

THE EFFECT OF SPECIAL ECONOMIC ZONES ON REGIONAL ECONOMIC GROWTH IN INDONESIA: A STAGGERED DIFFERENCE-IN-DIFFERENCES STUDY

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Special Economic Zones (SEZs) in Indonesia are designed to stimulate regional growth and industrial competitiveness through fiscal incentives and infrastructure development. This study evaluates the impact of SEZs establishment on regional economic performance using a Staggered Difference-in-Differences approach across 33 provinces from 2000 to 2023. The results reveal that the estimated effects of SEZs designation are limited in the early years of exposure and become impactful in long run. The analysis also shows heterogeneous treatment effects across cohorts, with some cohorts experiencing stronger and more sustained post-treatment growth, while others exhibit weaker or stagnant responses. These differences may reflect variations in industrial development, infrastructure readiness, and institutional capacity. Overall, the findings highlight the importance of sustained governance and local industrial integration in strengthening the long-term effectiveness of SEZs.

Keywords: Special Economic Zones (SEZs); Regional Economic Growth; Staggered Difference-in-Differences; Structural Transformation; Industrial Agglomeration; Institutional Governance

JEL Classification: R11; R12; O18; P25.

1. INTRODUCTION

Economic decentralization and regional autonomy in Indonesia were extensively implemented following the 1998 Economic Reform movement, aimed at enhancing equitable development and reducing regional dependence on the central government.

This policy was solidified through Law No. 22 of 1999 on Regional Governance and Law No. 25 of 1999 on Financial Balance between the Central Government and Regional Governments. The decentralization policy has fostered opportunities for regions to be more independent in harnessing their economic potential toward fiscal self-sufficiency. However, in practice, regional disparities persist due to differences in resource availability and management capacity.

To support regional economic potential development, the Indonesian government has devised various strategies to improve the investment climate in the regions, one of which is through the establishment of national strategic zones, with the current policy being Special Economic Zones. SEZs in Indonesia were first introduced as a strategic policy through Law No. 39 of 2009 on Special Economic Zones, with the goal of creating new economic growth centers and enhancing national industrial competitiveness. SEZs are designed to provide various comprehensive facilities and incentives to expand investment opportunities. These facilities include fiscal incentives such as tax exemptions and/or deferrals, import duty and excise facilities, and relief from other domestic levies. Additionally, non-fiscal incentives are also offered, including the easing of labor regulations, immigration facilitation, land ownership rights, and investment permits. Currently, there are 24 SEZs distributed across Indonesia, operating in various sectors including industry, tourism, digital technology, and other services (Aggarwal, 2022).

The positive impacts of SEZs are ambiguous regarding the creation of new economic value. This uncertainty arises because measures of success often rely on realized investment and regional output, even though these indicators do not automatically reflect additional net growth for the region. Furthermore, a policy orientation that overemphasizes physical investment risks creating an enclave development pattern, where the region grows but lacks linkages to the local economy. When strengthening the innovation ecosystem, inter-firm collaboration, and local supplier development are not at the core of interventions, technology transfer, productivity gains, and workforce development remain limited. As a result, spillovers from the zone are inconsistent, and benefits tend to accrue primarily to large companies (Aritenang and Chandramidi, 2020; ASFrick and Rodríguez-pose, 2023; Nuraini et al., 2025; Taufiqurrahman and Khoirunurrofik, 2023; Violita and Khoirunurrofik, 2025).

Based on these considerations, this paper aims to analyze the impact of SEZ establishment on regional economic growth in Indonesia. The study leverages variations in the timing of SEZ policy implementation across different provinces in Indonesia to estimate the policy's effects on regional economic growth. This research employs a quantitative approach using the Difference-in-Differences (DiD) method, comparing changes in total Gross Regional Domestic Product (GRDP) between regions that implemented SEZ policies and those that did not, both before and after the policies were enacted. The findings are expected to quantify the real impact of these policies. Additionally, the analysis controls for other socio-economic variables such as the Human Development Index, education levels, Gini ratio, and poverty indicators to

provide a more comprehensive understanding of the effectiveness of SEZ policies in driving regional economic growth.

The structure of this paper comprises several main sections. The second section outlines the theoretical context and reviews previous relevant studies on the topic. The third section details the research methodology and presents the analysis of the results. Finally, the fourth section concludes with the insights drawn from the findings and discussions.

2. LITERATURE REVIEW

Special Economic Zones (SEZs) are a region-based industrial policy aimed at creating new growth centers through the concentration of high value-added economic activities. From a theoretical perspective, the existence of SEZs is supported by Growth Pole Theory introduced by François Perroux in 1950. This theory argues that economic development does not occur simultaneously across all regions but instead emerges around specific growth poles. Rauhut and Humer (2020) further explain that these growth poles tend to develop in areas with strong linkages to supporting sectors, allowing economic growth to diffuse beyond the core area.

This perspective is reinforced by the framework of New Economic Geography (NEG). In his seminal work, Krugman (1991) emphasizes that agglomeration within a specific area generates efficiency gains through spatial concentration. In the context of SEZs, agglomeration creates three main advantages. First, the concentration of firms in one location provides a pooled labor market for workers with industry-specific skills, reducing both unemployment risk and labor shortages. Second, spatial proximity enables the development of localized, non-tradable specialized inputs that support production processes. Third, informational and knowledge spillovers arising from close interaction among firms enhance technological adoption and managerial innovation, giving clustered firms higher productivity than isolated producers.

Despite their theoretical potential as growth poles, the success of SEZs largely depends on institutional and bureaucratic capacity. Aggarwal (2019) argues that there are three key pillars crucial to SEZs' ability to drive economic transformation: bureaucratic strength in implementation, bureaucratic competence in determining strategic direction, and the bureaucracy's capacity to learn and change policies dynamically.

Based on these theoretical and institutional considerations, the Indonesian government formally institutionalized the SEZ policy through Law No. 39 of 2009 on Special Economic Zones, which stipulates that SEZ development is based on areas with geo-economic and geostrategic advantages. Geo-economic advantages refer to locations with strong access to global markets or proximity to natural resources, while

geostrategic advantages relate to areas that support regional security and stability. While Law No 39 of 2009 on Special Economic Zones provides the foundational framework for SEZ development, significant regulatory adjustments were introduced following the enactment of Law No 11 of 2020 on Job Creation, which was subsequently amended through Government Regulation in Lieu of Law No. 2 of 2022 and later enacted as Law No. 6 of 2023. This regulatory framework introduced the concept of "New SEZs" and established several key provisions, such as logistics, technology development, and tourism, the strengthening of administrators' roles through integrated one-stop business licensing and non-licensing services, the provision of fiscal incentives for investors, and the use of nationally integrated electronic systems to facilitate export-import activities.

Empirical studies indicate that the effectiveness of Special Economic Zones (SEZs) varies across countries and is highly dependent on policy design and local contexts. Evidence from China indicates that SEZs have positive effects on investment, employment, productivity, and firm entry, largely through export expansion and foreign direct investment, with broader economic liberalization playing a more important role than the number of zones (Leong, 2013; Lu et al., 2019). Studies from other countries show that the impact of SEZs is not uniform across different contexts. In South Korea, SEZs tend to improve firm performance and economic growth when they are supported not only by incentives, but also by adequate infrastructure and targeted government support (Kim and Lee, 2025), while evidence from India and Poland suggests that SEZ impacts differ across regions, with stronger benefits observed when zones are adapted to local institutional conditions or targeted toward less-developed areas (Ambroziak and Hartwell, 2018; Goodburn and Knoerich, 2022).

Studies show that Special Economic Zones (SEZs) in Indonesia impact regional economies differently depending on their sector and location. For instance, tourism-based SEZs generally drive faster short-term growth than manufacturing ones (Violita and Khoirunurrofik, 2025). While some areas like Sei Mangkei and Kendal have seen slight increases in regional income and household spending (Riesfandiari et al., 2023; Wardhana et al., 2025), other regions tell a different story. In Batam, the link between SEZ policy and actual firm productivity remains unclear (Aritenang and Chandramidi, 2020), and in Mandalika, massive infrastructure development has yet to successfully create enough jobs or reduce local poverty (Purwadinata et al., 2025).

Despite their potential, the implementation of Special Economic Zones (SEZs) in Indonesia faces critical structural challenges. A primary hurdle is the regulatory disharmony between central and local governments, which hampers investment efficiency. Furthermore, many SEZs function as "isolated units" with weak local industrial linkages, sourcing raw materials and labor from outside the region and preventing local wealth circulation (Nuraini et al., 2025). This disconnect is worsened by a significant skill mismatch; as highlighted by (Hamid et al., 2025), local communities are often restricted to low-value roles, while managerial positions are filled by outsiders, leaving locals with little bargaining power in the SEZ's value chain.

3. RESEARCH METHODS AND DATA

This study employs a quantitative approach aimed at examining the impact of Special Economic Zones (SEZs) on regional economic growth. To achieve this objective, the study utilizes data from 33 Indonesian provinces covering the period from 2000 to 2023, sourced from Statistics Indonesia, the Ministry of Finance, and the Coordinating Ministry for Economic Affairs. Summary statistics of the dataset used in this analysis are presented in Table 1.

Table 1. Summary Statistics

Variables	Observation	Mean	Standard Deviation
Gross Regional Domestic Product (IDR billion)	816	258,313.67	477,190.01
Special Economic Zone	816	0.14	0.35
Human Development Index	816	69.02	4.33
Population Density	816	688.35	2,457.66
Gini Ratio	816	0.38	0.06
Poverty Depth Index	816	2.58	2.10
Poverty Severity Index	816	0.74	0.81

The primary dependent variable used to evaluate the impact of SEZs is the Gross Regional Domestic Product (GRDP). GRDP serves as an appropriate metric for assessing whether SEZs implementation has succeeded in enhancing local economic performance. To capture the socio-economic context of each region, we also include the following explanatory variables: the Human Development Index (HDI), population density, poverty rate, and a measure of regional inequality.

The staggered Difference-in-Differences (DiD) method proposed by Callaway and Sant’Anna (2020) is particularly well-suited for evaluating the economic impacts of SEZs in Indonesia, given the policy’s phased implementation across different regions and time periods. Unlike traditional DiD frameworks, this approach accommodates scenarios where treatment—i.e., the establishment of an SEZ—is adopted at different times in different locations, as exemplified by the rollout of SEZs such as Batam and Mandalika. The core estimand in this methodology is the group-time average treatment effect, denoted as Equation 1.

$$ATT_{(g,t)} = E[Y_t(g) - Y_t(0)|G_g = 1] \quad (1)$$

where g is the period when a province first receives treatment, and t is the observation

period. This formulation allows for the estimation of treatment effects that are both group-specific and time-specific, enabling a nuanced analysis of SEZ outcomes without imposing homogeneity assumptions across space or time.

In *the* context of SEZs in Indonesia, where not all regions are designated for or granted authority to implement such zones, the appropriate $ATT_{(g,t)}$ estimation should employ the never-treated group assumption. According to Callaway and Sant'Anna (2020), when the never-treated group assumption is applied, the parallel trends assumption is as outlined in Equation 2.

$$E[Y_t(0) - Y_{t-1}(0)|X, G_g = 1] = E[Y_t(0) - Y_{t-1}(0)|X, C = 1] \quad (2)$$

These expressions for $ATT_{(g,t)}$ closely resemble the calculation of ATT in the traditional two-period, two-group setup. In this framework, the average treatment effect for units in group g is identified by comparing the actual change in outcomes between the most recent period before treatment and the current period with the expected change in outcomes for a comparison group. Under the parallel trends assumption, the latter represents the counterfactual path that group g would have followed if it had not received the treatment.

The $ATT_{(g,t)}$ framework makes no assumptions about the uniformity of treatment effects across groups or over time, enabling a consistent approach to analyzing variation in treatment impacts. By holding the group g constant and examining changes across time periods t , researchers can observe how treatment effects evolve within that group. Repeating this across different groups allows for a deeper understanding of how these effects differ across units. Additionally, $ATT_{(g,t)}$ provides a foundation for constructing aggregate causal parameters that address specific policy questions, such as average effects across all treated groups, differences across groups, effects by duration of exposure, and cumulative impacts over time.

Furthermore, the staggered DiD method addresses key limitations of the widely-used Two-Way Fixed Effects (TWFE) estimator, which is known to produce biased estimates in the presence of heterogeneous treatment effects and varying treatment timing (Borusyak and Jaravel, 2017; Goodman-Bacon, 2019; Sun and Abraham, 2020). By estimating $ATT_{(g,t)}$ across each treated group and each period, the approach offers a more granular view of policy impacts. This is particularly relevant in the Indonesian context, where the economic effects of SEZs may differ substantially between industrial regions like Batam and tourism-focused zones like Mandalika. The model's flexibility to capture such heterogeneity reinforces its relevance and effectiveness for the empirical assessment of staggered policy interventions like SEZs.

To capture the overall impact of a policy implemented at different times across units, this study employs the aggregated group-level treatment effect measure proposed by Callaway and Sant'Anna (2020). Specifically, the overall treatment effect is defined as Equation 3.

$$\theta_{sel}^o = \sum_{g \in G} \theta_{sel}(g) P(G = g | G \leq T) \quad (3)$$

where $\theta_{sel}(g)$ represents the average treatment effect for units first treated in period g , and the weights $P(G = g | G \leq T)$ reflect the relative size of each treatment group among all treated units. This aggregation strategy emphasizes the average causal effect experienced by each cohort across all post-treatment periods and offers an interpretable and policy-relevant summary of treatment impact while maintaining flexibility to account for heterogeneity across treatment timings.

4. RESULT AND DISCUSSION

As preliminary evidence regarding the effectiveness of the SEZ policy, Figure 1 illustrates the contrast in regional GDP growth before and after its implementation in 2012. Prior to the intervention, both groups of regions exhibited similar and relatively modest growth trends. In the post-2012 period, marked by a vertical yellow dashed line, regions designated as SEZs (blue line) demonstrated a marked acceleration in growth, exceeding their previous trend. In contrast, regions without SEZ status (red line) maintained a steady growth pattern with a considerably flatter slope. This pattern indicates that SEZ designation acted as a stimulus, contributing to a pronounced divergence in regional economic performance over the same period.

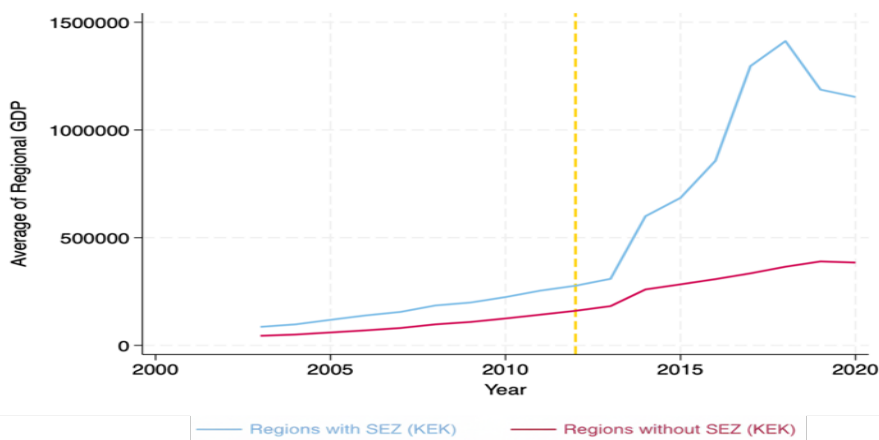


Figure 1. Comparison of Average Regional GDP between SEZ and Non-SEZ Regions

The increase in regional GDP aligns closely with the theory of agglomeration. Potter and Watts (2011) argues that the spatial concentration of labor in newly developed regions can generate an initial surge in productivity. This occurs because the accumulation of materials, suppliers, and supporting industries within a confined geographic area reduces transportation and production costs through enhanced logistical efficiency. Empirical evidence of this effectiveness is reflected in cumulative SEZ investment reaching IDR 294.4 trillion by the first semester of 2025, predominantly concentrated in manufacturing zones such as Gresik and Kendal SEZs, which has generated 187,376 jobs and export contributions of IDR 20.33 trillion.

When compared with SEZ implementation in other countries, both successful and unsuccessful experiences offer relevant benchmarks. Zeng (2010) notes that SEZs in China served as platforms for institutional experimentation later expanded nationwide, while Tafese et al. (2025) find that SEZ growth in Vietnam accelerated the shift of labor from agriculture to foreign-invested manufacturing. By contrast, the Pelabuhan Calabar in Nigeria faced operational constraints and low cargo volumes (Unor, 2025) and in India, rent-seeking practices weakened policy outcomes (Alkon, 2018). These cases show that beyond investment, consistent regulation and strong governance are essential for sustainable and inclusive SEZ performance.

Further analysis of Figure 2 and Table 2 reinforces the finding that the economic impact of SEZs in Indonesia is not immediate, as evidenced by the first nine years (Year 0 – 9) where ATET values remain statistically insignificant with z-scores below the required threshold. A significant increase only becomes evident in Year 10, with the ATET rising drastically to 381,672 and achieving high scientific validity ($z = 6.44$). This pattern suggests that the economic effects associated with SEZ designation may take considerable time to emerge.

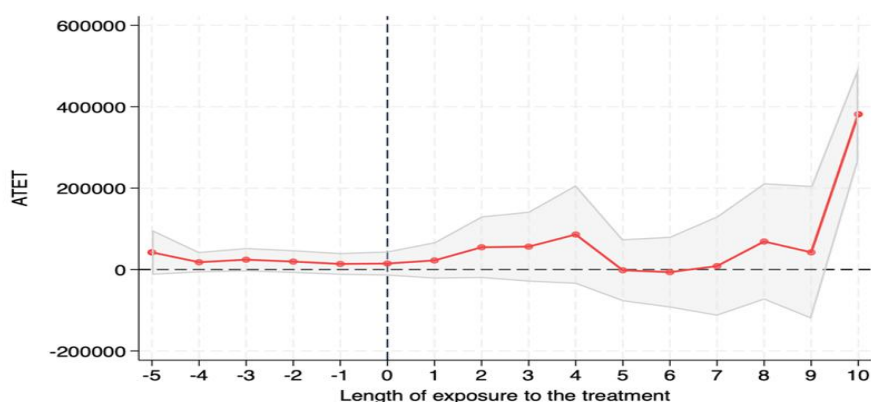


Figure 2. Cumulative ATT over SEZs Application in Indonesia

The observed pattern corroborates qualitative and quantitative findings from multiple scholarly sources. For instance, empirical fieldwork from Goodburn (2025) highlights that even amid heterogeneous local governance and land incorporation models, SEZs can produce varied but positive outcomes in employment and institutional development across Indian contexts that bear strong resemblance to Indonesia's zonal governance.

This parallel reinforces a causal interpretation of the cumulative ATET results, suggesting that the significant increase recorded in the tenth year is the result of a compounding effect where initial industrial activities finally converge into a mature ecosystem. Such long-run gains are consistent with the spatial and institutional dynamics analyzed by Kumera and Woldetensae (2023), implying that the surge in economic performance likely stems from synergistic urban-industrial linkages and positive spillovers that emerge around the zone peripheries after a decade of integration.

Table 2. Cumulative ATT over SEZs Application in Indonesia

Year	ATET	SE	z	CI 95% lower	CI 95% upper
-5	42,266	28252.450	1.50	-13107.650	97639.940
-4	18,044	12889.160	1.40	-7217.971	43306.620
-3	24,252*	14720.200	1.65	-4598.145	53103.980
-2	19,539	14320.310	1.36	-8527.934	47606.630
-1	13,815	13711.370	1.01	-13057.940	40689.640
0	14,814	15225.870	0.97	-15027.590	44656.730
1	22,364	22868.810	0.98	-22457.220	67186.890
2	54,833	38690.300	1.42	-20998.210	130665.000
3	56,271	43903.030	1.28	-29776.990	142319.700
4	86,084	61936.080	1.39	-35307.920	207477.100
5	-1,745	38957.550	-0.04	-78101.200	74609.590
6	-6,415	44436.780	-0.14	-93509.710	80679.250
7	8,589	62367.870	0.14	-113649	130828.100
8	68,952	73031.590	0.94	-74186.360	212092.200
9	42,351	83351.930	0.51	-121015	205718.200
10	38,1672***	59240.620	6.44	265563.300	497782.200

To assess the dynamic impact of SEZs on regional economic outcomes in Indonesia, we employed an event-study framework measuring the ATT across a relative time window centered on the year of SEZ establishment, exactly in 2012. Figure 3 reveal a distinct bifurcation between pre-treatment and post-treatment trends, where the former period ($t < 0$) demonstrates statistically insignificant fluctuations around zero, validating the parallel trends assumption and strengthening causal inference.

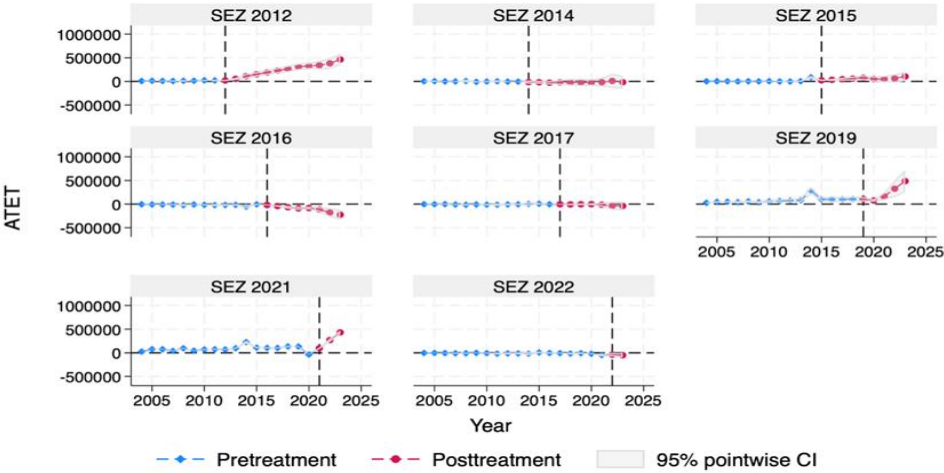


Figure 3. Pre and Post ATT of SEZs Application in Indonesia

The ATET estimation reveals substantial shifts in SEZ performance during specific periods. Notably, the 2012 cohort, comprising the Sei Mangkei and Tanjung Lesung SEZs, exhibited a robust positive trajectory in the post-treatment period. Situated in Simalungun Regency, North Sumatra, the 2,002.7-hectare Sei Mangkei SEZ functions as a strategic hub for the integrated downstreaming of palm oil and rubber. Its economic contribution is predominantly fueled by capital inflows, which have significantly catalyzed GRDP growth, maintaining Sei Mangkei’s position as the recipient of the highest investment realization among Sumatran SEZs. This investment appeal stems from agglomeration economies, which minimize transportation and operational costs through shared infrastructure. Furthermore, the zone’s specialization in downstream palm oil and rubber creates a comparative advantage within the supply chain, offering ready-to-distribute raw materials bolstered by a strong industrial ecosystem (Sarosa, 2024; Tamba et al., 2025; Violita and Khoirunurrofik, 2025).

Parallel to the Sei Mangkei SEZ, the Tanjung Lesung SEZ catalyzes regional economic growth through three key mechanisms: structural livelihood transformation, infrastructure enhancement, and upstream-downstream supply chain integration. The zone’s development has precipitated a distinct occupational transition, shifting the local workforce from traditional agrarian and maritime activities toward modern tourism services. This ecosystem is further reinforced by robust local supply chains and the expansion of public facilities, particularly toll roads and culinary hubs, which serve as vital pull factors for tourists. Collectively, these findings suggest that the implementation of the 4A framework (attraction, accessibility, amenities, and ancillary) is instrumental

in cultivating a competitive, high-value service sector in the Banten region (Hidayana and Lestari, 2025; Nugroho et al., 2025; Raga et al., 2025).

Figure 3 illustrates a pronounced acceleration in SEZ designations during 2019 and 2021. The Kendal SEZ, established via Government Regulation No. 85 of 2019, exemplifies this trajectory by generating substantial economic dividends through structural industrial transformation and the attraction of inward investment. Specifically, the zone has catalyzed a shift from an agrarian-based economy to a high-value manufacturing ecosystem. This transition has yielded aggregate socio-economic benefits, notably the reduction of income inequality and poverty rates, thereby validating the SEZ's efficacy in fostering inclusive growth through formal employment creation (Purnomosidi et al., 2025; Sarfiah et al., 2023; Wardhana et al., 2025).

Concurrently, the Singhasari SEZ exhibits nascent economic potential through a strategic pivot toward the digital economy. The zone is positioning itself as an integrated techno-educational hub by cultivating creative clusters, including animation studios, film production, and software development. However, optimizing Singhasari's performance necessitates urgent mitigation of the prevailing awareness gap among local communities, which currently impedes full economic integration (Amiruddin et al., 2021; Anisah et al., 2024).

Conversely, the Lido SEZ's growth trajectory in 2021 was characterized by investment-led expansion, reflecting its nascent developmental stage. The zone's economic value proposition is anchored in a triad of specialization: premium lifestyle tourism, an integrated creative industry ecosystem, and accelerated infrastructure development. By catering to the affluent market segment through world-class amenities, including a theme park, a championship-standard 18-hole golf course, and the Lido Music and Arts Center, the zone is positioned to catalyze substantial multiplier effects on regional productivity. Furthermore, capitalizing on agglomeration economies observed in established zones, Lido leverages its geostrategic proximity to the Greater Jakarta (Jabodetabek) economic hub, bolstered by a secured land tenure rate of 80% (Coordinating Ministry for Economic Affairs, 2022; Sa'diah and Khoirunurrofik, 2025).

A counter-intuitive phenomenon emerged within the 2016 SEZ cohort, where designation coincided with economic stagnation rather than the anticipated acceleration. Previous studies document several implementation challenges in the relevant SEZs, including communication problems, infrastructure constraints, and bureaucratic bottlenecks. Consequently, these structural inefficiencies have deterred capital realization, as investors opted to defer expansion in response to the region's operational unreadiness (Muzwardi and Nurhayati, 2025; Oktaviana et al., 2024; Rizalsan and Juwono, 2020; Tamba et al., 2025).

The placebo design shifts the effective SEZ adoption date earlier than the observed designation date by one year and two years, while keeping the estimator, sample, and specification as close as possible to the core staggered DiD. This follows the logic that a placebo analysis should be an altered version of the core analysis that still produces an estimate analogous to the main estimate. Eggers, Tuñón, and Dafoe (2024) formalize

this by decomposing the core estimate into three parts. The estimate equals the true average treatment effect plus bias plus sampling error. They define the placebo estimate in the same way, as placebo treatment effect plus placebo bias plus placebo sampling error.

In the empirical results, the one year and two year earlier adoption placebos are interpreted in Table 3. First, placebo dynamic ATET coefficients in the pre period should be close to zero. Confidence intervals should cover zero. The pattern should not show a smooth buildup that mimics the main post treatment dynamics. Second, placebo post period effects should also remain centered near zero. This is expected because the placebo assigns treatment in periods where No Average Treatment Effect should hold by construction. When these conditions are satisfied, the placebo results support the credibility of the core analysis in a specific sense. They are consistent with linked assumptions that connect the core and placebo settings.

Table 3. Placebo Test

Exposure	Placebo Year -2		Placebo Year -1	
	ATET	Std. Error	ATET	Std. Error
-5	25603.89	17040.18	20128.26	12695.99
-4	20128.26	12695.99	42266.15	28252.45
-3	42266.15	28252.45	18044.33	12889.16
-2	18044.33	12889.16	24252.92	14720.20
-1	24252.92	14720.2	19539.35	14320.31
0	19539.35	14320.31	13815.85	13711.37
1	33379.75	24900.97	30159.74	25441.16
2	48215.88	38822.04	35885.01	28216.14
3	56803.37	42349.13	74143.24	43353.81
4	97109.32	58967.72	78813.18	54624.28
5	94760.38	70192.23	113382.10	73359.64
6	124881.6	87439.72	10110.84	41378.50
7	6074.407	49780.38	-3634.91	47189.96
8	-1791.40	54473.37	31692.10	60890.38
9	12052.76	75000.77	101066.90	70554.40
10	76435.85	84716.08	63262.09	78749.18

In Table 3, the placebo estimates obtained by shifting SEZ adoption one year earlier and two years earlier are consistently centered near zero across the dynamic exposure window. The pre placebo coefficients are small in magnitude and do not display a coherent trend that would indicate differential growth trajectories prior to the true

designation. Their confidence intervals largely overlap zero, which is consistent with the absence of anticipatory effects that start well before formal implementation. In the post placebo window, the estimates remain statistically indistinguishable from zero and do not show a sustained positive shift comparable to the main results. This pattern implies that the staggered DiD specification does not mechanically generate treatment like dynamics when the treatment timing is intentionally falsified. It therefore reduces concerns that the main findings are driven by spurious timing correlation, latent differential trends, or model induced artifacts rather than the SEZ policy itself.

5. CONCLUSION

Special Economic Zones (SEZs) in Indonesia function as a reliable engine for regional growth, though they are not an immediate solution. Prior to 2012, regions with and without SEZ status grew at a similar, modest pace. However, following policy implementation, SEZ regions accelerated significantly while non-SEZ areas remained on a flatter growth path. A key finding is the latent effect of this policy, as data shows a significant economic boost materializes only after ten years of operation. This is evidenced by z-scores reaching high scientific validity only at the ten-year mark. This pattern suggests that SEZs require a decade to mature and build a solid industrial ecosystem before triggering a substantial multiplier effect on local productivity.

The success of these zones varies based on management and timing. The 2012 cohort, specifically Sei Mangkei and Tanjung Lesung, serves as a prime success story by successfully integrating local industries such as palm oil and modern tourism services. Newer zones also show promise, such as Kendal has effectively shifted its local economy toward high-value manufacturing, while Singhasari and Lido are tapping into the digital economy and premium lifestyle services. Conversely, the 2016 cohort experienced a stagnation instead of the expected growth. Contextual evidence suggests that differences in industrial development, infrastructure readiness, and institutional capacity may help explain these heterogeneous patterns. These findings highlight the importance of sustained institutional governance and local industrial integration for the long-term effectiveness of SEZs.

REFERENCES

Aggarwal, A. (2019), "SEZs and economic transformation: towards a developmental

- approach,” *Transnational Corporations Journal*, 26(2).
- Aggarwal, A. (2022), “Special Economic Zones in the Indonesia–Malaysia–Thailand Growth Triangle: Opportunities for Collaboration,” Asian Development Bank.
- Alkon, M. (2018), “Do special economic zones induce developmental spillovers? Evidence from India’s states,” *World Development*, 107, 396-409.
- Ambroziak, A. A. and C. A. Hartwell (2018), “The impact of investments in special economic zones on regional development: the case of Poland,” *Regional Studies*, 52(10), 1322-1331.
- Amiruddin, L., G. M. Rozalinna and P. Yunita (2021), “The Vague Awareness of Communities in the Singhasari Special Economic Zone Development during the COVID-19 Pandemic,” *Society*, 9(2), 490-503.
- Anisah, A. L., R. Katharina, D. Ma’rifah, T. Apriani, A. F. Syah, R. Sacipto, H. A. Fadhilah and F. D. Navisa (2024), “Singhasari Tourism Special Economic Zone: Can It Survive in Today’s World Economy?” *Jurnal Kepariwisata Indonesia*, 18(1), 141-156.
- Aritenang, A. F. and A. N. Chandramidi (2020), “The Impact of Special Economic Zones and Government Intervention on Firm Productivity: The Case of Batam, Indonesia,” *Bulletin of Indonesian Economic Studies*, 56(2), 225-249.
- Coordinating Ministry for Economic Affairs (2022), “Accelerating Investment Targets, Construction of a Number of Projects in the Lido SEZ,” Press Release No. HM.4.6/339/SET.M.EKON.3/06/2022.
- Frick, S. A. and A. Rodríguez-Pose (2023), “What draws investment to special economic zones? Lessons from developing countries,” *Regional Studies*, 57(11), 2136-2147.
- Goodburn, C. (2025), “Urbanising the Villages: Three modes of village incorporation and the implications for structural transition in India’s ‘Chinese-style’ special economic zones (SEZs),” *World Development*, 188.
- Goodburn, C. and J. Knoerich (2022), “Importing export zones: processes and impacts of replicating a Chinese model of urbanization in rural south India,” *Urban Geography*, 43(10), 1496-1518.
- Hamid, A., A. R. Satiadji and L. Zuraida (2025), “Strategi Pengembangan Sport tourism di Kek Mandalika Dalam Mewujudkan Sinergi Dengan Masyarakat Lokal Desa Kuta, Mertak, Sengkol Kecamatan Pujut, Kabupaten Lombok Tengah,” *Jurnal Ilmiah Global Education*, 6(3), 1459-1473.
- Hidayana, R. A. and M. Lestari (2025), “Analysis of Economic Growth and Tourism Potential in Tanjung Lesung, Panimbang, Banten as a Creative Economy Destination,” *International Journal of Business, Economics and Social Development*, 6(1), 126-131.
- Kim, J. and J. H. Lee (2025), “Free Economic Zones and Firm Performance: Evidence from Korea,” *KDI Journal of Economic Policy*, 2025(2), 81-97.
- Krugman, P. (1991), “Increasing Returns and Economic Geography,” *Journal of Political Economy*, 99.

- Kumera, E. and B. Woldetensae (2023), "Socio-spatial transformation: The case of Eastern Industry Zone and Bole Lemi-1 special economic zones, central Ethiopia," *Heliyon*, 9(5).
- Law No. 6 of 2023 on the Enactment of Government Regulation in Lieu of Law No. 2 of 2022 on Job Creation into Law (*Undang-Undang Nomor 6 Tahun 2023*).
- Law No. 11 of 2020 on Job Creation (*Undang-Undang Nomor 11 Tahun 2020 tentang Cipta Kerja*).
- Law No. 22 of 1999 on Regional Governance (*Undang-Undang Nomor 22 Tahun 1999 tentang Pemerintahan Daerah*).
- Law No. 25 of 1999 on Fiscal Balance between the Central Government and the Regions (*Undang-Undang Nomor 25 Tahun 1999 tentang Perimbangan Keuangan antara Pemerintah Pusat dan Daerah*).
- Law No. 39 of 2009 on Special Economic Zones (*Undang-Undang Nomor 39 Tahun 2009 tentang Kawasan Ekonomi Khusus*).
- Leong, C. K. (2013), "Special economic zones and growth in China and India: An empirical investigation," *International Economics and Economic Policy*, 10(4), 549-567.
- Lu, Y., J. Wang and L. Zhu (2019), "Place-based policies, creation, and agglomeration economies: Evidence from China's economic zone program," *American Economic Journal: Economic Policy*, 11(3), 325-360.
- Muzwardi, A. and Nurhayati (2025), "Examining Sorong Special Economic Zone and its Implications for the Region," *Papua Journal of Diplomacy and International Relations*, 5(1), 86-98.
- Nugroho, A., Jumanah and T. Stiawati (2025), "Strategic Policy for The Development of Tanjung Lesung Tourist Destination as A Special Economic Zone in Banten Province," *Publik (Jurnal Ilmu Administrasi)*, 14(1), 118-132.
- Nuraini, I. A., I. R. Dini, D. Wijayanti, M. N. Utami, O. R. N. Barokah and R. Y. K. Haribowo (2025), "Evaluasi Dampak Pengaruh Pembangunan Kawasan Ekonomi Khusus (KEK) Galang Batang Terhadap Produk Domestik Regional Bruto Kabupaten Bintan," *Jurnal Media Akademik*, 3(6), 3031-5220.
- Oktaviana, M. G., S. Sjamsiar, Sarwono and I. Noor (2024), "Policy Implementation Special Economic Zones Sorong in Analytical Hierarchy Process (AHP) Perspective," *RGSA – Revista de Gestão Social e Ambiental*, 18(8), 1-26.
- Purnomosidi, R. Y. K. H., A. T. Nurhasanah, D. A. Banowaty, N. H. Rahmadanti, R. A. Indrafarras, R. A. Pratiwi and U. H. Y. Pramesti (2025), "Analisis Pengaruh Pembangunan Kek Kendal Terhadap Tingkat Pengangguran Terbuka di Wilayah Kedungsepur, Jawa Tengah: Pendekatan Difference-In-Difference (DID)," *Socius: Jurnal Penelitian Ilmu-Ilmu Sosial*, 02(11), 853-858.
- Purwadinata, S., T. Handayani and N. N. Ferdaus (2025), "ANALISIS AGLOMERASI KAWASAN EKONOMI KHUSUS (KEK) MANDALIKA TERHADAP KEMISKINAN DI PROVINSI NTB," *Jurnal Oportunitas: Ekonomi Pembangunan*.
- Raga, R. A., H. P. Pertiwi, Y. Suryantari and M. Salim (2025), "Resilient by Design:

- 4A-Driven Sustainable Tourism Recovery in Tanjung Lesung Special Economic Zone (SEZ)," *Journal of Economics and Management Sciences*, 8(1), 281-292.
- Rauhut, D. and A. Humer (2020), "EU Cohesion Policy and spatial economic growth: trajectories in economic thought," *European Planning Studies*, 28(11), 2116-2133.
- Riesfandiari, I., B. Setyawan and I. T. Wahyudi (2023), "DAMPAK KAWASAN EKONOMI KHUSUS (KEK) SEI MANGKEI TERHADAP PEREKONOMIAN DI KABUPATEN SIMALUNGUN," *Jurnal Perspektif Bea Dan Cukai*, 7(1), 2023.
- Rizalsan, A. and V. Juwono (2020), "Policy Implementation of Tanjung Kelayang Special Economic Zone," *Jurnal Borneo Administrator*, 16(2), 159-178.
- Sa'diah, M. and K. Khoirunurrofik (2025), "The Relationship between Special Economic Zones and Economic Growth and Welfare: Empirical Evidence from Regencies and Cities in Indonesia," *Indonesian Treasury Review*, 10(2), 173-187.
- Sarfiah, S. N., Y. Septiani and Rr. R. Sugiharti (2023), "Peran Kendal sebagai kawasan ekonomi khusus dalam transformasi ekonomi: analisis strategis dan implementasi melalui matriks SWOT," *Journal of Economics Research and Policy Studies*, 3(1), 47-65.
- Sarosa, C. S. (2024), "Local Economic Potential Changes in Sei Mangkei in Simalungun District, North Sumatra," *MediaTrend*, 19(2), 263-277.
- Tafese, T., J. Lay and V. Tran (2025), "From fields to factories: Special economic zones, foreign direct investment, and labour markets in Vietnam," *Journal of Development Economics*, 174.
- Tamba, Y., P. Andiny and Miswar (2025), "Determinasi kinerja ekonomi kawasan ekonomi khusus di Pulau Sumatera: Bukti dari empat KEK," *Journal of Economics Research and Policy Studies*, 5(3), 721-735.
- Taufiqurrahman and Khoirunurrofik (2023), "Special Economic Zones (SEZs) Impact on Poverty in Indonesia," *The Indonesian Journal of Development Planning*, VII(2), 231-249.
- Unor, O. (2025), "Draft Limitations and Logistics Constraints at Calabar Port: A Case Study of ECM Terminals," *American Journal of Traffic and Transportation Engineering*, 10(4), 80-89.
- Violita, R. and K. Khoirunurrofik (2025), "Peran Kawasan Ekonomi Khusus (KEK) terhadap Pertumbuhan Ekonomi Wilayah: Analisis Spasial Eksternalitas," *Jurnal Ekonomi Dan Pembangunan Indonesia*, 25(1), 95-111.
- Violita, R. and K. Khoirunurrofik (2025), "Peran Kawasan Ekonomi Khusus (KEK) terhadap Pertumbuhan Ekonomi Wilayah: Analisis Spasial Eksternalitas," *Jurnal Ekonomi Dan Pembangunan Indonesia*, 25(1).
- Wardhana, I. W., I. Riesfandiari, E. Jamal, V. W. Hanifah, P. Pihri, F. W. Handoyo, N. Purwono, R. P. Ramadhan, B. Setyawan, M. Placek, B. P. A. W, N. D. Chrysanti, R. M. Daniswara, B. Wijanarko and E. Setiadi (2025), "Does a special economic zone impact the surrounding economy? The case study of Kendal, Indonesia," *Humanities and Social Sciences Communications*, 12(1).
- Zeng, D. Z. (2010), *Building Engines for Growth and Competitiveness in China*

Experience with Special Economic Zones and Industrial Clusters, The World Bank.

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