Singapore, n.d.a). The gap between its announcement and formal establishment also allows us to trace whether investment responses emerged before full implementation. The economic rationale of the JS-SEZ is to strengthen the joint value proposition of Johor and Singapore in competing for global investment, combining Singapore's strengths as a financial and business hub with Johor's advantages in land, labour, and access to the wider Malaysian market (Ministry of Trade and Industry Singapore, 2024). Supporting this complementarity are efforts to improve cross-border connectivity and the regional business environment (Invest Malaysia Facilitation Service Centre Johor, n.d.b), while the zone seeks to promote investment across 11 sectors, including strategic high-tech manufacturing and service activities (Enterprise Singapore, n.d.a; Malaysian Investment Development Authority, 2025). Yet, despite these ambitions, it remains unclear how the announcement of the JS-SEZ has reshaped the spatial distribution of investment within Malaysia, whether its effects extend beyond Johor, and whether they differ across industries. This paper therefore examines how the October 2023 announcement of the JS-SEZ affected the spatial distribution of FDI across Malaysian states, how these effects vary with distance from Johor, and whether they differ across industries.

To examine these questions, we use project-level greenfield FDI data from the Orbis

Crossborder Investment database and construct a panel of Malaysian states and federal territories from January 2022 to June 2026. We fix Johor Bahru as the geographic anchor of the JS-SEZ, and measure each state's exposure to the JS-SEZ based on its distance from Johor Bahru. Using the continuous-exposure difference-in-differences, we examine whether states located closer to Johor Bahru experienced larger changes in FDI following the October 2023 announcement. We then group states into distance quartiles from Johor Bahru to assess how quickly the investment response dissipates across space. We further examine whether these effects differ across industries, with particular attention to high-tech manufacturing and high-tech services given these align with the target industries of the zone (Enterprise Singapore, n.d.a; Malaysian Investment Development Authority, 2025). Finally, we use event-study specifications to trace how these spatial and sectoral responses evolve before and after the announcement.

Our results point to four main findings. First, states with greater exposure to Johor experienced larger increases in both FDI value and project counts following the JS-SEZ announcement. Second, this response is highly localised: the largest increase is concentrated in Johor, with more limited evidence of positive spillovers to the closest group of states and little robust evidence of effects farther away. Third, the response varies substantially across industries. High-tech sectors exhibit a weaker average proximity response than non-high-tech sectors, while within high-tech activities, manufacturing shows a more positive point estimate than services. This reflects the fact that high-tech services investments in Johor have already trended up compared to more distant states even prior to JS-SEZ announcement. Fourth, on the Singapore side of the zone we find no detectable increase in inward greenfield investment in the industries most linked to Johor through ownership, but a sharp rise in Singapore-sourced projects into Johor. Overall, the findings suggest that the early investment response to the JS-SEZ announcement has been spatially concentrated and sectorally uneven.

This paper makes four contributions. First, to our knowledge, it provides the first quasi-experimental assessment of the early investment effects of the JS-SEZ, offering evidence on how greenfield FDI responded across the announcement and early implementation phases of the zone. Second, rather than treating Malaysian states outside Johor as a homogeneous comparison group, we exploit continuous variation in their geographic exposure to the JS-SEZ. This allows us to examine not only whether investment increased in Johor, but also whether the effects extended to surrounding states and how rapidly they dissipated with distance. By comparing responses in Johor and other states, it also provides another check, giving us further assurance that the effects we find are more likely due to the announcement of the JS-SEZ, rather than some common shock to Malaysia. It also means identification does not rest on a single treated unit. Third, we examine the sectoral heterogeneity of these responses, distinguishing high-tech manufacturing from high-tech services and other industries. This provides a more detailed assessment of whether the early investment response to the JS-SEZ is aligned with the zone's stated objective of attracting strategic, technology-intensive activities. Fourth, we use ownership linkages from Orbis to identify which Singapore industries are exposed to the zone, and examine both the impact on investments for both parts of JS-SEZ, rather than on Johor alone.

The remainder of the paper is organized as follows. Section 2 describes the background of the JS-SEZ, and provides an overview of the FDI investments in Malaysia. Section 3 discusses the data used and describes how we measure the spatial exposure to JS-SEZ. Section 4 outlines our empirical strategy. Section 5 presents the results. Section 6 shows the robustness analysis. Finally, Section 7 concludes.

2 Background

2.1 The Johor–Singapore Special Economic Zone

The JS-SEZ is a joint initiative by Malaysia and Singapore aimed at strengthening bilateral economic collaboration and attracting global investment (Singapore Economic Development Board, n.d.). Building on the complementary strengths of both economies (Singapore Economic Development Board, n.d.), the JS-SEZ seeks to strengthen Johor's investment proposition through a combination of sector-specific incentives and investment facilitation measures. The zone comprises nine designated flagship zones across Iskandar and Pengerang in Johor (Figure 1), each with distinct sectoral specialisations spanning 11 priority sectors (Enterprise Singapore, n.d.a).[1] To encourage investment in these targeted sectors and locations, the JS-SEZ provides a range of fiscal incentives, including investment tax allowances, reduced tax rates for qualifying business activities (Malaysian Investment Development Authority, 2025), and preferential tax rates for eligible talent (Ministry of Finance, Malaysia, 2025).

[1]The 11 sectors consist of Business Services, Digital Economy, Education, Energy, Financial Services, Food Security, Green Economy, Healthcare, Logistics, Manufacturing, and Tourism.

Figure 1: Map of the nine flagship zones and their sectoral specialisations in the Johor-Singapore Special Economic Zone. *Source:* Enterprise Singapore.

Beyond fiscal incentives, the Malaysian government has also established the Invest Malaysia Facilitation Johor (IMFC-J) to streamline investment and business processes within the JS-SEZ (Ministry of Finance, Malaysia, 2025). Cross-border administrative processes have also been facilitated through measures such as XPATNOVA, an integrated expatriate facilitation system that streamlines application and approval processes (Invest Malaysia Facilitation Service Centre Johor, n.d.a). In parallel, partnerships between educational institutions and industry players in Malaysia and Singapore have been developed to strengthen talent pipelines and support the workforce needs of the JS-SEZ (Enterprise Singapore, n.d.b). Together, these measures combine targeted fiscal incentives with investment, cross-border and talent facilitation, providing a more integrated investment framework within the JS-SEZ.

Against this broader policy and institutional backdrop, we next examine Johor's historical and recent position within Malaysia's FDI landscape.

2.2 Historical and Recent FDI Trends and Composition

Figures 2–5 provide descriptive evidence on the evolution and composition of FDI in Malaysia and Johor. Figure 2 shows that total greenfield FDI in Malaysia increased substantially over the three periods, from US$73.35 billion in 2013-2016 to US$124.47 billion in 2021-2024, despite a decline in 2017-2020.[2] Johor remained a major recipient throughout, attracting US$11.46 billion, US$6.82 billion, and US$11.05 billion across the

[2] The three four-year periods are used to provide longer-run descriptive context and do not correspond to the treatment periods used in the empirical analysis.

three periods, respectively. However, its share of total Malaysian FDI declined from approximately 15.6% in 2013-2016 to 13.1% in 2017-2020 and 8.9% in 2021-2024, indicating that the recent expansion in Malaysian FDI was distributed across a broader set of states rather than increasingly concentrated in Johor.

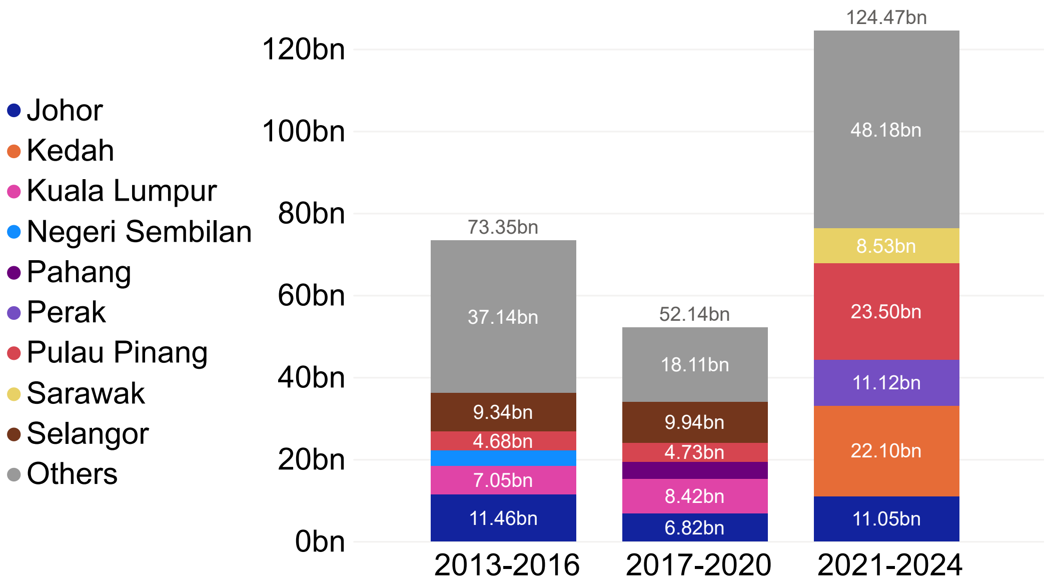
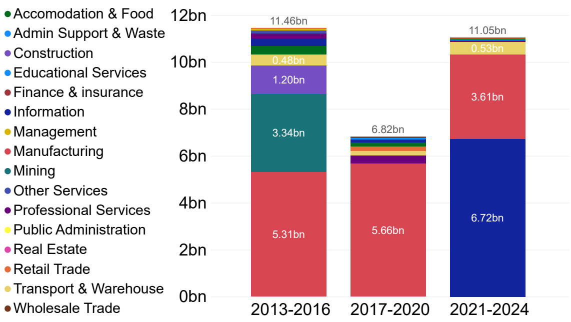
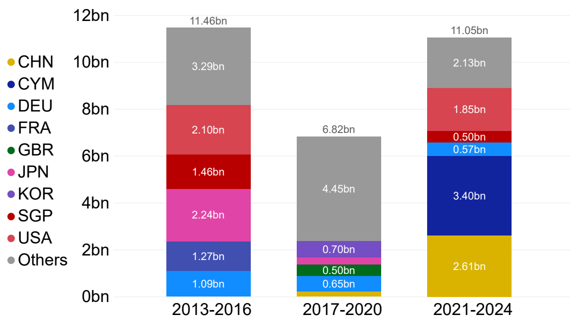


Figure 2: Malaysia FDI by Top 5 States and Period. *Source:* Orbis Crossborder Investment data and authors' calculations.

The composition of Johor's FDI also changed substantially over time. Figure 3 shows that manufacturing investments accounted for a large share of Johor's FDI in the earlier periods, while information-related service investments became considerably more prominent in 2021–2024. The source-country composition also shifted across periods. Japan and the USA were the largest source of FDI in the earlier period, while investment from China emerged as the more prominent source of FDI in the most recent period. Nevertheless, Johor's FDI remained concentrated among a relatively small number of major source economies.



(a) Johor FDI by Industry and Period



(b) Johor FDI by Top 5 Source Countries and Period

Figure 3: Johor FDI by Industry and Source across Periods. *Source:* Orbis Crossborder Investment data and authors' calculations.

Figures 4-5 focus on the period following the formal establishment of the JS-SEZ in January 2025. Figure 4 shows substantial quarter-to-quarter variation in Malaysian greenfield FDI between 2025 Q1 and 2026 Q2. Johor accounted for a particularly large share in 2025 Q1 and 2026 Q2, attracting approximately US$3.03 billion and US$11.78 billion respectively.

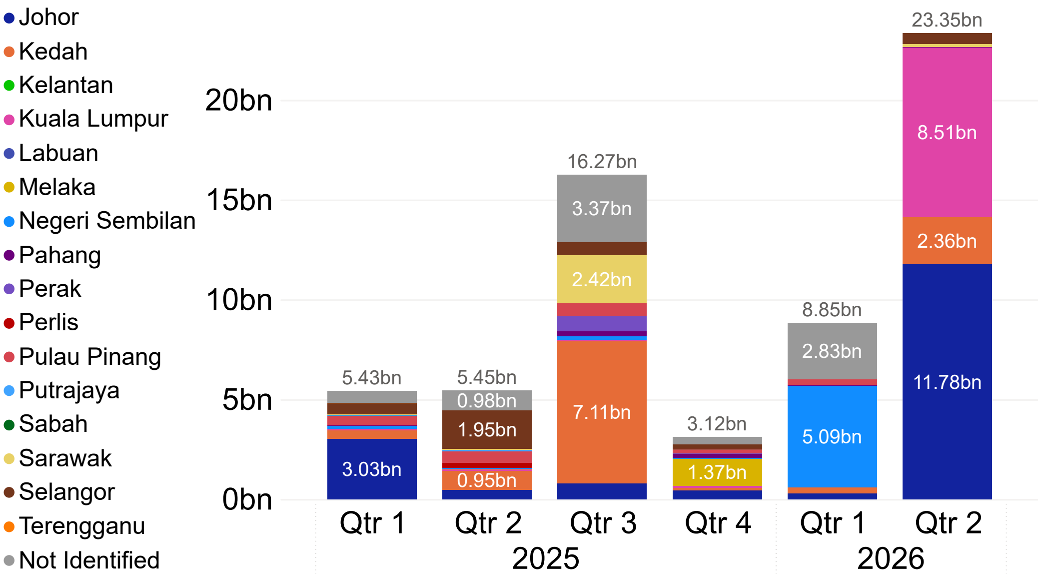
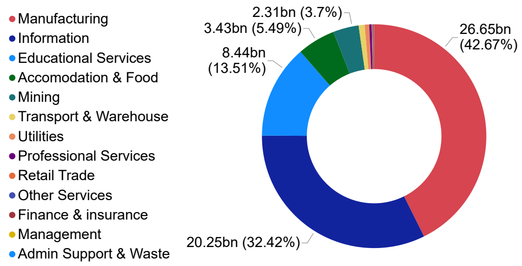
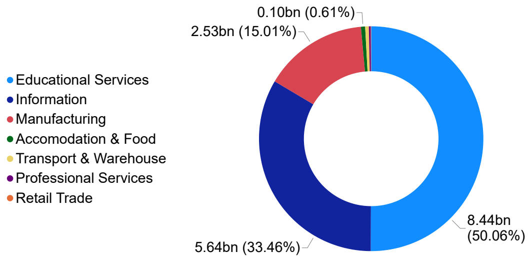


Figure 4: Malaysia FDI by State, 2025 Q1 to 2026 Q2. *Source:* Orbis Crossborder Investment data and authors' calculations.

Figure 5 further highlights a marked difference in sectoral composition between Johor and Malaysia as a whole. At the national level, manufacturing accounted for 42.7% of FDI value, followed by information at 32.4% and educational services at 13.5%. In Johor, by contrast, educational services represented 50.1% of FDI value, followed by information at 33.5% and manufacturing at 15.0%. Notably, Education and the Digital Economy are among the priority sectors targeted by the JS-SEZ. The large shares of educational and information-related investment in Johor during 2025 Q1–2026 Q2 are therefore broadly consistent with the sectoral orientation of the zone, although the descriptive evidence does not by itself establish a causal link. These differences in sectoral FDI composition motivate the subsequent analysis of sectoral heterogeneity in the response to the JS-SEZ.



(a) Malaysia FDI by Industry



(b) Johor FDI by Industry

Figure 5: FDI by Industry, 2025 Q1 to 2026 Q2. *Source:* Orbis Crossborder Investment data and authors' calculations.

3 Data

3.1 Greenfield FDI

The main outcome data are sourced from the Orbis Crossborder Investment database, based on which we created cleaned records of individual greenfield FDI projects at the destination city–state level. Orbis identifies projects using publicly available information, including news aggregation services, newsfeeds, corporate press releases, regulatory filings, and stock-exchange announcements, with project information subsequently verified and supplemented by its research team (Driffield et al., 2023; Moody's, 2024; Digital Marketplace, n.d.). The database tracks projects at different stages, including announced, completed, postponed, and cancelled or withdrawn investments (Driffield et al., 2023; Digital Marketplace, n.d.).

The panel runs from January 2004 to June 2026. For projects with missing state or city information, we manually identified their actual locations by searching for the project title. We also corrected cases in which the project state or city was misattributed. We then retain all projects destined for Malaysia that can be matched to a named state, dropping observations recorded as "Not Identified." For the main empirical analysis, we restrict the sample to January 2022 to June 2026, providing 21 pre-announcement months before the October 2023 announcement of the JS-SEZ. Each project carries a value in USD millions and a project count. We aggregate to either the state–month or state–quarter cell and construct a balanced panel by filling empty cells with zeros, capturing both the total amount and total number of FDI projects per state–month or state–quarter.

The two main outcome variables are:

- $\log(1+\text{FDI value}_{it})$: log-transformed total value of greenfield FDI projects in state i in period t.
- $\log(1+\text{FDI count}_{it})$: log-transformed number of greenfield FDI projects.

The $\log(1+\cdot)$ transformation accommodates the large share of zero-FDI observations and enables a proportional interpretation of coefficients. As a robustness check, we also estimate the models in levels using Poisson pseudo-maximum likelihood (PPML) in Appendix B, which accommodates zero outcomes without log transformation and is robust to heteroskedasticity.

However, as a caveat, the Orbis data are subject to several limitations. Where disclosed investment values are unavailable, Orbis provides estimated project values based on its own methodology (Digital Marketplace, n.d.). Moreover, because project identification depends on publicly available information, the database may not capture the complete universe of greenfield FDI projects, and comparisons across commercial FDI databases indicate that project coverage can differ substantially across data providers (Lakemann et al., 2025). Recorded project activity may also differ from investment ultimately realised, particularly where projects are postponed, cancelled, or withdrawn. Accordingly, the FDI values and project counts used in this paper are best interpreted as measures of recorded greenfield investment activity rather than realised balance-of-payments FDI flows.

3.2 Industry Classification

We downloaded the Orbis FDI projects with industries coded in North American Industry Classification System (NAICS). To facilitate the comparison of FDI investmenst across levels of technology content, we classify NAICS industries into five categories following the US Census Bureau's Business Dynamic Statistics of US high-technology industries (BDS-HT) classification (US Census Bureau, n.d.; Hecker, 2005):

1. **High-tech manufacturing** (`ht_mfg`): NAICS 3341, 3342, 3344, 3345, 3364 (computer hardware, semiconductors, aerospace).
2. **High-tech services** (`ht_svc`): NAICS 5112, 5182, 5191, 5413, 5415, 5417 (software publishing, data processing, R&D services).
3. **Other manufacturing** (`oth_mfg`): NAICS 31–33 excluding high-tech manufactur-

ing.

4. **Other services** (`oth_svc`): NAICS 42–92 excluding high-tech services.

5. **Other** (`other`): agriculture, mining, utilities, construction.

Table 1 shows the sector distribution in the raw FDI data. Other services account for the majority of raw FDI observations (55.9%), followed by Other manufacturing (20.5%), while High-tech manufacturing and High-tech services account for 7.37% and 13.2% respectively. In value terms, however, Other manufacturing accounts for the largest share of FDI (39.3%), followed by High-tech manufacturing (25.8%), illustrating that sectors with fewer recorded projects may nevertheless account for a substantial share of investment value.

Table 1: Sector distribution of greenfield FDI projects (raw observations)

Sector	No. of Observations	Share (%)	FDI (USD mn)	FDI Share (%)
HT Manufacturing	318	7.37	82,322	25.8
HT Services	568	13.2	41,221	12.9
Other Manufacturing	885	20.5	125,204	39.3
Other Services	2,411	55.9	43,930	13.8
Other	133	3.08	26,126	8.19
Total	4,315	100.0	318,802	100.0

Source: Orbis Crossborder Investment database and authors' calculations.

Additionally, given that JS-SEZ targets investments across 11 key economic sectors to drive cross-border growth (Singapore Economic Development Board, n.d.), we further map the NAICS industry codes to the 11 sectors according to Table 2. It shows that promoted industries already make up for the bulk of investments in Johor. In the period between January 2022 and September 2023 (pre-announcement period), over 24% of FDI by project count falls under the 11 promoted sectors, and the share further increased to 34.2% between October 2023 and June 2026. Within the promoted sectors, manufacturing and digital economy are the top two by either project count or value. Besides, it is worth noting that while the share of projects by count under the digital economy sector decreased from 13.9% to 9.2%, by value its share increased from 4.7% to 36.5%, reflecting a few large-value investments typically related to data centers. Education sector-related investments also saw a jump. In the pre-announcement period, they were mostly absent; but post-announcement, investments in the education sector account for 0.4% of all project counts and 11.3% of total project value. In Section 5, in addition to examining the impact of the announcement of JS-SEZ on high-tech manufacturing, high-tech services, or non-high-tech investments, we further distinguish investments according to whether they belong to the 11 promoted sectors or not, and estimate their dynamic responses through an event study.

Table 2: Mapping of NAICS Industries to JS-SEZ Promoted Sectors

		Pre-announcement		Post-announcement	
JS-SEZ sector	NAICS 2017 industries	% proj.	% value	% proj.	% value
Manufacturing	All other NAICS 31–33 (manufacturing not assigned to a more specific promoted sector)	20.4	85.8	21.1	37.9
Digital Economy	5112 Software Publishers; 5173 Wired and Wireless Telecommunications Carriers; 5182 Data Processing, Hosting, and Related Services; 5415 Computer Systems Design and Related Services	13.9	4.7	9.2	36.5
Tourism	7131 Amusement Parks and Arcades; 7211 Traveler Accommodation; 7225 Restaurants and Other Eating Places	8.2	0.6	11.5	1.2
Logistics	4831 Deep Sea, Coastal, and Great Lakes Water Transportation; 4881 Support Activities for Air Transportation; 4885 Freight Transportation Arrangement; 4921 Couriers and Express Delivery Services; 4931 Warehousing and Storage	10.2	1.3	8.4	2.4
Business Services	5411 Legal Services; 5412 Accounting, Tax Preparation, Bookkeeping, and Payroll; 5413 Architectural, Engineering, and Related Services; 5416 Management, Scientific, and Technical Consulting Services; 5417 Scientific Research and Development Services; 5511 Management of Companies and Enterprises; 5613 Employment Services; 5614 Business Support Services	12.9	2.9	6.1	0.9
Financial Services	5221 Depository Credit Intermediation; 5222 Non-depository Credit Intermediation; 5231 Securities and Commodity Contracts Intermediation and; 5239 Other Financial Investment Activities; 5241 Insurance Carriers; 5242 Agencies, Brokerages, and Other Insurance Related	5.4	0.3	2.0	0.1
Healthcare	3254 Pharmaceutical and Medicine Manufacturing; 3391 Medical Equipment and Supplies Manufacturing	1.7	1.1	1.4	0.6
Green Economy	3359 Other Electrical Equipment and Component Manufacturing	1.7	2.6	2.5	4.6
Energy	2111 Oil and Gas Extraction; 2211 Electric Power Generation, Transmission and Distribution; 3241 Petroleum and Coal Products Manufacturing	0.3	0.0	2.1	1.6
Food Security	1119 Other Crop Farming; 3116 Animal Slaughtering and Processing; 3118 Bakeries and Tortilla Manufacturing; 3119 Other Food Manufacturing	1.0	0.2	1.2	0.7
Education	6114 Business Schools and Computer and Management Training; 6117 Educational Support Services	0.0	0.0	0.4	11.3
Not promoted	Mainly retail trade (NAICS 44–45); also wholesale trade, construction and real estate	24.1	0.6	34.2	2.2

Notes: The JS-SEZ promotes eleven sectors. Each greenfield project is assigned to the first matching sector in the order listed, so that a specific promoted sector takes precedence over the generic manufacturing category: battery manufacturing is assigned to Green Economy, pharmaceutical and medical-device manufacturing to Healthcare, and refining to Energy. Shares are computed over the January 2022–June 2026 estimation sample (806 projects). The eleven sectors account for 69.6% of projects but 98.6% of FDI value; the non-promoted residual consists almost entirely of retail outlets.

3.3 Spatial Exposure

We compute *spatial exposure* as the inverse great-circle distance from each Malaysian state's centroid to the Johor Bahru district centroid, normalised so that Johor itself equals one:

$$\text{Exposure}_i = \frac{1/d_i}{\max_j(1/d_j)}, \tag{1}$$

where d_i is the great-circle distance in kilometres from state i's centroid to the centroid of Johor Bahru district, the administrative core of the JS-SEZ. The benefit of anchoring exposure on Johor Bahru rather than on the geometric centre of Johor state, which lies some 73km further north, is that we obtain a genuine positive distance for the sate of Johor. Centroids and boundaries are taken from the GADM 4.1 administrative shapefiles for Malaysia (level 1 for states, level 2 for the Johor Bahru district anchor). For distances, we use the WGS 84 spherical geometry implemented in the `sf` package (Pebesma, 2018). All sixteen states and federal territories are retained as separate spatial units. Table 3 reports exposure values and distance bins. Among the non-Johor states, Melaka, Negeri Sembilan, Pahang, and Putrajaya form the closest distance group (Q1), while Perlis, Sarawak, Labuan, and Sabah form the farthest group (Q4).

Table 3: Exposure and Distance of All States and Federal Territories

State	Distance (km)	Exposure	Distance Bin
Johor	73.2	1.0000	Q0 (Johor)
Melaka	186.3	0.3929	Q1 (Closest)
Negeri Sembilan	223.5	0.3274	Q1 (Closest)
Putrajaya	279.1	0.2622	Q1 (Closest)
Pahang	281.8	0.2597	Q1 (Closest)
Kuala Lumpur	293.7	0.2492	Q2
Selangor	319.4	0.2291	Q2
Terengganu	389.9	0.1877	Q2
Kelantan	461.0	0.1588	Q2
Perak	467.5	0.1565	Q3
Pulau Pinang	569.1	0.1286	Q3
Kedah	604.4	0.1211	Q3
Perlis	679.1	0.1078	Q4 (Farthest)
Sarawak	1065.9	0.0687	Q4 (Farthest)
Labuan	1337.7	0.0547	Q4 (Farthest)
Sabah	1541.8	0.0475	Q4 (Farthest)

Notes: Distance is the great-circle distance from each state's centroid to the centroid of Johor Bahru district, the administrative core of the JS-SEZ. Distance bins are quartiles of that distance among the fifteen non-Johor units (cut-offs 288, 461 and 642 km); Johor is assigned its own bin (Q0). Boundaries from GADM 4.1. Source: GADM 4.1 and authors' calculations.

3.4 Descriptive Statistics

Table 4 reports descriptive statistics for the quarterly estimation panel, which consists of 16 Malaysian states and federal territories observed over 18 quarters from 2022 Q1 to 2026 Q2. Greenfield FDI is highly uneven across state-quarter observations. Quarterly FDI value averages US$454.7 million, with a standard deviation of US$1.47 billion and a maximum of US$11.78 billion. Similarly, the average state-quarter records 2.65 projects, while the maximum reaches 59 projects. The substantial dispersion in both outcomes reflects the episodic nature of greenfield investment and motivates the use of log-transformed FDI value and project counts in the empirical analysis.

Tables 5 and 6 provide a more detailed breakdown of Johor's FDI composition by showing the leading NAICS-6 industries within each sector group across the pre-announcement, post-announcement, and post-implementation periods. Data Processing and Hosting is

Table 4: Descriptive Statistics

Variable	Mean	SD	Min	Max
FDI value (USD mn)	454.731	1473.364	0.000	11780.708
log(1 + FDI value)	2.740	2.910	0.000	9.374
FDI project count	2.649	5.222	0.000	59.000
log(1 + FDI count)	0.807	0.892	0.000	4.094
Exposure (inv. dist., norm.)	0.234	0.220	0.047	1.000
Distance to Johor Bahru (km)	548.341	408.536	73.185	1541.836
Post-announcement indicator	0.611	0.488	0.000	1.000

Note: Panel unit is state $\times$ quarter, 2022 Q1–2026 Q2 (16 states, 18 quarters, $N = 288$). Zeros entered for state-quarters with no recorded FDI projects. Source: Orbis Crossborder Investment database, GADM 4.1, and authors' calculations.

particularly prominent within high-tech services throughout all three periods. It accounted for 27.6% of Johor's FDI project count and 54.6% of FDI value before the announcement, with its share of FDI value rising to 67.1% during the post-announcement period before declining to 33.4% following implementation. By comparison, individual high-tech manufacturing industries accounted for considerably smaller shares of Johor's total FDI. The post-implementation period also saw a large concentration of investment in Professional and Management Development Training, which alone accounted for 50.1% of Johor's FDI value. This is consistent with the prominence of educational services in Johor's recent sectoral composition documented in Section 2.2 and Section 3.2.

Comparing the two tables also highlights an important distinction between the number and value of FDI projects. Several industries account for a substantially larger share of FDI value than of project counts, indicating that Johor's investment profile can be influenced by a relatively small number of large projects. Data Processing and Hosting provides a clear example: its share of FDI value substantially exceeded its share of project counts in each of the three periods. Similarly, Professional and Management Development Training accounted for half of Johor's FDI value in the post-implementation period despite not being among the leading industries by project count. These differences motivate the use of both FDI value and project count as outcome variables in the subsequent empirical analysis.

Table 5: Top NAICS-6 Industries in Johor by Sector Group and Period (% of total Johor FDI project count)

	2022Q1–2023Q3 (Pre-announcement)	**2023Q4–2024Q4** (Post-announcement)	**2025Q1–2026Q2** (Post-implementation)
HT Manufacturing	Computer Terminal & Peripherals Mfg (3.4%) Other Electronic Component Mfg (3.4%)	Computer Terminal & Peripherals Mfg (3.6%) Printed Circuit Assembly Mfg (3.6%) Irradiation Apparatus Mfg (3.6%)	—
HT Services	Data Processing & Hosting (27.6%) Testing Laboratories (3.4%) R&D in Physical Sciences (3.4%)	Data Processing & Hosting (25.0%)	Data Processing & Hosting (15.4%) Engineering Services (4.4%) Software Publishers (2.2%)
Other Manufacturing	Commercial Bakeries (3.4%) Basic Organic Chemical Mfg (3.4%) Paint and Coating Manufacturing (3.4%)	Commercial & Service Machinery Mfg (7.1%) Misc. Electrical Equipment Mfg (7.1%) Misc. Chemical Products Mfg (3.6%)	Petroleum Refineries (4.4%) Misc. Chemical Products Mfg (3.3%) Meat Processed from Carcasses (2.2%)
Other Services	Freight Transport Arrangement (10.3%) Furniture Stores (3.4%) Supermarkets & Grocery Stores (3.4%)	General Warehousing & Storage (7.1%) Household Appliances & Electronics (3.6%) Other Gasoline Stations (3.6%)	Hotels (except Casino Hotels) and Motels (11.0%) New Car Dealers (4.4%) Other Gasoline Stations (4.4%)

Note: Top 3 industries by FDI project count within each sector group. Percentages are shares of total Johor FDI project count in each period. Source: Orbis Crossborder Investment database and authors' calculations.

Table 6: Top NAICS-6 Industries in Johor by Sector Group and Period (% of total Johor FDI value)

	2022Q1–2023Q3 (Pre-announcement)	**2023Q4–2024Q4** (Post-announcement)	**2025Q1–2026Q2** (Post-implementation)
HT Manufacturing	Computer Terminal & Peripherals Mfg (2.4%) Other Electronic Component Mfg (0.0%)	Printed Circuit Assembly Mfg (2.2%) Computer Terminal & Peripherals Mfg (2.0%) Irradiation Apparatus Mfg (2.0%)	—
HT Services	Data Processing & Hosting (54.6%) R&D in Physical Sciences (2.4%) Testing Laboratories (0.4%)	Data Processing & Hosting (67.1%)	Data Processing & Hosting (33.4%) R&D in Physical Sciences (0.1%) Engineering Services (0.1%)
Other Manufacturing	Plastics Packaging Film Mfg (9.9%) Basic Organic Chemical Mfg (8.1%) Surgical & Medical Instrument Mfg (7.4%)	Commercial & Service Machinery Mfg (7.6%) Misc. Electrical Equipment Mfg (3.9%) Misc. Chemical Products Mfg (2.6%)	Misc. Chemical Products Mfg (1.9%) Paper Bag and Coated and Treated Paper Manufacturing (1.6%) Packaging Machinery Mfg (1.6%)
Other Services	Freight Transport Arrangement (1.9%) Telemarketing & Contact Centres (0.8%) Claims Adjusting (0.3%)	General Warehousing & Storage (4.5%) Freight Transport Arrangement (0.5%) Deep Sea Freight Transport (0.5%)	Professional and Management Development Training (50.1%) Hotels (except Casino Hotels) and Motels (0.6%) General Warehousing & Storage (0.3%)

Note: Top 3 industries by FDI value within each sector group. Percentages are shares of total Johor FDI value in each period.
Source: Orbis Crossborder Investment database and authors' calculations.

4 Empirical Strategy

4.1 Spatial Spillovers and Sectoral Heterogeneity

The objective of our empirical strategy is to assess whether the JS-SEZ announcement effectively directed investments to the intended "priority" sectors, and to understand whether there is any spatial spillover effects. For this purpose, we adopt a difference-in-differences specification with continuous exposure based on geographic proximity to the JS-SEZ for policy impact evaluation.

We use a continuous difference-in-differences set-up instead of the conventional difference-in-differences because a binary difference-in-differences design that treats Johor as treated and all other states as controls faces two difficulties in this setting. First, identification would rest on a single treated unit, which makes conventional cluster-robust inference unreliable (Conley and Taber, 2011). Second, and more fundamentally, it assumes that the remaining states are unaffected by the zone. However, in this paper, we wish to test whether there are any spillover effects on the remaining states of Malaysia, since a place-based policy of this kind is expected to generate spatial spillovers (Butts, 2021). For both reasons, we resort to measuring exposure continuously, similar to Acemoglu and Finkelstein (2008). However, we are aware that such a method is subject to the critique of Callaway et al. (2024): the estimated coefficient should not be interpreted as representing the differences across states *caused* by their different levels of exposure, which are measured by geographic proximity to Johor Bahru.

4.1.1 Difference-in-Differences with Continuous Exposure

Our baseline specification is a continuous-exposure difference-in-differences design, where exposure is modelled based on geographic proximity to Johor Bahru, which we use as the anchor location of the JS-SEZ. The modelling approach here, using a continuous exposure measure, closely follows Acemoglu and Finkelstein (2008), while later we further group Malaysian states into bins according to their distance from Johor Bahru, motivated by Butts (2021).

$$Y_{it} \;=\; \beta\,(\text{Exposure}_i \times \text{Post}_t) \;+\; \alpha_i \;+\; \gamma_t \;+\; \varepsilon_{it}, \tag{2}$$

where Y_{it} is the log-transformed FDI outcome for state i in period t; Exposure_i is the normalised inverse-distance exposure defined in equation (1); $\text{Post}_t = \mathbf{1}[t \geq \text{Oct}\,2023]$ is an indicator for the post-announcement period; α_i are state fixed effects; and γ_t are time (month or quarter) fixed effects. Standard errors are clustered at the state level.

The coefficient β then captures the differential change in FDI associated with a one-unit increase in exposure following the announcement. Under the parallel trends assumption, changes in FDI would not have systematically varied with states' exposure to the JS-SEZ in the absence of the announcement.

We also estimate a version where we construct a state-sector-time balanced panel. In this version, β therefore measures the average impact on log FDI at the state–sector level, rather than on state totals. We include state×sector fixed effects to absorb time-invariant state–sector composition differences:

$$Y_{ist} \;=\; \beta\,(\text{Exposure}_i \times \text{Post}_t) \;+\; \alpha_{is} \;+\; \gamma_t \;+\; \varepsilon_{ist}. \tag{3}$$

4.1.2 Binned Distance Difference-in-Differences

To non-parametrically characterise how spillovers vary with proximity, we separate Johor itself and partition the remaining states into four distance quartiles relative to Johor, and interact each bin indicator with the post dummy:

$$Y_{it} \;=\; \sum_{k\in\{Q_0,Q_1,Q_2,Q_3\}} \beta_k \Big(\mathbf{1}[\text{bin}_i = k] \times \text{Post}_t\Big) \;+\; \alpha_i \;+\; \gamma_t \;+\; \varepsilon_{it}, \tag{4}$$

where the assignment of states to each distance bin is reported in Table 3, with Q4, the farthest distance quartile, serving as the reference category. A declining pattern in $\hat{\beta}_k$ as k increases provides evidence of spatial decay.

4.1.3 Sectoral Heterogeneity: Triple Difference (DDD)

To examine whether spillovers differ across industries, we extend equation (3) with an interaction between exposure, post, and a sector characteristic Z_s:

$$Y_{ist} \;=\; \beta_0\,(\text{Exposure}_i \times \text{Post}_t) + \gamma\,(\text{Exposure}_i \times \text{Post}_t \times Z_s) + \alpha_{is} + \delta_{st} + \varepsilon_{ist}, \tag{5}$$

where δ_{st} are sector×time fixed effects that absorb differential aggregate trends across sectors, such as common push to high-tech sectors. The coefficient β_0 captures the average spillover for the reference sector group, and $\beta_0+\gamma$ is the total spillover for sector type $Z_s = 1$. In our baseline DDD, $Z_s = \mathbf{1}[\text{high-tech}]$, equalling one for both high-tech manufacturing (HT-Mfg_s) and high-tech services (HT-Svc_s).

Decomposing high-tech: manufacturing vs services. To distinguish between high-tech manufacturing and high-tech services, we replace the single indicator with two:

$$\begin{aligned} Y_{ist} \;=\; &\beta_0\,(\text{Exposure}_i \times \text{Post}_t) + \beta_1\,(\text{Exposure}_i \times \text{Post}_t \times \text{HT-Mfg}_s \\ &+ \beta_2\,(\text{Exposure}_i \times \text{Post}_t \times \text{HT-Svc}_s) + \alpha_{is} + \delta_{st} + \varepsilon_{ist}. \end{aligned} \tag{6}$$

Here β_0 captures the post-announcement gradient with respect to exposure for the non-HT baseline, β_1 is the additional exposure gradient for high-tech manufacturing, and β_2 is the additional exposure gradient for high-tech services.

4.1.4 Dynamic Effects: Event Study

To assess the parallel trends assumption, we estimate an event-study version of equation (2):

$$Y_{it} \;=\; \sum_{\tau \neq -1} \beta_\tau \left(\mathbf{1}[t - t^* = \tau] \times \text{Exposure}_i\right) \;+\; \alpha_i \;+\; \gamma_t \;+\; \varepsilon_{it}, \tag{7}$$

where τ indexes event time (months or quarters) relative to the announcement ($t^* =$ Oct 2023), and $\tau = -1$ is omitted as the reference period. Under parallel trends assumption, we expect $\hat{\beta}_\tau \approx 0$ for all $\tau < 0$. For the sector heterogeneity dimension, we estimate separate event studies for each sector group (HT manufacturing, HT services, and non-HT), running equation (7) on the relevant panel subsample.

Additionally, we examine whether the eleven sectors promoted by the JS-SEZ responded differently from the rest of the economy. We aggregate project counts to the state $\times$ group $\times$ quarter level, where $g \in \{\text{promoted}, \text{non-promoted}\}$ indexes the respective group, and estimate equation (7) separately on each group subsample:

$$Y_{it}^g \;=\; \sum_{\tau \neq -1} \beta_\tau^g \Big(\text{Exposure}_i \times \mathbf{1}[t - t^* = \tau]\Big) \;+\; \alpha_i^g \;+\; \gamma_t^g \;+\; \varepsilon_{it}^g, \tag{8}$$

where $Y_{it}^g = \log(1 + \text{count of group-}g \text{ projects in state } i, \text{ quarter } t)$. The event-study coefficients are conventionally normalised on the single quarter $\tau = -1$. Here that quarter is an outlier within an otherwise trendless pre-announcement window. It lies 0.46 above the pre-announcement mean for promoted sectors and 0.91 below it for the rest, even though a linear pre-trend fitted through the pre-announcement coefficients is statistically indistinguishable from zero in both groups. Normalising on it would therefore shift every post-announcement coefficient, in opposite directions across the two panels. According to Schmidheiny and Siegloch (2023), other normalisations are possible. For this exercise, we thus instead re-centre on the average estimated coefficient of the $T = 7$ pre-announcement quarters, $\tilde{\beta}_\tau^g = \beta_\tau^g - T^{-1}\sum_{s<0}\beta_s^g$, with standard errors obtained by the delta method. Under this normalisation, the average post-announcement coefficient equals the corresponding static difference-in-differences estimate, so the dynamic path and the static estimate are directly comparable. The two paths for the promoted sectors, $\tilde{\beta}_\tau^P$, and non-promoted sectors, $\tilde{\beta}_\tau^N$, are plotted on a common vertical scale, so their magnitudes can be read against each other directly.

Finally, we estimate dynamic treatment effects for Malaysian states of difference distance bins from Johor:

$$Y_{it} = \sum_{k \in \{Q0,Q1,Q2,Q3\}} \sum_{\tau \neq -1} \delta_{k\tau} \Big(\mathbf{1}[\text{Bin}_i = k] \times \mathbf{1}[t - t^* = \tau] \Big) + \alpha_i + \lambda_t + \varepsilon_{it} \tag{9}$$

where again $\mathbf{1}[\text{Bin}_i = k]$ is an indicator equal to one if state i belongs to bin k. $\mathbf{1}[t-t^* = \tau]$ is an event-time dummy with $\tau = -1$ omitted as the reference period. α_i are state fixed effects and λ_t are time fixed effects. Standard errors are clustered at the state level.

The coefficients $\delta_{k\tau}$ capture the dynamic treatment effect for bin k at event time τ, measured relative to both the farthest bin ($Q4$, reference group) and the pre-treatment period $\tau = -1$. Pre-treatment flatness of $\delta_{k\tau}$ for $\tau < 0$ supports the parallel trends assumption across distance bins.

5 Results

5.1 Aggregate Spillover Effects

Table 7 reports estimates of equation (2) for log FDI value. All four specifications — monthly and quarterly frequency, with and without sector fixed effects — yield a positive and statistically significant coefficient on $\text{Exposure}_i \times \text{Post}_t$ at the 1% level. In the aggregate state-level specifications, the estimated coefficients are 1.404 at the monthly frequency and 2.879 at the quarterly frequency, indicating that states with greater exposure to Johor experienced larger increases in FDI value following the JS-SEZ announcement. The corresponding state–sector estimates are 0.3748 and 0.6753 and remain significant at the 1% level. These magnitudes are not directly comparable to the aggregate ones: because $\log(1 + \cdot)$ is nonlinear, and disaggregating the same flows across five sector cells changes the scale of the outcome. Taken together, the state–sector decomposition changes both the scale and interpretation of the dependent variable. What these estimates establish is that the positive gradient survives the inclusion of state×sector fixed effects and hence is not an artefact of time-invariant differences in sectoral composition across states.

Table 8 shows analogous results for log FDI count. The coefficient on $\text{Exposure}_i \times \text{Post}_t$ is again positive and statistically significant at the 1% level across all four specifications. The estimated coefficients are 0.2746 and 0.4727 in the monthly and quarterly aggregate specifications, and 0.0692 and 0.1226 in the corresponding state–sector fixed effects specifications. Taken together, Tables 7 and 8 show that states with greater exposure to Johor experienced larger post-announcement increases in both the value and number of recorded greenfield FDI projects.

Table 7: Continuous DiD: $\log(1 + \text{FDI Value})$

Dependent Variable:	$\log(1+FDI_{val})$			
			Monthly	Quarterly
			State-sector level	State-sector level
	Monthly	Quarterly	State-sector FE	State-sector FE
Model:	(1)	(2)	(3)	(4)
Variables				
exposure × post	1.404***	2.879***	0.3748***	0.6753***
	(0.1303)	(0.4803)	(0.0462)	(0.0952)
Fixed-effects				
state FE	Yes	Yes		
year-month FE	Yes		Yes	
yeare-quarter FE		Yes		Yes
state-sector FE			Yes	Yes
Fit statistics				
Observations	864	288	4,320	1,440
R^2	0.41263	0.55861	0.22932	0.41080
Within R^2	0.00727	0.02484	0.00135	0.00246

Notes: Estimates of $\hat{\beta}$ from equations (2) and (3). The outcome is $\log(1 + \text{FDI value})$. Columns (1)–(2) are estimated at the state level with state and time fixed effects; columns (3)–(4) are estimated at the state-sector level with state×sector and time fixed effects. Columns (1) and (3) use monthly data, while columns (2) and (4) use quarterly data. The sample covers Jan 2022–Jun 2026, including 21 pre-announcement months. Standard errors are clustered at the state level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 8: Continuous DiD: log(1 + FDI Count)

Dependent Variable:	$\log(1 + FDI_{cnt})$			
	Monthly	Quarterly	Monthly State-sector level State-sector FE	Quarterly State-sector level State-sector FE
Model:	(1)	(2)	(3)	(4)
Variables				
exposure × post	0.2746***	0.4727***	0.0692***	0.1226***
	(0.0557)	(0.1006)	(0.0181)	(0.0276)
Fixed-effects				
state FE	Yes	Yes		
year-month FE	Yes		Yes	
year-quarter FE		Yes		Yes
state-sector FE			Yes	Yes
Fit statistics				
Observations	864	288	4,320	1,440
R^2	0.62132	0.78876	0.45675	0.64172
Within R^2	0.00621	0.01503	0.00112	0.00197

Notes: Same specifications as Table 7. The outcome is log(1 + FDI count). Columns (1)–(2) are estimated at the state level with state and time fixed effects; columns (3)–(4) are estimated at the state-sector level with state×sector and time fixed effects. Columns (1) and (3) use monthly data, while columns (2) and (4) use quarterly data. The sample covers Jan 2022–Jun 2026, including 21 pre-announcement months. Standard errors are clustered at the state level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 9 reports the binned distance DiD estimates from equation (4). The post-announcement FDI increase is sharply concentrated in Johor (Q0), with large and statistically significant coefficients across all specifications. Beyond the host state, the closest non-Johor quartile (Q1: Melaka, Negeri Sembilan, Pahang, and Putrajaya) also records positive increases in FDI value, with coefficients of 0.4321 and 1.151 at the monthly and quarterly frequency respectively, with both statistically significant. The corresponding project-count estimates are smaller, with no statistically significant effect at the monthly frequency and a positive, marginally significant effect at the quarterly frequency. The Q2 and Q3 coefficients are individually indistinguishable from zero, but they are imprecisely estimated rather than small: at the quarterly frequency the FDI-value point estimates are 0.606 and 0.419, with standard errors of roughly 0.50. Indeed the value estimates decline monotonically across bins — 2.595, 1.151, 0.606 and 0.419 for Q0 through Q3 at the quarterly frequency — an ordering consistent with distance decay even though the individual coefficients beyond Q1 cannot be separated from zero. Overall, the results suggest that the post-announcement investment response is concentrated in Johor, with limited evidence of positive effects in the neighbouring states.

Table 9: DiD with Binned Distance

Dependent Variables:	$\log(1+FDI_{val})$		$\log(1+FDI_{cnt})$	
	Val (M)	Val (Q)	Cnt (M)	Cnt (Q)
Model:	(1)	(2)	(3)	(4)
Variables				
post × dist_bin = Q0_johor	1.215***	2.595***	0.2655***	0.4273***
	(0.1077)	(0.3935)	(0.0529)	(0.0964)
post × dist_bin = Q1_closest	0.4321***	1.151**	0.0606	0.1864*
	(0.1444)	(0.4325)	(0.0571)	(0.1057)
post × dist_bin = Q2	0.0620	0.6056	-0.0226	0.0291
	(0.3090)	(0.5224)	(0.0857)	(0.1395)
post × dist_bin = Q3	0.0075	0.4185	0.0362	0.0587
	(0.1509)	(0.4993)	(0.0570)	(0.1049)
Fixed-effects				
state FE	Yes	Yes	Yes	Yes
year-month FE	Yes		Yes	
year-quarter FE		Yes		Yes
Fit statistics				
Observations	864	288	864	288
R^2	0.41284	0.55904	0.62196	0.78930
Within R^2	0.00762	0.02580	0.00790	0.01756

Notes: Estimates of $\hat{\beta}_k$ from equation (4). Distance bins: Q0 = Johor; Q1 = closest quartile of remaining states; Q4 = farthest quartile (reference). Columns (1)–(2): log FDI value; (3)–(4): log FDI count. Panel restricted to Jan 2022–Jun 2026. Standard errors clustered at state level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

In the Appendix, we show the estimates of each distance bins on a map. Each Malaysian state is shaded according to the estimated post-announcement FDI change from the binned distance DiD (Table 9), estimated on the January 2022–June 2026 panel. Blue shades indicate states where FDI increased relative to the farthest-distance reference group (Q4: Perlis, Sabah, Sarawak, Labuan) following the October 2023 JS-SEZ announcement, while red/orange shades indicate underperformance. Johor (Q0, darkest blue) registers the largest and most precisely estimated positive effect, consistent with it being the JS-

SEZ host state, while the closest non-Johor states show more limited positive responses particularly for FDI value. The estimated effects become economically smaller and statistically insignifant for the more distant Q2 and Q3 groups, consistent with a spatial response that dissipates with distance from Johor.

5.2 Sectoral Heterogeneity

Pooled high-tech. Table 10 reports DDD estimates from equation (5), pooling high-tech manufacturing and services into a single high-tech indicator ($Z_s = \mathbf{1}[\text{high-tech}]$). The baseline coefficient on *exposure* × *post*, which captures the estimated exposure gradient for non-high-tech sectors, is positive and statistically significant across all four specifications. By contrast, the triple interaction *exposure* × *post* × Z_s is negative in all four specifications and significant in three of them (it is imprecise in the quarterly value column). Its magnitude shows that $\hat{\gamma}$ very nearly offsets $\hat{\beta}_0$, so the implied total high-tech response, $\hat{\beta}_0 + \hat{\gamma}$, is close to nil, especially in the monthly panel, equivalent to -0.004 and -0.009 in the monthly value and count columns, with standard errors of 0.14 and 0.03. The point is not merely that high-tech sectors exhibit a weaker exposure gradient than non-high-tech sectors, but that their estimated total exposure gradient is close to zero. In the count specification, the estimate is sufficiently precise to rule out a gradient of the magnitude observed for non-high-tech sectors. One interpretation is that high-tech FDI location decisions are driven by factors beyond geographic proximity, such as existing industrial clusters and skilled labour supply, whereas non-high-tech investment responds more directly to the announcement signal. Table 11 further decomposes this high-tech differential into manufacturing and services.

Table 10: DDD: High-Tech vs Non-High-Tech Sectors

Dependent Variables:	$\log(1+FDI_{val})$		$\log(1+FDI_{cnt})$	
	Val (M)	Val (Q)	Cnt (M)	Cnt (Q)
Model:	(1)	(2)	(3)	(4)
Variables				
exposure × post	0.6270***	1.002***	0.1213***	0.2227***
	(0.1011)	(0.2296)	(0.0262)	(0.0482)
exposure × post × Z_s	-0.6305**	-0.8177	-0.1303***	-0.2502**
	(0.2225)	(0.5310)	(0.0402)	(0.0988)
Fixed-effects				
state-sector FE	Yes	Yes	Yes	Yes
sector × year-month FE	Yes		Yes	
sector × year-quarter FE		Yes		Yes
Fit statistics				
Observations	4,320	1,440	4,320	1,440
R^2	0.28046	0.44325	0.49893	0.67593
Within R^2	0.00243	0.00351	0.00225	0.00433

Notes: Estimates of $(\hat{\beta}_0, \hat{\gamma})$ from equation (5). Panel restricted to Jan 2022–Jun 2026. State-specific linear trends omitted. Standard errors clustered at state level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Manufacturing vs services decomposition. Table 11 separates the high-tech differential into high-tech manufacturing ($\hat{\beta}_1$) and high-tech services ($\hat{\beta}_2$) following equation (6). The two components behave differently. For FDI value, $\hat{\beta}_2$ is large, negative and significant at the 1% level at both frequencies (-0.877 and -1.475), whereas $\hat{\beta}_1$ is negative but statistically indistinguishable from zero (-0.384 and -0.160). High-tech manufacturing, in other words, is not measurably different from non-high-tech sectors in its response to proximity. The pooled high-tech differential for FDI value in Table 10 is thus driven by services. The negative services estimate should be interpreted with caution though: exposed states were already gaining high-tech service investment relative to distant states before the announcement (Figure 16), and this elevated pre-period baseline mechanically depresses the difference-in-differences estimate. The lower panel of Table 11 reports the implied total effects. High-tech manufacturing retains a positive point estimate in value terms (0.243 monthly, 0.842 quarterly, the latter significant at the 10% level), while high-tech services is negative (-0.250 and -0.473), so the near-zero pooled high-tech effect reflects offsetting responses rather than a uniform absence of one. For project counts neither component is individually distinguishable from zero once we compute the total effect.

Table 11: DDD: HT Manufacturing vs HT Services (Decomposed)

Dependent Variables:	$\log(1 + FDI_{val})$		$\log(1 + FDI_{cnt})$	
	Val (M)	Val (Q)	Cnt (M)	Cnt (Q)
Model:	(1)	(2)	(3)	(4)
Variables				
exposure × post	0.6270***	1.002***	0.1213***	0.2227***
	(0.1011)	(0.2297)	(0.0262)	(0.0483)
exposure × post × HT-Mfg$_s$	-0.3837	-0.1599	-0.1329***	-0.2404**
	(0.2494)	(0.6443)	(0.0387)	(0.0943)
exposure × post × HT-Svc$_s$	-0.8773***	-1.475***	-0.1276**	-0.2599**
	(0.2162)	(0.4771)	(0.0485)	(0.1133)
Total effects (linear combinations)				
$\beta_0 + \beta_1$: HT manufacturing	0.2433	0.8424*	-0.0116	-0.0178
	(0.1842)	(0.4491)	(0.0239)	(0.0668)
$\beta_0 + \beta_2$: HT services	-0.2502*	-0.4731	-0.0064	-0.0372
	(0.1264)	(0.3237)	(0.0407)	(0.0806)
Fixed-effects				
state-sector FE	Yes	Yes	Yes	Yes
sector × year-month FE	Yes		Yes	
sector × year-quarter FE		Yes		Yes
Fit statistics				
Observations	4,320	1,440	4,320	1,440
R^2	0.28064	0.44380	0.49893	0.67593
Within R^2	0.00269	0.00450	0.00225	0.00434

Notes: Estimates of $(\hat{\beta}_0, \hat{\beta}_1, \hat{\beta}_2)$ from equation (6). $\hat{\beta}_1$ = additional differential for HT manufacturing (vs. non-HT); $\hat{\beta}_2$ = additional differential for HT services (vs. non-HT). The lower panel reports the implied total effects, $\hat{\beta}_0 + \hat{\beta}_1$ and $\hat{\beta}_0 + \hat{\beta}_2$, with standard errors obtained from the clustered variance–covariance matrix. Fixed effects: state×sector and sector×time. No state-specific linear trends. Panel: Jan 2022–Jun 2026. Standard errors clustered at the state level (16 clusters) in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

5.3 Event Study: Dynamic Effects

Figures 6 and 7 plot the event-study coefficients $\hat{\beta}_\tau$ from equation (7) at quarterly frequency, for FDI value and count respectively. Each figure has four panels: panel (a) pools all sectors, while panels (b)–(d) re-estimate the same specification separately on high-tech manufacturing, high-tech services and non-high-tech units. All four panels share a common vertical scale, so magnitudes are directly comparable across sector groups. The vertical dashed red line marks the quarter when JS-SEZ was announced (October 2023, $\tau = 0$). The vertical dotted blue line marks the formal establishment of JS-SEZ (January 2025, $\tau = +5$ quarters).

We begin by examining the aggregate responses. For FDI count (Figure 7, panel (a)), pre-period coefficients are scattered around zero with no systematic drift: a linear pre-trend fitted through the pre-announcement coefficients has a slope of -0.001 ($t = -0.03$, see Figure 16 in Appendix A), consistent with parallel trends. Post-announcement coefficients turn positive, peak around 2025Q1 and remain positive but volatile thereafter. FDI value (Figure 6, panel (a)) shows the same broad pattern. However, we show in Appendix A Figure 16 that the fitted pre-trend slope is 0.44 but imprecisely estimated ($t = 1.42$), so a pre-existing differential trend in value cannot be ruled out as sharply as for counts.

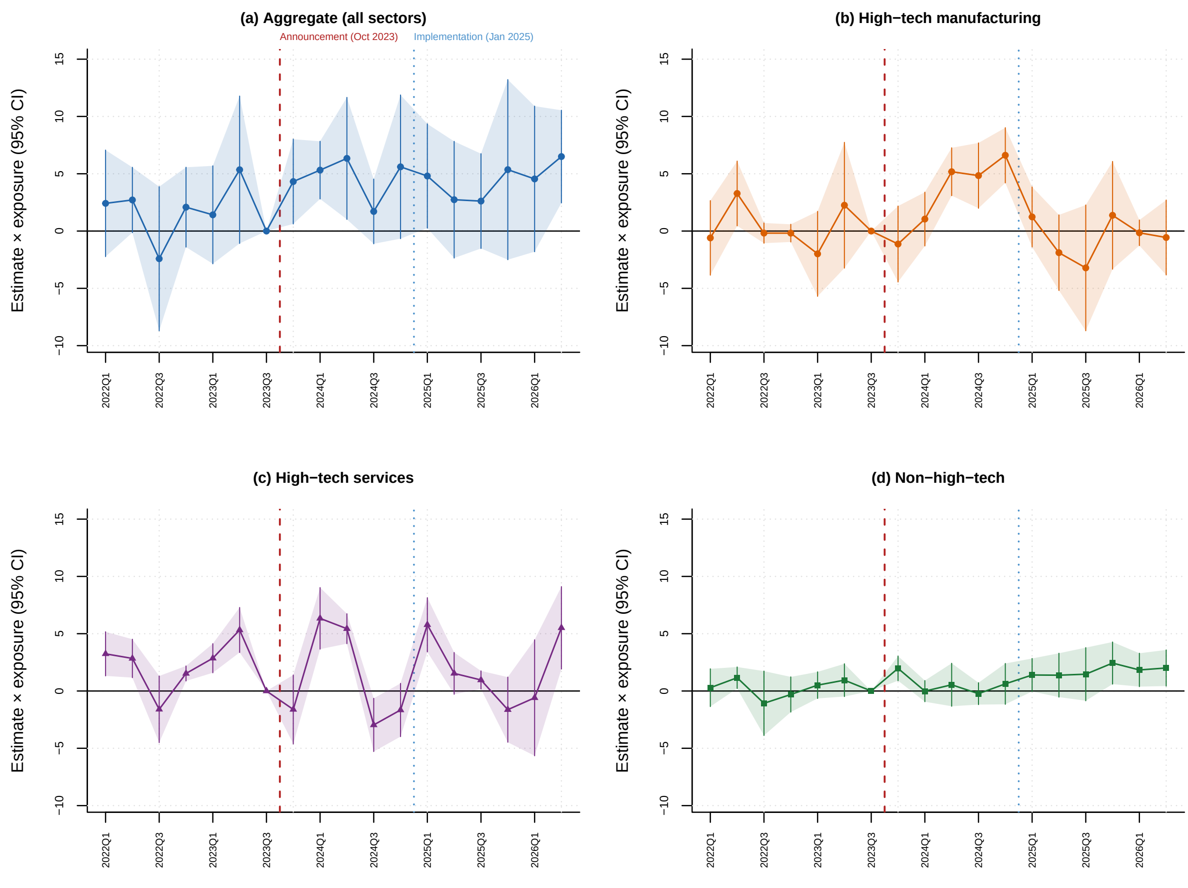


Figure 6: Event study: log(1+FDI value), quarterly frequency. Panel (a) pools all sectors; panels (b)–(d) estimate equation (7) separately on each sector-group subsample. State and time fixed effects are included. All panels share a common vertical scale. Red dashed: announcement (Oct 2023); blue dotted: implementation (Jan 2025), labelled in panel (a). Shaded bands: 95% CIs, clustered by state.

Panels (b)–(d) of Figure 6 present the sector-disaggregated event studies: high-tech manufacturing (orange circles), high-tech services (purple triangles) and non-high-tech (green squares), each estimated on its own subsample and plotted on a common vertical scale. HT manufacturing shows a positive post-announcement trend that peaks around 2024Q3–2025Q1 before declining in the post-implementation period. In contrast, HT services, while more volatile, registers higher point estimates post-implementation (2025Q1), though the wide confidence intervals preclude strong inference on the difference between the two groups. Non-HT remains close to zero throughout with slight increases post-announcement and post-implementation.

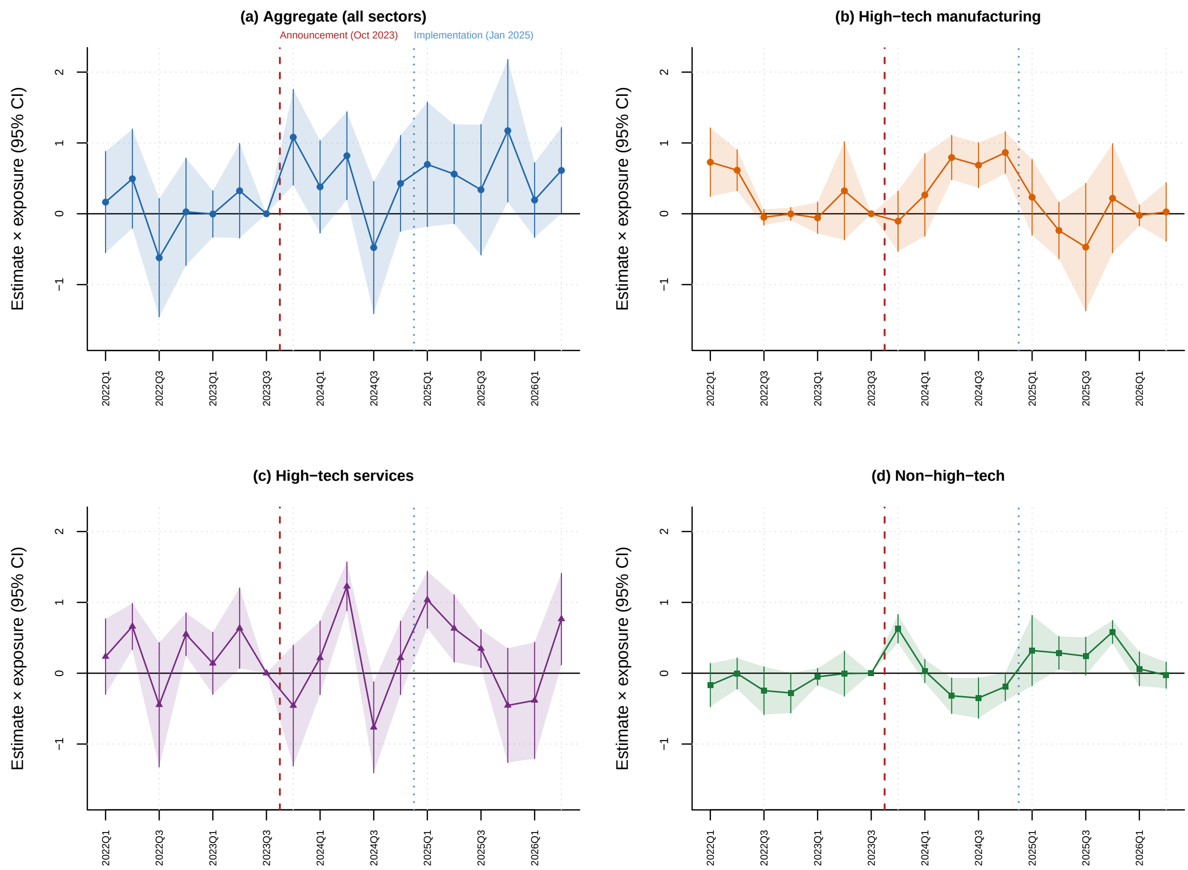


Figure 7: Event study: $\log(1 + \text{FDI count})$, quarterly frequency. Specification identical to Figure 6.

The pre-announcement windows of these panels differ in an important respect. We show fitted linear trends in Appendix A. Fitting a linear trend through the pre-announcement coefficients of each subsample, high-tech manufacturing and non-high-tech show no systematic drift (slopes of -0.04, $t = -0.10$, and 0.06, $t = 0.64$, for FDI value). High-tech services, by contrast, exhibits a pronounced and precisely estimated upward pre-trend (slope 0.39, $t = 6.45$ for value; 0.04, $t = 2.83$ for counts). Exposed states were therefore already gaining high-tech service investment relative to distant states before the announcement, and the negative $\hat{\beta}_2$ in Table 11 partly reflects the subsequent reversion of that elevated pre-period baseline rather than a causal effect of the JS-SEZ. We therefore treat the high-tech services differential as descriptive.

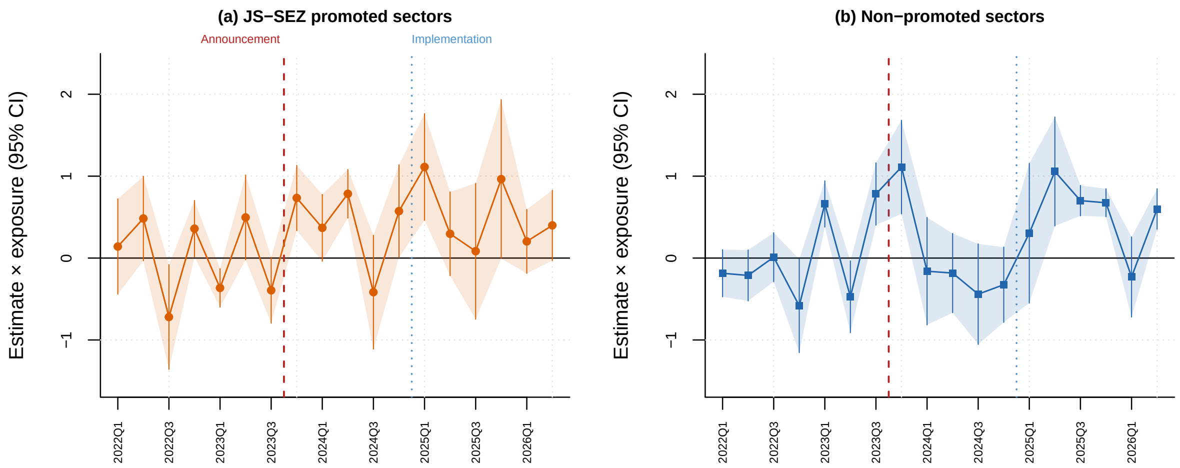


Figure 8: Event study by JS-SEZ promoted status: log(1 + FDI count), quarterly. Panel (a) covers the eleven promoted sectors, panel (b) all other activity. Coefficients are expressed relative to the average of the seven pre-announcement quarters rather than to a single reference quarter. Both panels share a common vertical scale. Red dashed: announcement (Oct 2023); blue dotted: implementation (Jan 2025). Shaded bands: 95% CIs, clustered by state.

We next show the dynamic responses of the estimated FDI–geographic proximity gradient for the 11 promoted sectors and the non-promoted sectors in Figure 8. Figure 8 suggests that both promoted and non-promoted activity recorded more projects in states closer to Johor Bahru after the announcement, but the response is larger for the promoted sectors. Averaging over the post-announcement quarters, the coefficient is 0.46 for promoted sectors against 0.28 for the rest. Here we focus on the responses of count of FDI projects, motivated by the fact that in terms of value, FDI flows are highly skewed and concentrated in the promoted sectors, with the non-promoted sectors accounting for less than 1% pre-JS-SEZ announcement and slightly over 2% post. Project counts, by contrast, split 70–30 between the two groups and are therefore informative (see Table 2). As mentioned previously, here we use the average of the pre-announcement coefficients as the reference instead of normalising on the single omitted quarter $\tau = -1$, although we do report the figure where $\tau = -1$ is used as the reference period in Figure 17 of Appendix A.

Finally, Figures 9 and 10 present dynamic treatment effects disaggregated by distance bin, using the 2022–2026 panel with Q4 (farthest states: Perlis, Sabah, Sarawak, Labuan) as the reference group. Pre-announcement coefficients are statistically indistinguishable from zero across all bins, consistent with parallel pre-trends. Following the JS-SEZ announcement in 2023 Q4, Johor (Q0) exhibits the largest and most persistent positive deviation from the reference group, while the response for Q1–Q3 is smaller and less precisely estimated, consistent with a treatment effect that decays sharply with distance from Johor.

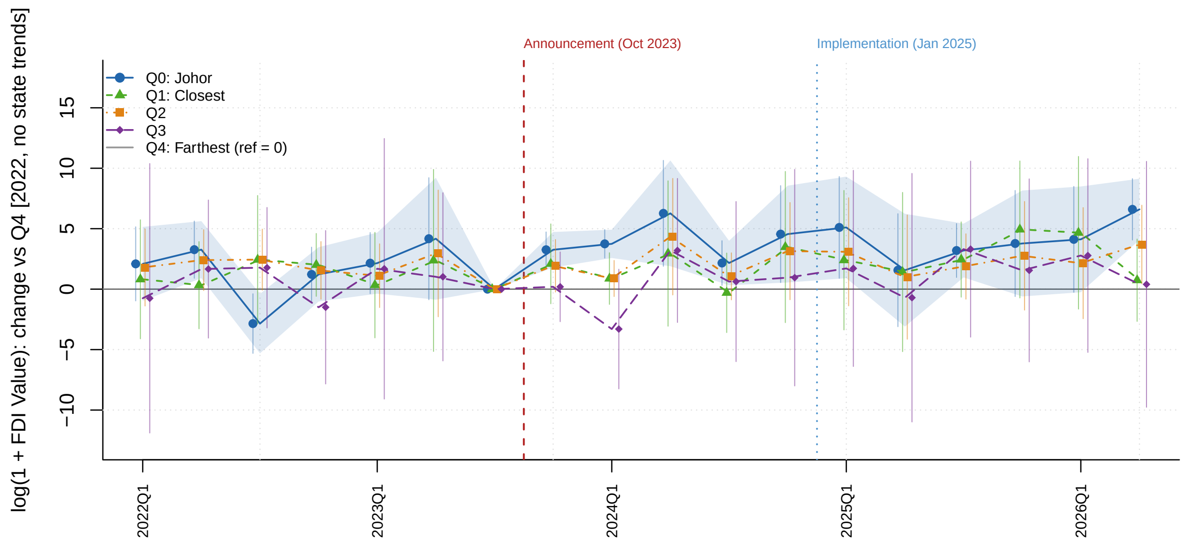


Figure 9: Event study by distance bin: log(1 + FDI value), quarterly, 2022–2026. Bins Q0–Q3 are overlaid; Q4 (farthest states) is the reference group, normalised to zero. Dashed vertical line marks the JS-SEZ announcement (2023 Q4). Shaded bands are 95% confidence intervals clustered at the state level.

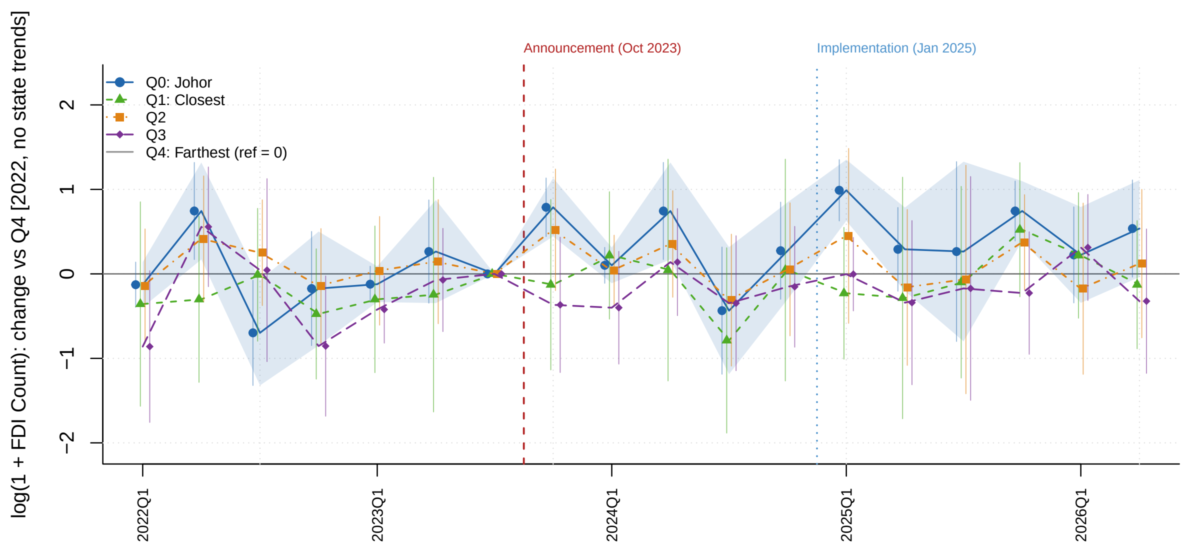


Figure 10: Event study by distance bin: log(1 + FDI count), quarterly, 2022–2026. Specification identical to Figure 9.

5.4 The Distribution of Inflows within the Zone

The JS-SEZ spans both Johor and Singapore, so a natural question is how the region's inflows have been divided between the two since the announcement. Figure 11 plots Johor's quarterly share of greenfield FDI within the region (Johor and Singapore). Measured by project counts, that share rose from 4.2 per cent before the announcement to 10.8 per cent post-announcement. Using FDI value, share accounted for by Johor rose from 5.5 to 21.4 per cent.

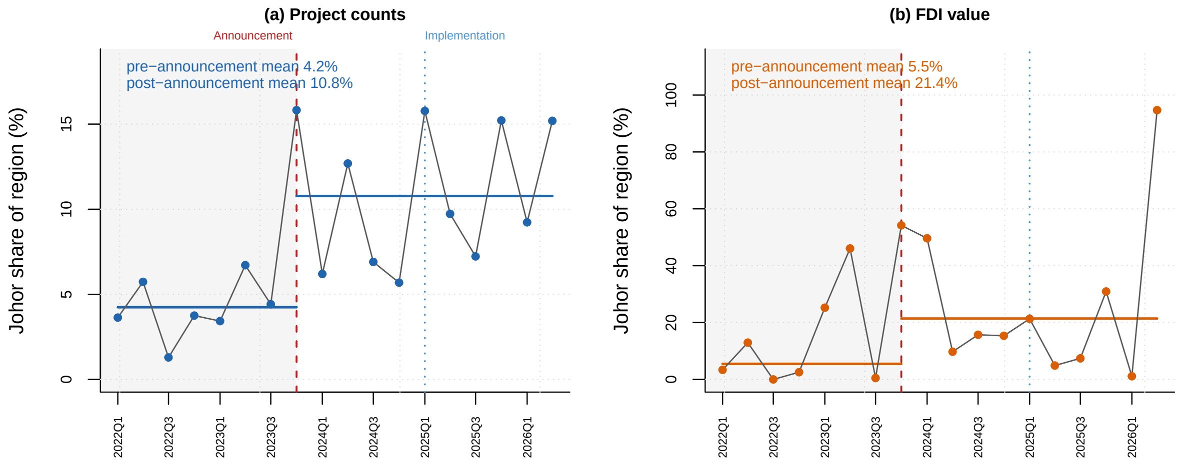


Figure 11: Johor's share of greenfield FDI within the JS-SEZ region (Johor and Singapore), by quarter. Panel (a) uses project counts and panel (b) FDI value. Horizontal lines are the pre- and post-announcement shares computed over period totals. The shaded region marks the pre-announcement window; red dashed: announcement (Oct 2023); blue dotted: implementation (Jan 2025). Singapore is part of the zone rather than a comparison group, so this figure decomposes how the region's inflows are split and is not a causal comparison.

The count share of Johor is flat at around four per cent throughout the pre-announcement window, with no visible drift, and shifts to a higher level from 2023Q4 onward. Two developments lie behind that shift, and they carry different weight. Johor's own project count rose from 4.1 to 6.7 per quarter, an increase of about sixty per cent. Over the same window, however, Singapore's fell from 93.5 to 55.3 per quarter. The denominator is therefore contracting at the same time as the numerator expands, and the decline in Singapore's project count is larger in absolute terms than the increase in Johor's. A rising share should not be read as investment moving from one side of the zone to the other.

In contrast, the value series is too volatile to interpret. Greenfield FDI value is dominated by a small number of very large commitments, and the quarterly share swings accordingly: it reaches 46 per cent in 2023Q2, before the announcement, falls to 0.5 per cent in 2023Q3 when a single large Singaporean project lands, and reaches 95 per cent in 2026Q2. The pattern is driven by which quarter a given mega-project happens to fall in rather than by any change in the underlying split. For instance, the five largest Johor projects announced after October 2023 account for 74 per cent of the state's post-announcement value, and all five are data centres. This is the same phenomenon documented in Table 2, where the digital economy's share of value rises from 4.7 to 36.5 per cent while its share of projects falls.

5.5 Pass-through Ownership and Inward FDI into Singapore

To more formally assess the JS-SEZ's impact on greenfield FDI activity into Singapore, we need to pin down which industries are expected to be more affected. To do so, we identify all investments in Johor that have "passed through" Singapore. In other words, we download from the Orbis global database subsidiary firms in Johor that have a foreign shareholder in Singapore but whose global ultimate owner is located outside Singapore. These are the subsidiaries of multinational enterprises that invested in Johor through Singapore-registered intermediate shareholder. Such corporate linkages will be especially important as Singapore and Johor seek to jointly elevate their value proposition in attracting global investors. This yields 285 such subsidiaries. Because the ultimate owner is foreign, establishing that Singapore intermediary is itself an inward investment into Singapore. To understand which industries in Singapore are expected to be more affected by the JS-SEZ policy, we examine the distribution of Singapore intermediate shareholders.

Table 12 reports the industry distribution of those Singapore shareholders. It is highly concentrated: manufacturing accounts for 26.7 per cent of matched linkages, management of companies (holding) for 23.5 per cent, wholesale trade for 21.1 per cent and professional and technical services for 11.9 per cent. These four industries together account for 83.2 per cent of all measured linkages, and for 95.4 per cent when the sample is restricted to Johor manufacturing subsidiaries. The remaining nine industries each account for under two per cent, and several rest on one or two firms. In the later set-up of estimating the impact of JS-SEZ on Singapore's inward greenfield FDI activity, we therefore group industries rather than treating the distribution as a continuous exposure measure. We consider two groups of treated industries: manufacturing (NAICS 31–33) on the one hand, and the three hub-service industries (NAICS 55, 42 and 54) on the other. The remaining industries will serve as the control group.

Table 12: Industry of the Singapore shareholder of matched Johor subsidiaries

Singapore shareholder's industry	NAICS	All Johor subsidiaries ($N = 285$)	Johor mfg. subsidiaries only ($N = 111$)
Treated: manufacturing			
Manufacturing	31–33	26.7	31.5
Treated: hub services			
Management of companies (holding)	55	23.5	32.4
Wholesale trade	42	21.1	26.1
Professional / technical services	54	11.9	5.4
Control			
Construction	23	5.6	2.7
Transport / warehousing	48–49	5.3	0.9
Administrative / support	56	1.8	0.0
Real estate	53	1.4	0.0
Accommodation / food services	72	1.1	0.0
Health care	62	0.7	0.0
Education	61	0.4	0.0
Information	51	0.4	0.0
Retail trade	44–45	0.4	0.9
Treated groups combined		**83.2**	**95.4**

Notes: Percentage of matched Johor subsidiaries whose Singapore shareholder operates in each industry. The sample comprises Johor subsidiaries whose global ultimate owner is located outside Singapore and which are held through a Singapore-registered intermediate shareholder. Column (1) uses all such subsidiaries; column (2) restricts to those whose own activity is in manufacturing. Columns sum to approximately 100 per cent. Source: Orbis, matched to the greenfield project data.

We test the impact of JS-SEZ on the two treated groups of industries on a balanced panel of the 23 NAICS two-digit sectors present in the Singapore data, by quarter, over 2022Q1–2026Q2 ($23 \times 18 = 414$ cells), estimating

$$Y_{gt} \;=\; \beta_M \, (D_g^M \times \text{Post}_t) \;+\; \beta_S \, (D_g^S \times \text{Post}_t) \;+\; \alpha_g \;+\; \delta_t \;+\; \varepsilon_{gt}, \tag{10}$$

where Y_{gt} is $\log(1+\cdot)$ of the value or number of inward greenfield projects into Singapore in sector g and quarter t; D_g^M and D_g^S mark the manufacturing and hub-service groups; Post_t again begins in 2023Q4; and α_g and δ_t are sector and quarter fixed effects. Projects whose source country is Singapore are excluded, so the outcome is cross-border inward investment throughout. The dynamic counterpart replaces the single Post_t interaction with a full set of event-time interactions, as in equation (7). Standard errors are clustered by sector. Because there are only two treated groups spanning six sectors, we report randomization inference alongside the asymptotic p-values. A three-sector treatment label requires $\binom{23}{3} = 1{,}771$ distinct assignments across the 23 sectors, so we enumerate all of them. The reported randomization p-values are therefore exact.

Table 13 reports the results and shows that none of the point estimates is positive and most are statistically insignificant. The manufacturing value estimate is negative and conventionally significant, but the pre-announcement coefficients in that specification are jointly non-zero ($p = 0.000$), so we do not interpret it as a treatment effect.

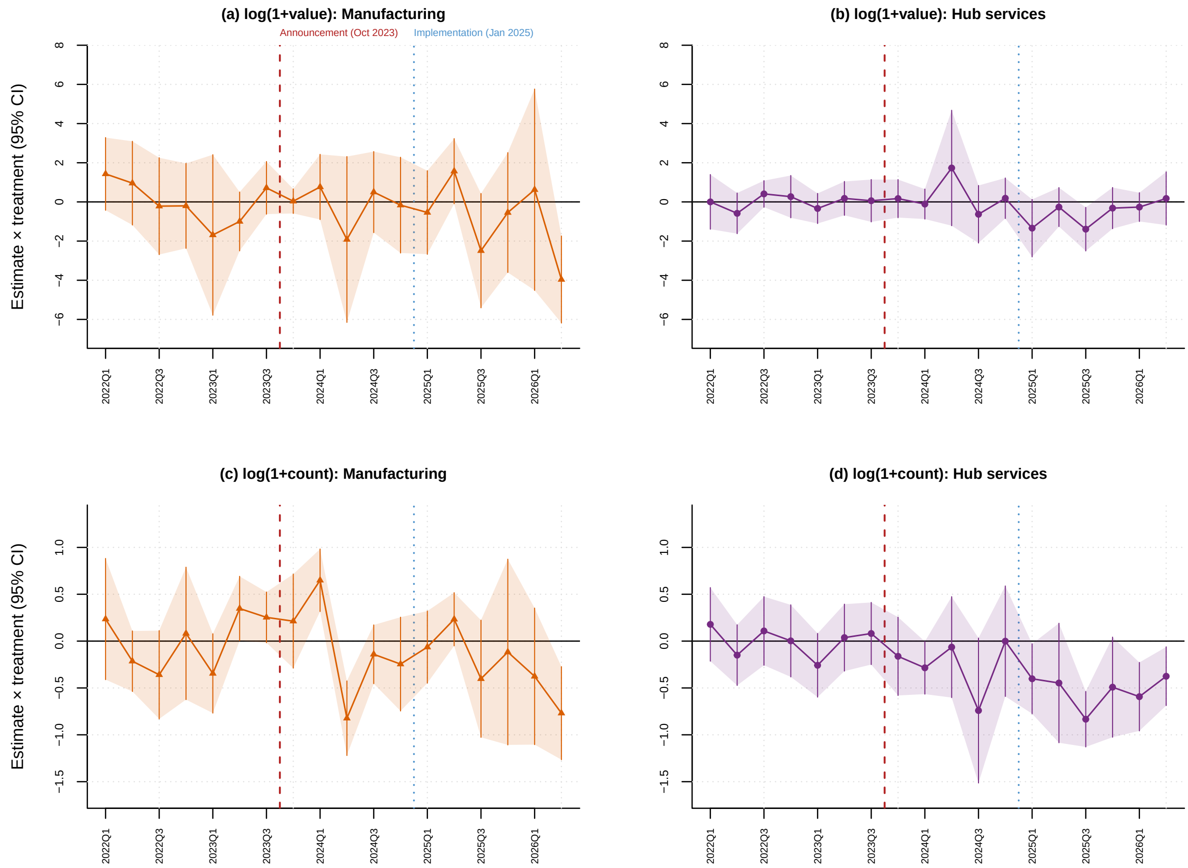


Figure 12: Inward greenfield FDI into Singapore: event-study estimates for manufacturing and hub-service industries. "Manufacturing" is NAICS 31–33; "hub services" comprises management of companies (55), wholesale trade (42) and professional and technical services (54). Both groups are estimated jointly against the remaining 17 NAICS two-digit sectors on a quarterly panel over 2022Q1–2026Q2. Coefficients are re-centred on the pre-announcement mean rather than on a single reference quarter, so every event-time point carries a confidence interval. Red dashed: announcement (Oct 2023); blue dotted: implementation (Jan 2025). Shaded areas are 95% confidence intervals from standard errors clustered by sector.

Table 13: Inward greenfield FDI into Singapore and the Johor ownership channel

		Estimate		p-value		Pre-trend p	
Group	Outcome	$\hat{\beta}$	s.e.	Asy.	RI	Joint	Slope
Panel A: All 23 sectors							
Manufacturing	$\log(1 + \text{value})$	−0.529	0.185	0.009	0.044	0.000	0.070
	$\log(1 + \text{count})$	−0.107	0.137	0.440	0.553	0.000	0.229
Hub services	$\log(1 + \text{value})$	−0.103	0.249	0.682	0.756	0.417	0.683
	$\log(1 + \text{count})$	−0.375	0.126	0.007	0.050	0.262	0.777
Panel B: Control group excludes accommodation and food services							
Manufacturing	$\log(1 + \text{value})$	−0.459	0.173	0.015	0.090	0.000	0.077
	$\log(1 + \text{count})$	−0.071	0.133	0.599	0.641	0.000	0.203
Hub services	$\log(1 + \text{value})$	−0.030	0.240	0.902	0.923	0.463	0.668
	$\log(1 + \text{count})$	−0.340	0.123	0.012	0.097	0.385	0.822

Notes: Estimates of β_M and β_S from equation (10) on a balanced panel of NAICS two-digit sectors by quarter, 2022Q1–2026Q2 (Panel A: $23 \times 18 = 414$ cells; Panel B: $22 \times 18 = 396$). Standard errors clustered by sector. "RI" reports exact randomization-inference p-values obtained by enumerating every possible assignment of the three-sector treatment label across sectors ($\binom{23}{3} = 1{,}771$ in Panel A, $\binom{22}{3} = 1{,}540$ in Panel B); no sampling is involved. "Joint" is a Wald test that the pre-announcement event-study coefficients are jointly zero; "Slope" tests a linear differential pre-trend.

The number of projects in the hub-services industries, however, is estimated to have declined relative to the remaining control industries post-JS-SEZ announcement. The estimate shows that $\log(1 + \mathit{count})$ of projects declined by 0.375 log points. Upon a closer examination of the control industries, we find that Accommodation and food services (NAICS 72) is the one control sector whose activity rose sharply over the sample: its project count roughly doubled, from 4.12 to 8.00 per quarter between the pre- and post-announcement windows, while the two largest control sectors moved the other way (information −40 per cent, finance −56 per cent). We therefore as a robustness check, removed the sector from the control group in Panel B of Table 13 and Figure 13. We find that the point estimate for the impact of number of projects in the hub-services industries in Singapore is barely affected for the point estimates (−0.375 to −0.340), and the effect remains marginally significant. The p-value rises to 0.097. Figure 13 remains largely similar to Figure 12. There is no significant difference in either value or count of services sector projects just after the JS-SEZ announcement relative to the control group, but there's a dip since 2025 Q1, especially in 2025 Q3.

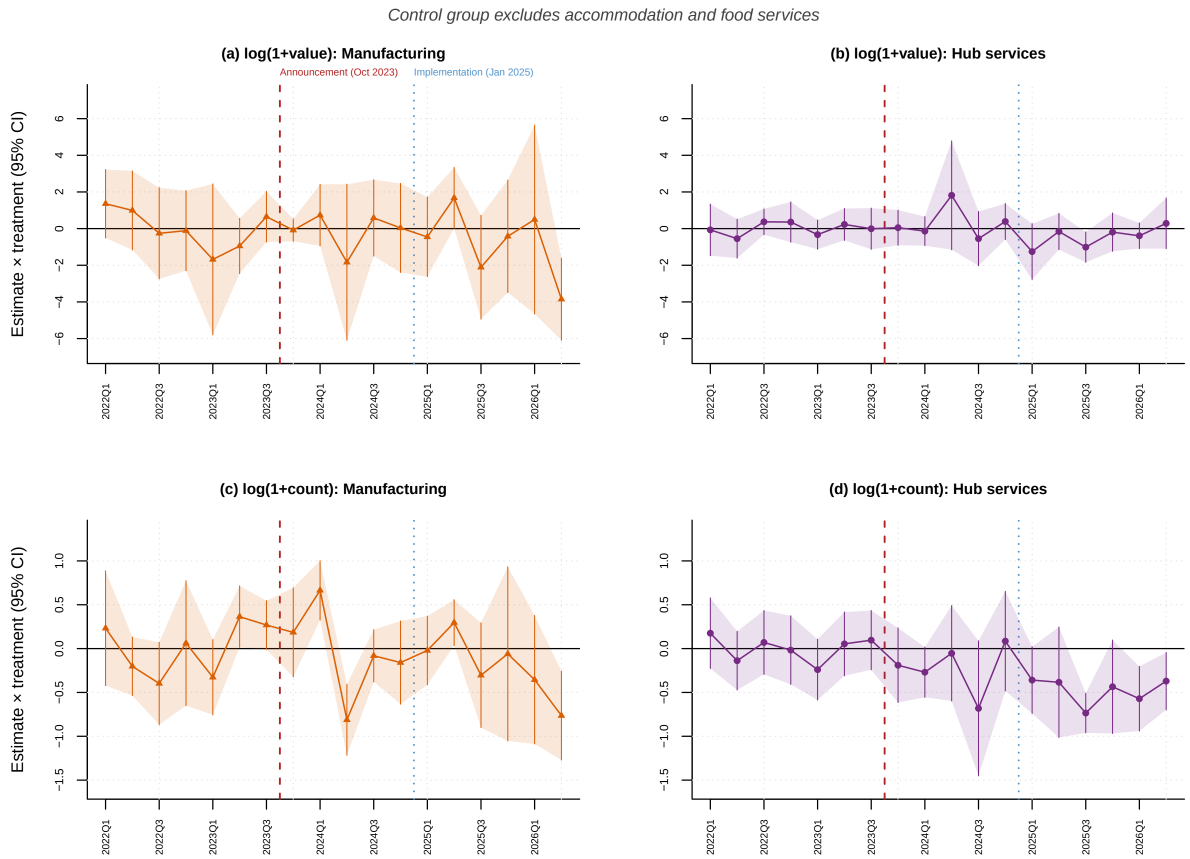


Figure 13: Robustness: inward greenfield FDI into Singapore with accommodation and food services (NAICS 72) removed from the control group. The specification, groups and sample period are otherwise identical to Figure 12. Red dashed: announcement (Oct 2023); blue dotted: implementation (Jan 2025). Shaded areas are 95% confidence intervals from standard errors clustered by sector.

However, given that the decline of services sector is concentrated after 2025Q2 rather than at the January 2025 implementation date, and coincides with the 2025 United States tariff measures, which may fall differentially on the trade-intermediation and regional-coordination activities that define the hub-service group, we therefore are cautious in interpreting the declining estimate, and are inclined to report the Singapore evidence as showing no detectable increase due to JS-SEZ in drawing greenfield investment activity to Singapore in either the manufacturing or services group. This is also consistent with the response of FDI in hub services industries post-JS-SEZ announcement up to 2025 Q1.

5.6 Greenfield FDI from Singapore to Johor

Another benefit of JS-SEZ to Singapore' enterprises is that it may enable easier access to land and labour at more affordable costs. If this holds true, we should expect an increase in Singapore's outward greenfield FDI investments into Johor relative to the other states.

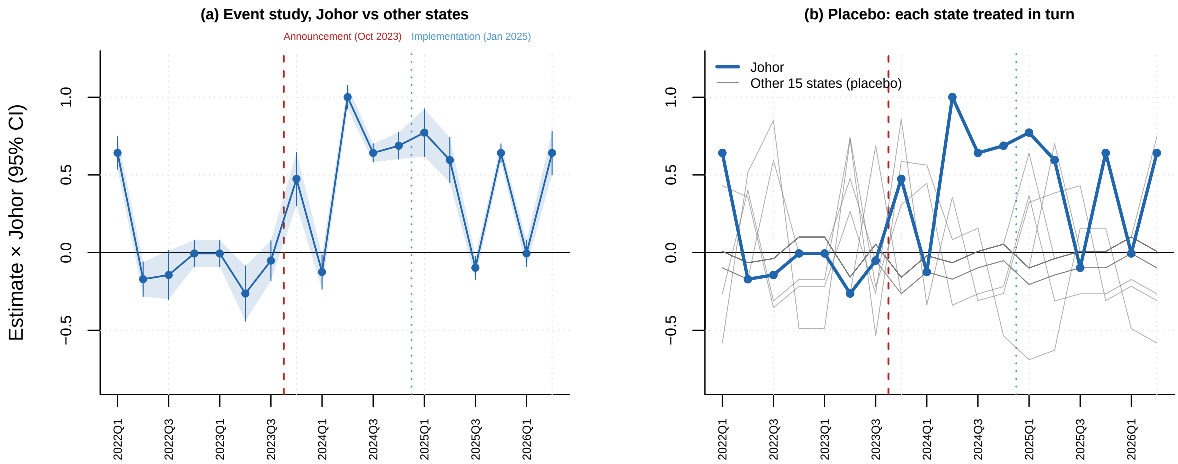


Figure 14: Singapore-sourced greenfield FDI into Johor, quarterly 2022Q1–2026Q2. The outcome is $\log(1+\text{count})$ of projects whose source country is Singapore. The panel covers all sixteen Malaysian states with empty cells set to zero. Coefficients are re-centred on the pre-announcement mean. Panel (a) reports the event study for Johor with 95% confidence intervals from standard errors clustered by state. Because only one state is treated, these intervals should be read as indicative. Panel (b) repeats the estimation with each state in turn designated as treated, and we plot the estimates for Johor in bold, the fifteen placebo states in grey. Red dashed: announcement (Oct 2023); blue dotted: implementation (Jan 2025).

We therefore estimate a difference-in-differences across the sixteen Malaysian states, comparing Johor with the rest, using only Singapore-sourced greenfield projects as the outcome, with state and quarter fixed effects and standard errors clustered by state. The shift is pronounced. Over the seven quarters before the announcement Johor recorded a single Singapore-sourced project; over the eleven quarters since it recorded 9.5, lifting Singapore's share of Johor's inward projects from 3.5 to 12.9 per cent. Singapore's investment into the rest of Malaysia moved the other way, falling 21 per cent. The difference-in-differences estimate on $\log(1 + \text{count})$ is 0.475. Panel (a) of Figure 14 plots the corresponding event study; Panel (b) re-runs it with each state in turn as the treated unit. Both panels show a distinct increase in investments in Johor from Singapore. Although we do want to mention two caveats. The counts are small in absolute terms, and Selangor also saw Singapore-sourced projects rise, from 3 to 6.5, over the same window. Nevertheless, taken together from the previous section, we read the evidence so far as indicating that Singapore's gains from the zone accrue through its firms' location decisions rather than through additional inward investment into Singapore itself, when judged just by the investment dimension alone.

6 Robustness Analysis

This section reports three checks on the main estimates: using Poisson pseudo-maximum likelihood instead of log-like transformation, a check on whether the estimated gradient is an artefact of the host state, and a check on the location of the spatial anchor.

Poisson pseudo-maximum likelihood. We note that roughly ninety per cent of state×sector×month cells contain no recorded project, so the $\log(1 + y)$ transformation used in the main tables is not innocuous. The additive constant is arbitrary and the implied elasticities are sensitive to it. Table 14 in Appendix B re-estimates the same conditional-mean specifications by Poisson pseudo-maximum likelihood, which is estimated on the level of FDI, accommodates zeros without transformation, and is consistent under heteroskedasticity (Santos Silva and Tenreyro, 2022). Coefficients are semi-elasticities and are therefore not comparable in magnitude to the OLS estimates.

The aggregate results are robust. In Panel A the proximity response remains positive and significant at the 1% level for both outcomes, whether the specification includes state or state×sector fixed effects. We do not separately report the monthly and quarterly estimates since they are numerically identical under the PPML specification.

The sector specifications in Panels B and C rest on a substantially reduced sample and we read them with more caution. PPML drops fixed-effect groups whose outcome is identically zero, which removes 32 of the 80 state×sector groups. This includes four of the five sectors in Kelantan, Perlis, Terengganu, Labuan and Putrajaya. This means that identification here rests on a smaller state-sector sample. On this restricted sample the negative high-tech services differential in FDI value survives, whereas the count-based sector differentials, which are significant under OLS in Tables 10 and 11, are not distinguishable from zero.

Is the gradient an artefact of the host state? Johor is by construction the most exposed unit, and its exposure of one exceeds the next-highest value of 0.39 by a wide margin. A natural concern is that the estimated gradient simply reflects Johor against everything else. We argue that the binned specification of Table 9 addresses this directly. There, we show the Q1 coefficient, which is identified entirely off non-Johor states (Melaka, Negeri Sembilan, Pahang and Putrajaya), remains positive and significant for FDI value at both frequencies. The response therefore extends beyond the host state (i.e., Johor) itself, even though it attenuates quickly. For instance, the Q2 and Q3 coefficients cannot be separated from zero.

Location of the spatial anchor. Exposure is measured to the centroid of Johor Bahru district. The results are insensitive to this choice. Replacing it with the Johor–Singapore

Causeway, the crossing that defines the zone's link to Singapore, shifts the anchor by roughly eight kilometres, changes no state's exposure by more than 0.024, leaves the two exposure measures correlated at 0.9996, and produces identical distance-bin assignments for all sixteen units.

7 Conclusion

This paper examines how effective the announcement of Johor-Singapore Special Economic Zone is in drawing investment activity to the targeted sectors. Using project-level data spanning 2022 Jan – 2026 June, we adopt a difference-in-differences research design in which treatment intensity varies with each state's geographic proximity to Johor Bahru, which we set as the location anchor of JS-SEZ. We then trace the investment response across the October 2023 announcement of JS-SEZ and the January 2025 formal launch.

Four findings emerge. First, states closer to the zone recorded larger increases in both the value and the number of greenfield projects. The estimates are significant at the 1% level and survive estimation by Poisson pseudo-maximum likelihood on the level of FDI. Second, the response is sharply concentrated in Johor and nearby states. At the quarterly frequency Johor's increase in FDI value exceeds that of the farthest states by 2.60 log points and the closest non-Johor quartile gains 1.15, but the two more distant quartiles cannot be separated from zero. The effect of the announcement of the zone thus remained in locations close to it. This provides also evidence for distance decay effect. Third, the composition of the response only partly matches the zone's stated priorities. The eleven promoted sectors and the remainder of the economy both gained, with a larger point estimate for the promoted sectors (0.46 against 0.28). Splitting by technology intensity, the estimated response is concentrated in non-high-tech activity. Although high-tech manufacturing does exhibit a modest increase in FDI value and a brief increase in project counts. For high-tech services, however, we do not estimate a positive effect. We caution against this as a reading of the causal effect for high-tech services. This is because investments in the high-tech services sector were already trending up before the policy announcement, violating parallel pre-trend assumption. Fourth, the two sides of the zone respond differently. Singapore's own inward greenfield investment shows no detectable increase, whether in manufacturing or in the hub-service industries most connected to Johor through ownership, while Singapore-sourced projects into Johor rose from one over the seven pre-announcement quarters to 9.5 over the eleven since.

We propose four policy implications. First, the response is visible from the announcement onward, well before the zone became operational, which suggests that investors price in the policy signal rather than the incentives themselves. Second, the binned specification shows that the gains of the JS-SEZ extend beyond the host state: the closest non-Johor states

(Melaka, Negeri Sembilan, Pahang and Putrajaya) record a significant increase in FDI value relative to the farthest states, so neighbouring states share in the response. Third, besides a positive impact on investment in the promoted sectors, we find that the response extends to the non-promoted sectors as well, with the difference between the two groups statistically indistinguishable from zero. The point estimate of the impact is larger for the promoted sectors than the nonpromoted sectors, however. Across specific industries, while high-tech manufacturing shows a modest increase in FDI value, we do not find a positive causal effect on high-tech services. In fact, in the high-tech services sector, more exposed states were already on a rising trend relative to more distant ones, depressing the difference-in-differences estimate. Fourth, the pull of investment is asymmetric across the two sides of the zone. The measurable increase in greenfield FDI is concentrated on the Malaysian side, while Singapore's own inward investment shows no detectable increase in either the manufacturing or the hub-service industries. What we do observe on the Singapore side is a marked rise in Singapore-sourced projects into Johor, which suggests that the zone's benefit to Singapore operates through the location decisions of Singapore-based firms, such as giving them access to land, labour and production inputs next door, rather than through additional investment drawn into Singapore itself. We stress that this reading rests on greenfield investment announcement data alone, and that gains accruing to Singapore through channels these data do not capture, such as the expanded regional operations of incumbent firms, would not appear in our estimates. We note the caveat that, with only eleven quarters after the announcement and six after the launch, the estimates should be interpreted as short-run effects.

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Appendices

A Additional Figures

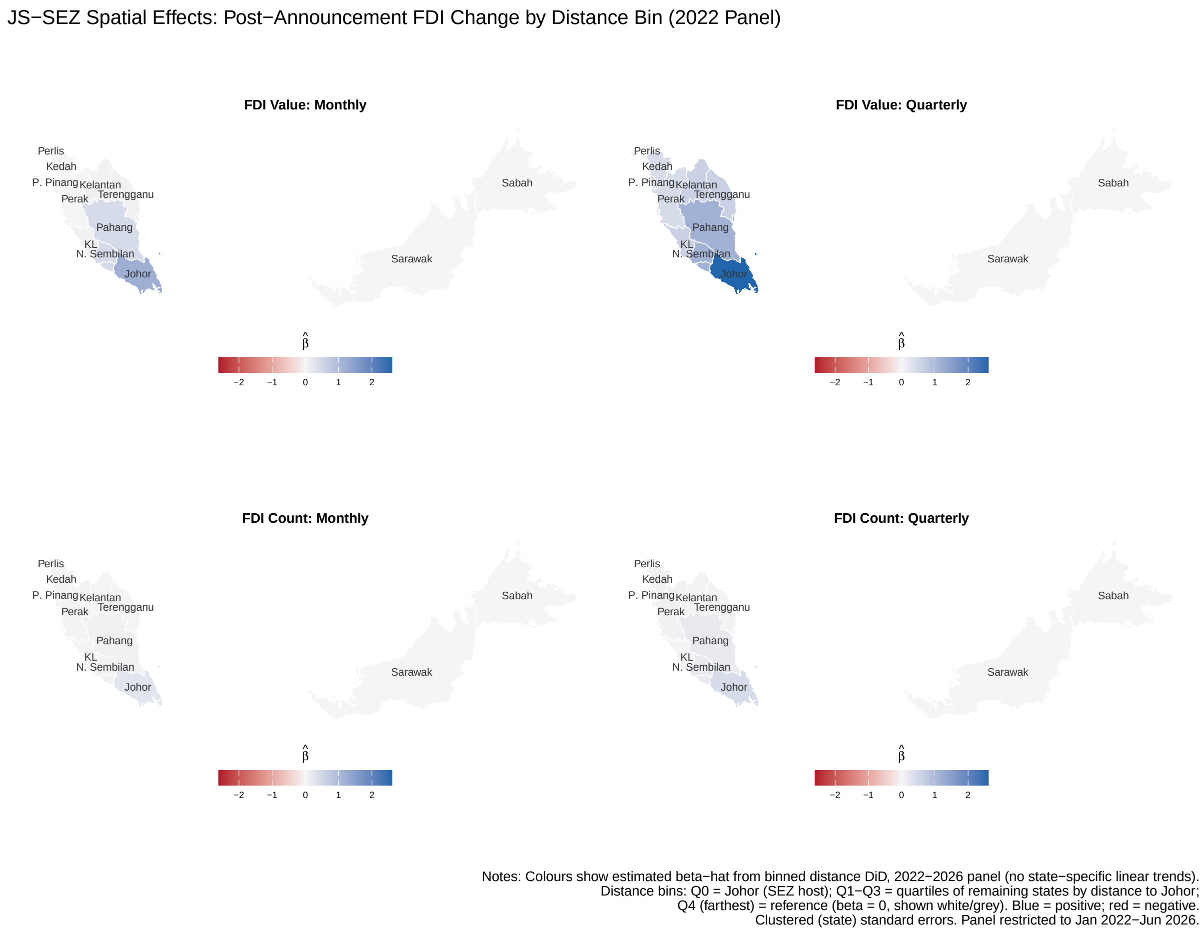

Figure 15: Post-Announcement FDI Change by Distance Bin (2022–2026 Panel)

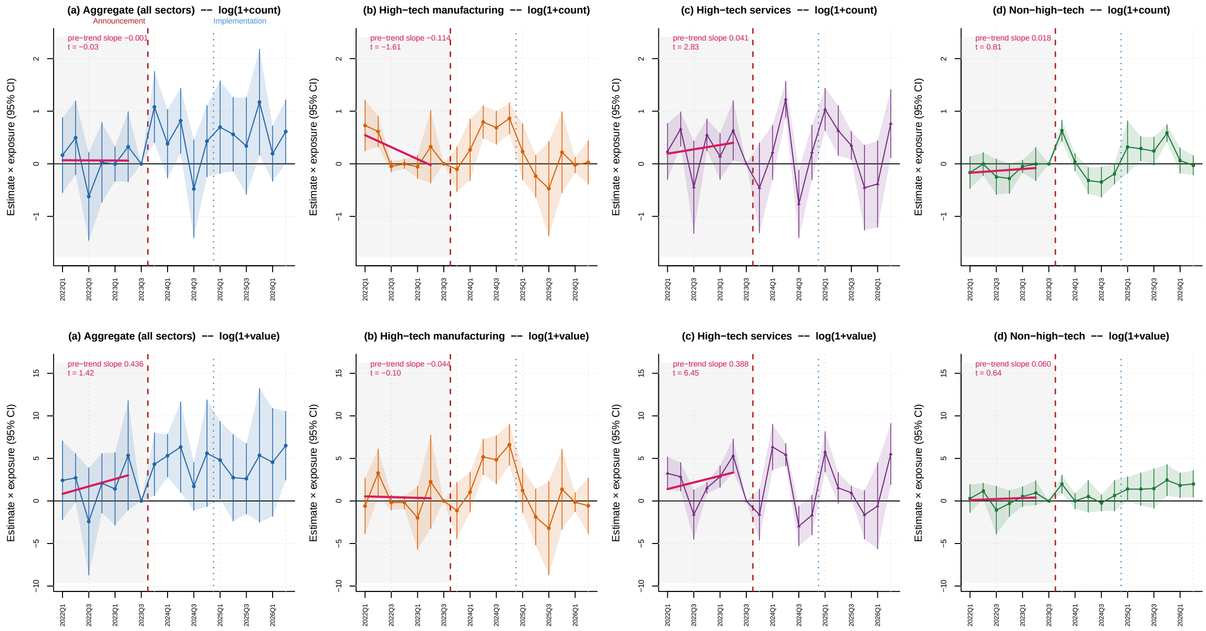

Figure 16: Pre-trend diagnostics. Event-study coefficients from equation (7), estimated on the aggregate panel and on each sector subsample; top row log(1 + FDI count), bottom row log(1 + FDI value). The shaded region marks the pre-announcement window and the red line is a linear trend fitted through the pre-announcement coefficients, with its slope and t-statistic annotated. Vertical scales are common within each row. Bars are 95% confidence intervals, clustered by state.

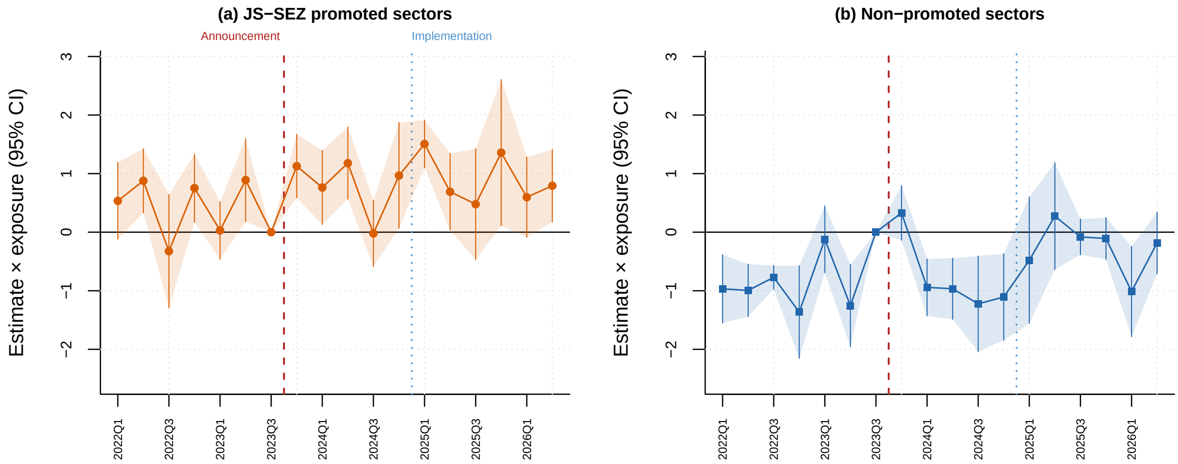

Figure 17: Event study by JS-SEZ promoted status, normalised on $\tau = -1$: $\log(1 + \text{FDI count})$, quarterly. Panel (a) covers the eleven promoted sectors, panel (b) all other activity. This figure reproduces Figure 8 using the conventional normalisation on the single omitted quarter rather than on the pre-announcement average. The quarter of 2023Q3 is an outlier in both groups. It lies 0.46 below the pre-announcement mean for promoted sectors and 0.91 above it for the non-promoted, so every post-announcement coefficient is shifted, in opposite directions across the two panels. Both panels share a common vertical scale. Red dashed: announcement (Oct 2023); blue dotted: implementation (Jan 2025). Shaded bands: 95% CIs, clustered by state.

B Poisson PML Robustness

Table 14: Poisson PML Estimates

Dependent Variable:	FDI value	FDI count
Model:	(1)	(2)
Panel A: Continuous DiD		
exposure × post [state, time FE]	3.1828***	0.5747***
	(0.5037)	(0.1201)
exposure × post [state×sector, time FE]	3.1828***	0.5747***
	(0.4928)	(0.1174)
Observations (state×sector spec)	2,592	2,646
dropped (all-zero FE groups)	1,728	1,674
Panel B: DDD, pooled high-tech		
exposure × post	3.0591***	0.7575***
	(0.7360)	(0.2070)
exposure × post × Z_s	-2.7252**	-0.0213
	(1.2839)	(0.4402)
Observations	2,007	2,035
dropped (all-zero FE groups)	2,313	2,285
Panel C: DDD, high-tech split		
exposure × post	3.0591***	0.7575***
	(0.7362)	(0.2070)
exposure × post × HT-Mfg$_s$	-1.9809	-0.9664
	(1.9978)	(0.6728)
exposure × post × HT-Svc$_s$	-3.0189**	0.2251
	(1.1948)	(0.3972)
Observations	2,007	2,035
dropped (all-zero FE groups)	2,313	2,285

Notes: Poisson pseudo-maximum-likelihood estimates of the specifications in Tables 7–11, with FDI value (USD mn) and project counts entering in levels rather than as $\log(1 + y)$. Exposure is the inverse-distance measure of equation (1). Panel A corresponds to equations (2) and (3), Panel B to equation (5) and Panel C to equation (6). Monthly and quarterly specifications are numerically identical under PPML and are not reported separately. Observations dropped are those belonging to fixed-effect groups with an identically zero outcome. Standard errors clustered at the state level (16 clusters) in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

C Randomization Inference

The main estimates cluster standard errors at the state level, and the Malaysian panel contains only 16 states. Conventional cluster-robust inference is asymptotically valid as the number of clusters grows, but with few clusters it can over-reject the null and produce confidence intervals that are too narrow (Cameron and Miller, 2015). We therefore re-assess significance using randomization inference, which provides an alternative to inference based on large-cluster asymptotic approximations (MacKinnon and Webb, 2020). The procedure holds the panel fixed and reassigns the treatment variable at random across states: for the continuous specifications we permute the exposure values across the 16 states, and for the binned specifications we permute the distance-bin labels and rebuild the bin indicators. Each draw re-estimates the specification and stores its cluster-robust t-statistic. Over 9,999 draws this traces out the distribution of the test statistic under the null that exposure is unrelated to the outcome, and the reported p-value is the share of draws whose $|t|$ is at least as large as the one actually observed. Table 15 reports these alongside the asymptotic p-values, in braces and square brackets respectively.

The aggregate results are unaffected. In Panels A, B, D and E the proximity coefficient remains significant under randomization inference in every column, for both value and counts and at both frequencies. The binned estimates in Panel C survive on FDI value—for Johor itself ($p = 0.033$ monthly, 0.073 quarterly) and for the nearest ring of states ($p = 0.016$ and 0.045), although not for project counts, where none of the bin coefficients is distinguishable from the permutation distribution. The sectoral differentials fare least well. Of the eight high-tech interactions in Panels D and E, only three remain significant at the ten per cent level, and the negative high-tech services differential in FDI value, which is significant at the one per cent level asymptotically, returns $p = 0.071$ monthly and $p = 0.122$ quarterly. We therefore treat the aggregate proximity gradient as robust, the value-based binned estimates as robust, and the sectoral composition results as suggestive rather than established.

Table 15: Randomization Inference p-values

Panel A: Continuous DiD, $\log(1 + \mathit{FDI\ value})$ *(Table 7)*				
	(1) M	(2) Q	(3) M secFE	(4) Q secFE
exposure × post	1.4041***	2.8794***	0.3748***	0.6753***
p: Asy. / RI	[0.000] {0.000}***	[0.000] {0.010}**	[0.000] {0.004}***	[0.000] {0.010}***
Panel B: Continuous DiD, $\log(1 + \mathit{FDI\ count})$ *(Table 8)*				
	(1) M	(2) Q	(3) M secFE	(4) Q secFE
exposure × post	0.2746***	0.4727***	0.0692***	0.1226***
p: Asy. / RI	[0.000] {0.043}**	[0.000] {0.045}**	[0.002] {0.062}*	[0.000] {0.048}**
Panel C: Binned distance DiD (Table 9)				
	Val M	Val Q	Cnt M	Cnt Q
post × Q0 (Johor)	1.2148***	2.5953***	0.2655***	0.4273***
p: Asy. / RI	[0.000] {0.033}**	[0.000] {0.073}*	[0.000] {0.170}	[0.000] {0.190}
post × Q1 (closest)	0.4321***	1.1513**	0.0606	0.1864*
p: Asy. / RI	[0.009] {0.016}**	[0.018] {0.045}**	[0.305] {0.418}	[0.098] {0.157}
post × Q2	0.0620	0.6056	-0.0226	0.0291
p: Asy. / RI	[0.844] {0.864}	[0.264] {0.333}	[0.796] {0.828}	[0.837] {0.859}
post × Q3	0.0075	0.4185	0.0362	0.0587
p: Asy. / RI	[0.961] {0.969}	[0.415] {0.489}	[0.535] {0.655}	[0.584] {0.647}
Panel D: DDD, pooled high-tech (Table 10)				
	Val M	Val Q	Cnt M	Cnt Q
exposure × post	0.6270***	1.0023***	0.1213***	0.2227***
p: Asy. / RI	[0.000] {0.010}**	[0.001] {0.030}**	[0.000] {0.048}**	[0.000] {0.051}*
× high-tech	-0.6305**	-0.8177	-0.1303***	-0.2502**
p: Asy. / RI	[0.013] {0.127}	[0.144] {0.337}	[0.005] {0.095}*	[0.023] {0.174}
Panel E: DDD, high-tech split (Table 11)				
	Val M	Val Q	Cnt M	Cnt Q
exposure × post	0.6270***	1.0023***	0.1213***	0.2227***
p: Asy. / RI	[0.000] {0.012}**	[0.001] {0.029}**	[0.000] {0.044}**	[0.000] {0.050}*
× HT manufacturing	-0.3837	-0.1599	-0.1329***	-0.2404**
p: Asy. / RI	[0.145] {0.367}	[0.807] {0.869}	[0.004] {0.084}*	[0.022] {0.173}
× HT services	-0.8773***	-1.4754***	-0.1276**	-0.2599**
p: Asy. / RI	[0.001] {0.071}*	[0.007] {0.122}	[0.019] {0.114}	[0.037] {0.176}

Notes: Each block reproduces the point estimate from the table indicated. Asymptotic p-values are reported in square brackets and randomization-inference p-values in braces. Randomization p-values are computed from 9,999 draws that permute the exposure measure (Panels A, B, D, E) or the distance-bin assignment (Panel C) across the 16 Malaysian states, holding the panel structure fixed. Stars attached to the randomization p-values use the same thresholds as elsewhere: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. M and Q denote monthly and quarterly panels; secFE denotes state×sector fixed effects.