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Employment Effects of Special Economic Zones: Evidence from Thailand

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Abstract

In 2015, Thailand established Special Economic Zones (SEZs) in ten border provinces across the country. However, despite a generous fiscal incentive package and upgraded infrastructure, the SEZs have not attracted the intended level of investment. This paper investigates the causal impacts of the SEZ policy in Thailand on employment, using a balanced panel data set covering 77 provinces from 2012 to 2020. The results of a difference-in-difference (DID) approach show that in provinces with SEZs, employment of native workers (both formal and informal) declines by 7 percent compared to provinces with no SEZs. This negative impact is largely due to a significant decrease in informal employment. There was no significant change in the number of migrant workers in treated provinces compared to those without SEZs. The findings also confirm the validity of the parallel-trends assumption and show no evidence of an anticipatory treatment effect prior to the implementation of the SEZ policy. These findings suggest that the SEZ policy needs to be revised to place more emphasis on employment generation and promoting inclusive growth through subregional development.

Keywords

Special economic zones, Employment generation, Economic development, Investment

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Introduction

Over recent decades, there has been a significant proliferation of special economic zones (SEZs), also known as free trade zones, export processing zones, and industrial parks (Akinci & Crittle, 2008; Buba & Wong, 2017; Farole, 2011). While the definitions of these terms may vary, an SEZ is generally understood as a geographically delimited area that offers benefits for foreign and domestic investors physically and financially within the zone, including less regulation, improved infrastructure, and financial incentives. According to the United Nations Conference on Trade and Development (UNCTAD), there are currently around 5,400 SEZs worldwide, up from 79 in 1975 (UNCTAD, 2019).

In an open economy, SEZs can be a tool to facilitate industrial activities and promote a country's participation in the global economy (Aggarwal, 2007, 2022; Ge, 1999; Liu, 2002; Lu et al., 2019; Warr & Menon, 2016; Zeng, 2015). Several studies suggest that SEZs are engines for export growth, attracting foreign direct investment, employment generation, and fostering structural changes (Farole & Akinci, 2011; Ge, 1999; Jensen, 2018; Wang, 2013; Zheng, 2021). Nevertheless, SEZs may not serve as a policy means in facilitating economic development as intended. Using a novel data set covering 346 SEZs in 22 emerging countries, Frick et al. (2019) found that, despite generous incentives provided to firms, it is difficult for SEZs to sustain their growth over time and their success depends on size and proximity to large markets. In contrast to what proponets of SEZs believe, Alkon (2018) found that SEZs in India do not bring about local socioeconomic development in their surrounding areas, or "developmental spillovers". SEZs may also result in lower progress towards poverty reduction compared to non-SEZs (Durongkaveroj, 2022b; Yiming & Lei, 2020). Additionally, SEZs can lead to land dispossession and conflicts between farmers, firms, and states (Levien, 2011, 2013; Misra, 2022). Overall, the economic impact of SEZs is highly context specific and inconclusive.

In this paper, I examine the effects of SEZs on employment in Thailand. Thailand represents an ideal case study for the issue at hand for several reasons. First, like several other countries in East Asia, Thailand established ten SEZs in 2015, located in ten border provinces across the country. The purpose of this policy is to distribute prosperity to other provinces, improve living standards among local people, and increase the country's competitiveness (NESDC, 2022). Second, despite generous fiscal incentives offered to both Thai and foreign investors, SEZs have not attracted a significant level of investment. Between 2015 and 2022, 106 projects in the ten SEZs were approved, with a total value of investment of 29,036 million Baht. During the same period, around 6,000 new businesses in a range of sectors, such as construction, logistics, clothing, and hotels, were established in these areas. Additionally, between October 2017 and October 2022, documented migrant workers from Myanmar and Cambodia numbered nearly 458,000. These figures for

investment projects, new business registrations, and migrant workers are relatively low compared to those outside the SEZs. Third, there is a province-level panel data set available covering a sufficient length of time to examine the causal impact of SEZs on employment.

This paper investigates the effects of establishing SEZs on employment in ten border provinces of Thailand. While employment generation is not an objective of the SEZ policy, employment is a crucial aspect of economic development, particularly in developing countries like Thailand. Using province-level data on the employment of native workers and migrant workers, a difference-in-difference (DID) approach compares employment in provinces that established SEZs after 2015 to provinces that did not establish such zones. Out of 77 provinces, ten provinces that established SEZs were used as treatment groups, while 67 provinces were used as control groups. The results show that the establishment of SEZs is associated with a 7% decrease in employment of native workers, but no significant change in employment of migrant workers. This negative impact is largely driven by a significant decrease in the number of informal workers. The results are robust to time-varying controls and alternative measures of a province's level of economic development. The common trend assumption is examined and the results from both a graphical diagnostic and a formal test suggest that the key identification assumption of the DID estimation is satisfied.

This paper contributes to the broader literature on trade and development. The rapid establishment of special economic zones (SEZs) has coincided with a structural change in the key features of international trade in developing countries. Since 1990, global production sharing (GPS), defined as the cross-border dispersion of production processes within vertically integrated global industries, has been a defining characteristic of the trade and investment regimes of several countries, including Thailand (Athukorala, 2014; Athukorala & Kohpaiboon, 2014; Antras, 2020; Durongkaveroj, 2022a). This phenomenon has been driven by advances in production technology, cheaper communication and transportation costs, and more liberal trade policies (Fernandes et al., 2022; World Bank, 2020). Multinational enterprises (MNEs) establishing subsidiaries in host countries play a major role in GPS, particularly in the early stages of a country's engagement in global production networks (Gereffi, 2005; Meyer et al., 2020). As such, SEZs can facilitate the development of GPS by attracting MNEs to the zones. However, the extent to which SEZs can attract new and existing investors to the zones depends on the cost advantages they offer compared to alternative sites or zones available elsewhere in the country, which can be driven by more generous incentives and improved infrastructure.

The remainder of this paper is structured as follows: Section 2 briefly describes the SEZ policy in Thailand. In section 3, the methodology employed is outlined. In section 4, the empirical evidence is presented, and the parallel-trends assumption is discussed. Section 5 discusses the findings. The final section concludes.

Special Economic Zones in Thailand

Thailand established SEZs in ten border provinces across the country in 2015 (Aggarwal, 2022; NESDC, 2022). SEZs were implemented in two phases: the first phase started in 2015 and included Tak, Mukdahan, Sakaeo, Trat, and Songkhla and the second phase started in 2016 and included Chiang Rai, Nong Khai, Nakhon Phanom, Kanchanaburi, and Narathiwat. These ten SEZs cover an area of 6,221 square kilometers, accounting for about 1% of the total area.

The purpose of SEZs is to bring about economic development in the zones (NESDC, 2022), including an increase in investment, economic activity and employment. Since SEZs are located in border areas, firms can hire migrant workers on a temporary basis to support their operations. Firms can either buy or rent land in the zones, and the rental rates are set by the government and vary across SEZs.

The Board of Investment (BOI) is responsible for investment projects in the SEZs (BOI, 2021). There are two options available to a firm seeking fiscal incentives: 1) 13 groups of targeted activities designed by the National Committee on the Development of SEZs, and 2) general activities under the BOI announcement No. 2/2557. Businesses in the 13 targeted industries receive higher fiscal incentives from the BOI. Each zone has different targeted activities depending on local competencies, limitations and demands. As of November 2022, 73 projects in 10 SEZs have been approved by the BOI, with a total investment amount of around 19 billion baht. Of 73 projects, 29 of which invested in the Tak SEZ (NESDC, 2022). The Tak SEZ also had the highest number of new business registrations between 2015 and 2022.

SEZs are still relatively small in terms of investment, compared to total investment made in the rest of the country (outside the zones). The number of applications submitted to the BOI for SEZs from 2015 to 2020 accounted for less than 1% of total applications submitted to the BOI (BOI, 2022). The data also shows that the Eastern Economic Corridor (EEC), an area-based development initiative located in three provinces in eastern Thailand, attracted many more investment applications than SEZs. Investment in the EEC was worth 209 billion baht in 2020, accounting for 40% of the total value of investment applications submitted to the BOI.

Empirical Strategy and Data

Empirical strategy

To estimate the effect of SEZs on employment, a difference-in-difference (DD) regression approach is employed. In 2015, ten border provinces across Thailand established SEZs. In this context, this estimator compares the difference in employment between treatment and control provinces before and after the establishment of the SEZs. The key

identifying assumption of this approach is that, in absence of SEZs, the difference in employment between treatment and control provinces would have remained the same. The model takes the following form:

$$EMP_{it} = \gamma_i + \gamma_t + \mathbf{X}_{it}\beta + D_{it}\delta + \varepsilon_{it} \quad (1)$$

where EMP_{it} is the (logarithm of) number of workforce in province $i\ (i = 1,\ldots,77)$ at time $t\ (t = 2012,\ldots,2020)$. γ_i are province fixed effects, γ_t are time fixed effects, $\mathbf{X}_{it}$ are covariates, D_{it} is a variable that takes the value of 1 if a province establishes a SEZ after 2015 and 0 otherwise, and ε_{it} is an error term. The coefficient δ is the average treatment effect of the treated (ATET) on native-born (Thai) employment. In this study, time-varying province-level covariates $(\mathbf{X}_{it})$ include the (logarithm of) real gross provincial product (GPP), the (logarithm of) number of firms $(FIRM)$, the (logarithm of) mean years of schooling (EDU), the (logarithm of) population (POP), and the share of workers aged 60 or older in the total workforce (OLD).

In addition, I investigate the effect of SEZs on migrant workers. The estimating equation used in the empirical analysis is:

$$MIG_{nt} = \gamma_n + \gamma_t + \mathbf{X}_{nt}\beta + D_{nt}\vartheta + \varepsilon_{nt} \quad (2)$$

where MIG_{nt} is the (logarithm of) number of migrant workers in province $i\ (i = 1,\ldots77)$ at time $t\ (t = 2012,\ldots,2020)$. γ_n are province fixed effects, γ_t are time fixed effects, and $\mathbf{X}_{it}$ are covariates. D_{nt} is a variable that takes the value of 1 if a province establishes a SEZ after 2015 and 0 otherwise. The coefficient ϑ is the average treatment effect of the treated on migrant workers.

Data

The analysis is based on a panel data set covering 77 provinces in Thailand from 2012 to 2020. The number of workforce (EMP) include both formal and informal native-born (Thai) workers aged over 15 years old. The data on employment come from the labor force survey conducted by the National Statistical Office of Thailand (NSO), and the Ministry of Digital Economy and Society (MDES). The data on informal workers are taken from the informal employment survey conducted by the NSO along with the labor force survey during the third quarter (July-September). Formal employment refers to employed persons who are protected or have social security. In general, informal workers include government officers, state employees, and employed persons who are insured with the Social Security Office. Informal employment refers to employed persons without protection or social security. The

data on registered migrant workers (MIG) are taken from the Department of Employment, Ministry of Labor. The estimated effect on migrant workers could be less precise because, unfortunately, province-level data on registered migrant workers at the One Stop Services (OSS) are not available. For covariates, gross provincial product (GPP) per capita is measured in real term (Chain volumes measures, reference year = 2002). The data on GPP come from the National Economic and Social Development Council. The data on firms or business establishments $(FIRM)$ are taken from the Department of Labor Protection and Welfare, Ministry of Labor. These are firms with at least 1 employee. Unfortunately, there is no information on their size, ownership, or types of business. Lastly, the data on mean years of schooling come from the Office of the Education Council, Ministry of Education. Table 1 presents the descriptive statistics for variables in a regression.

Table 1 Descriptive statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
Native-born worker	693	497,830	583,024	106,474	5,287,679
Migrant worker	693	23,490	56,107	4	665,362
GPP pc (million Baht)	693	100,625	98,463	26,330	547,218
Population	693	886,615	1,023,221	179,262	8,998,732
Mean years of schooling	693	8.05	0.90	5.56	11.30
Share of workers aged over 60	693	11.70	4.31	2.68	26.28

Estimation method and identifying assumption

This paper uses the difference-in-difference (DID) approach to investigate the impact of the SEZs on employment of native workers and migrant workers. The key identifying assumption for the DID approach is that the treatment group and control group should follow the same trend over time in the absence of the treatment (Ashenfelter & Card, 1985; Bertrand et al., 2004; Goodman-Bacon, 2022). It is assumed that the untreated units (provinces that did not establish SEZs) provide an appropriate counterfactual for the trend that the treated units (provinces that established SEZs) would have followed if they had not been treated. This is known as the parallel trends assumption or common trend assumption (Abadie, 2005; Lechner, 2011). The parallel trends assumption is examined using a graphical exploration and a formal test after presenting the empirical results. Note that there is no variation in treatment timing.

Results

The effects of SEZs on native employment for both formal and informal workers in the native population are presented in Table 2. Column 1 of Table 2 shows the results from the DID estimation without any covariates. The coefficient on SEZ is negative, but not statistically significant at the 5% level. After including province-level control variables, the coefficient on SEZ is negative and statistically significant at the 5% level (Column 2 of Table 2). The average treatment effect of the treated (ATET) is -0.077, indicating that in provinces that established SEZs, employment decreases by 8% after the SEZ policy was implemented in 2015, compared to provinces without SEZs. This means that if the provinces that established SEZs had not done so, employment would have been higher by about 8%. The DID coefficient is also robust when provincial levels of economic development are measured by either the share of manufacturing value added or the share of services value added as a percentage of GDP (Column 3 of Table 2).

Table 2 The effects of the SEZs on employment using a DID method

Dependent variable: (log of) employment			
Independent variable	(1)	(2)	(3)
Special Economic Zones (SEZ)	-0.051 (0.043)	-0.077** (0.031)	-0.075** (0.031)
Real gross provincial product (ln) $(RGPP)$		0.037 (0.102)	
Number of firms $(FIRM)$		0.001** (0.000)	0.001** (0.000)
Mean years of schooling (EDU)		0.176 (0.160)	0.136 (0.152)
Population (ln) (POP)		1.980*** (0.261)	1.886*** (0.235)
Share of elderly worker (OLD)		-0.018*** (0.006)	-0.018*** (0.006)
Manufacturing value-added (MFG)			-0.006 (0.004)
Services value added $(SERV)$			-0.000 (0.002)
Constant	12.920*** (0.023)	-14.270*** (3.951)	-12.400*** (3.221)
Number of observations	693	692	692

Note: $*\ p < 0.1.** p < 0.05.*** p < 0.01.$

Table 3 shows the effects of the SEZ policy on migrant workers. As shown in Column 1 of Table 3, the DID coefficient on SEZ is positive but not statistically significant at the 5% level. This suggests that provinces that established SEZs did not see significantly more migrant workers relative compared to provinces without SEZs. As shown in Columns 2 and 3 of Table 3, after including relevant control variables, the DID coefficients become negative but are still not statistically significant at the 5% level. This indicates that provinces that establish SEZs do not have a higher potential to employ migrant workers compared to those that do not establish SEZs.

Table 3 The effects of the SEZs on migrant workers using a DID method

Dependent variable: Migrant workers (log)			
Independent variable	(1)	(2)	(3)
Special Economic Zones (SEZ)	0.013 (0.134)	-0.003 (0.124)	-0.008 (0.126)
Real gross provincial product (ln) $(RGPP)$		0.446 (0.664)	
Number of firms $(FIRM)$		-0.001 (0.001)	-0.001 (0.001)
Mean years of schooling (EDU)		-0.680 (0.923)	-0.801 (0.913)
Population (ln) (POP)		0.066 (1.067)	-0.298 (1.082)
Share of elderly worker (OLD)		0.005 (0.026)	0.002 (0.026)
Manufacturing value-added (MFG)			-0.004 (0.018)
Services value added $(SERV)$			0.000 (0.008)
Constant	8.125*** (0.082)	3.658 (17.560)	13.870 (14.900)
Number of observations	693	692	692

Note: $*\ p < 0.05.** p < 0.01.*** p < 0.001.$

Robustness Check

The findings from Table 2 suggest that SEZs lead to a significant decrease in native-born employment. This negative impact on employment may differ between formal and informal employment, as firms in SEZs are encouraged to use formal workers. Table 4 shows the changes in formal and informal workers in SEZs and non-SEZs before and after the establishment of SEZs in 2015. It is found that, on average, SEZs saw a larger decline in

informal workers than non-SEZs. In addition, the increase in the number of formal workers was slower in SEZs than in non-SEZs. Table 5 presents the results of a formal regression analysis.

Table 4 Mean of formal and informal employment in SEZs and non-SEZs before and after SEZ policy

Variables	Areas	2012-2014	2015-2020	(%)
Formal workers	Non-SEZs	205,208	235,733	14.88
	SEZs	126,768	129,811	2.40
Informal workers	Non-SEZs	315,981	276,173	-12.60
	SEZs	284,983	239,656	-15.91

As shown in Columns 1 - 3 of Table 5, the DID coefficient for SEZ is negative, but not statistically significant at the 5% level. This suggests that the SEZ policy does not have a significant impact on formal employment. However, as shown in Column 5 of Table 5, the DID coefficient for SEZ is negative and statistically significant at the 5% level. The average treatment effect of the treated (ATET) is -0.077, indicating that in provinces that established SEZs, informal employment fell by 8% after the SEZ policy was implemented in 2015, compared to provinces without SEZs. The size of the coefficients is similar to those reported in Table 2. Therefore, the negative impact of SEZs on native employment is driven primarily by a decrease in the number of informal workers.

Table 5 The effects of the SEZs on formal and informal employment using a DID method

	Formal Employment			Informal Employment		
Independent variable	(1)	(2)	(3)	(4)	(5)	(6)
Special Economic Zones (SEZ)	0.011 (0.045)	-0.018 (0.037)	-0.020 (0.037)	-0.057 (0.047)	-0.077** (0.038)	-0.074* (0.039)
Real gross provincial product (ln) $(RGPP)$		0.183 (0.125)			0.005 (0.109)	
Number of firms $(FIRM)$		0.001*** (0.000)	0.001*** (0.000)		0.001*** (0.000)	0.001*** (0.000)
Mean years of schooling (EDU)		0.075 (0.263)	0.030 (0.268)		0.156 (0.166)	0.105 (0.159)
Population (ln) (POP)		1.468*** (0.293)	1.333*** (0.290)		2.046*** (0.314)	1.938*** (0.258)
Share of elderly workers (OLD)		-0.027*** (0.007)	-0.028*** (0.008)		-0.007 (0.005)	-0.006 (0.005)
Manufacturing value-added (MFG)			-0.001 (0.004)			-0.009** (0.004)
Services value added $(SERV)$			-0.002 (0.002)			0.001 (0.002)
Constant	11.77*** (0.025)	-9.93** (4.436)	-5.83 (4.115)	12.45*** (0.023)	-15.33*** (4.814)	-13.59*** (3.480)
Number of observations	693	692	692	693	692	692

Note: $*p < 0.05.**p < 0.01.***p < 0.001.$

Parallel Trend Examination

This paper examines the effects of Thailand's SEZs policy, which was implemented in 2015, using a difference-in-difference (DID) approach. As mentioned previously, this estimator assumes that the treatment and control groups would have followed the same trend over time in the absence of the treatment. This assumption is referred as a parallel trends assumption. This means that the treatment and control groups should have had similar mean outcomes that changed closely over time before the treatment. In DID estimation, it is common to show graphical diagnostics and conduct additional tests in order to examine the validity of the DID approach. Figure 1 compares the mean employment between the treatment and control groups and provides evidence of parallel trends.

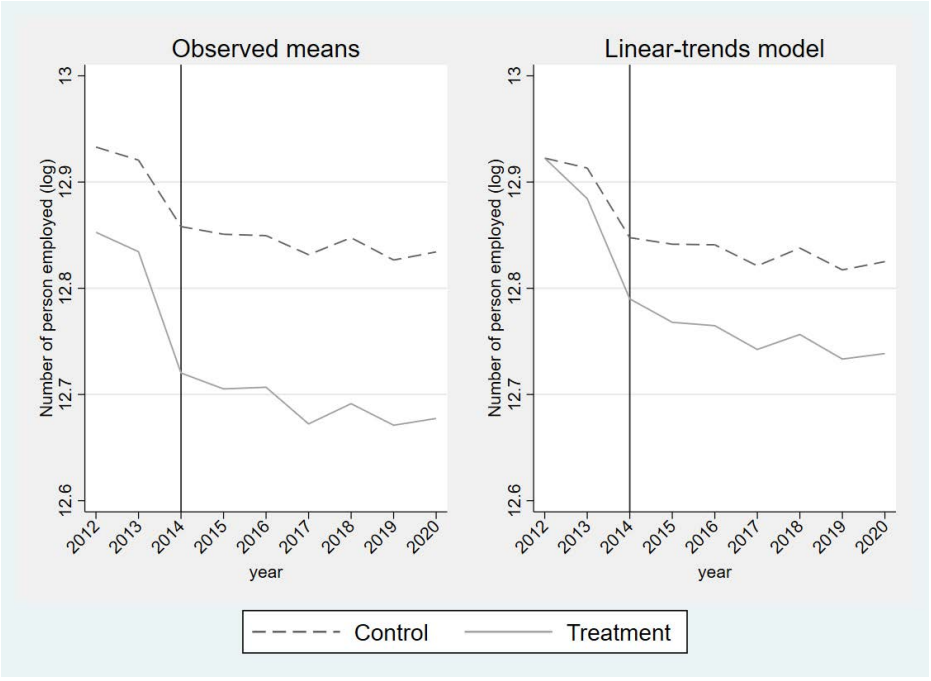

Figure 1 Mean of log of employment

According to the left side of Figure 1, the outcome trajectories in the treatment and control groups prior to the treatment period (2015) look similar. The right side of Figure 1 shows the results of the linear-trends model, which suggests that the province-level trajectories also parallel. The differences between the treatment and control groups do not grow larger over time up to 2015. Figure 1 provides evidence that the parallel trends assumption holds for the estimated effect on employment. To complement the graphical diagnostics for parallel trends, I also conducted a statistical test on the linear-trends model coefficient to determine if there were differences in the trends between the treatment and

control groups. The result did not reject the null hypothesis of parallel linear trends (the p-value is 0.2733), suggesting that the pretreatment trends are linear in both groups and there are no differences in the slopes between the two groups.

Moreover, I also conducted a Granger-type causality model to test for anticipatory treatment effects, which would occur if the treatment had an effect before it was implemented. The results did not reject the null hypothesis of no anticipatory effects prior to treatment (the p-value is 0.5466). Therefore, I conclude that there should be no concern about the identification of ATET reported in Table 2.

Figure 2 displays a visual check of the trajectories of MIG for the treatment and control groups prior to the implementation of the SEZ policy.

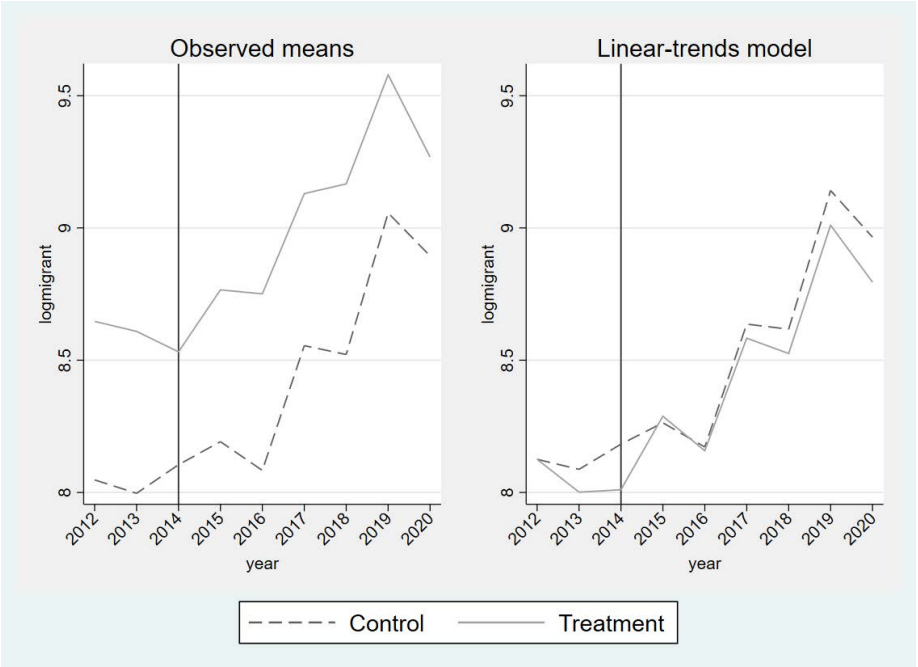

Figure 2 Mean of log of migrant workers

The graph suggests that the parallel-trends assumption is not satisfied, as the treated and control provinces do not follow a parallel trend before the policy was implemented. However, the result from the linear-trends model did not reject the null hypothesis of parallel trends. This test therefore supports the parallel-trends assumption. In addition, the findings from the Granger causality test suggest that there is no behavioral change before the implementation of the SEZ policy. The results from these tests suggest the validity of the ATET estimate shown in Table 2.

Discussion

This section discusses the findings. The ability of SEZs to generate employment depends heavily on the economic activities that they bring about. High value-added sectors and capital-intensive activities may have limited potential to create employment due to their low per-unit use of labor compared to other factors of production, especially capital.

For Thailand's SEZs, a firm wishing to receive benefits such as tax holidays and exemptions on import duties for machinery must invest in 13 targeted activities designated by the National Committee on the Development of SEZ. As shown in Table 6, the targeted activities differ in each SEZ, but it is fair to conclude that all SEZs have similar targeted activities, with the exception of Trat, Mukdahan, and Nong Khai. These targeted activities include both labor-intensive activities (e.g., agro-industry, textiles, garments, and leather products) and capital-intensive activities (e.g., engine and vehicle parts, machinery, equipment, and parts). While it is true that the Thai government wants to move away from labor-intensive activities, it is unlikely that the SEZ policy only attracts capital-intensive activities.

One possible reason for the negative impact on employment, particularly among informal workers, is that informal workers may be concentrated in sectors or activities that do not benefit directly from the SEZ policy. Tables 7 and 8 show the distribution of formal and informal workers across industries. Although data is not available for all ten SEZs, these national-level figures provide insight into trends and changes in the labor market. The data reveals that in 2020, about 56% of informal workers were working in agriculture, forestry, and fishing, and nearly all agricultural employment was informal. In contrast, only 6% of informal workers were working in manufacturing, and only 20% of manufacturing employment was informal. Since high value-added manufacturing is promoted in SEZs, jobs typically performed by informal workers may not align with the targeted activities. As a result, informal workers may have difficulty finding jobs in SEZs. Future research could investigate formal and informal employment in each individual SEZ.

Table 6 Targeted activities for special economic zones

13 Targeted Industries	Tak	Sa Kaeo	Trat	Mukda-han	Songkhla	Chiang-Rai	Nong-Khai	Nakhon-Phanom	Kancha-naburi	Nara-thiwat
1. Agro-industry, fishery industry, and related activities	X	X	X	X	X	X	X	X	X	X
2. Ceramic products	X							X	X	X
3. Textile, garment, and leather products	X	X			X	X	X	X	X	X
4. Furniture or parts	X	X			X	X		X	X	X
5.Gems and jewelry or parts	X	X				X		X	X	X
6. Medical devices or parts	X	X				X		X	X	X
7. Engine and vehicle parts, machinery, equipment, and parts	X	X						X	X	X
8. Electronics and electrical appliances industries	X	X		X				X	X	X
9. Plastic products	X	X				X		X	X	X
10. Medicine	X	X				X		X	X	X
11. Logistics	X	X	X	X	X	X	X	X	X	X
12. Industrial zones and industrial estates	X	X	X	X	X	X	X	X	X	X
13. Tourism promotion service and activities to support tourism	X	X	X	X	X	X	X	X	X	X

Source: NESDC (2022)

Table 7 Sectoral distribution of work among formal and informal workers

	Formal Workers			Informal Workers		
	2015	2020	Δ%	2015	2020	Δ%
Agriculture, forestry, and fishing	6.02	7.01	16.35	55.98	55.63	-0.62
Mining and quarrying	0.39	0.33	-16.84	0.04	0.02	-53.76
Manufacturing	29.94	26.04	-13.03	6.07	5.78	-4.77
Electricity, gas, steam supply	0.58	0.64	10.72	0.01	N/A	N/A
Water supply	0.28	0.47	65.69	0.10	0.06	-37.88
Construction	6.62	7.16	8.15	4.88	4.43	-9.18
Wholesale and retail trade	15.04	15.99	6.35	16.66	16.91	1.52
Transportation storage	3.90	4.84	23.87	2.63	2.46	-6.47
Accommodation and food service	5.23	5.70	8.84	7.94	9.19	15.82
Information and communication	1.26	1.12	-11.34	0.12	0.07	-45.16
Financial and insurance activities	2.90	2.88	-0.69	0.15	0.09	-40.92
Real estate activities	0.93	0.98	5.11	0.24	0.24	0.74
Professional, scientific, and technical	1.62	1.72	5.75	0.34	0.30	-11.79
Administrative and support services	2.58	2.63	1.99	0.38	0.32	-14.40
Public administration and defence	8.93	9.07	1.56	0.46	0.21	-54.17
Education	6.40	6.34	-0.95	0.38	0.25	-35.13
Human health and social work	3.49	3.59	2.73	0.29	0.19	-32.70
Arts and entertainment	0.78	0.56	-27.86	0.63	0.72	14.78
Other service activities	1.34	1.46	8.47	2.59	3.07	18.52
Activities of household as employers	1.26	1.27	0.60	0.05	0.03	-47.87
Activities of extraterritorial	0.02	0.01	-38.77	N/A	N/A	N/A
Unknown	0.47	0.22	-54.33	0.05	0.01	-82.23

Source: NSO (2022)

Table 8 Formal vs informal employment by industry

	2015		2020		Δ%	
	Formal	Informal	Formal	Informal	Formal	Informal
Agriculture, forestry & fishing	7.83	92.17	9.80	90.20	25.07	-2.13
Mining and quarrying	87.58	12.42	93.26	6.74	6.49	-45.76
Manufacturing	79.58	20.42	79.53	20.47	-0.06	0.25
Electricity, gas, steam supply	97.87	2.13	100.00	0.00	2.17	-100.00
Water supply	68.41	31.59	86.31	13.69	26.17	-56.66
Construction	51.72	48.28	58.20	41.80	12.53	-13.42
Wholesale and retail trade	41.63	58.37	44.92	55.08	7.91	-5.64
Transportation storage	53.99	46.01	62.91	37.09	16.53	-19.39
Accommodation and food service	34.26	65.74	34.83	65.17	1.68	-0.87
Information and communication	89.14	10.86	93.54	6.46	4.94	-40.54
Financial and insurance activities	93.84	6.16	96.55	3.45	2.88	-43.93
Real estate activities	75.15	24.85	77.50	22.50	3.12	-9.44
Professional, scientific, and technical	78.83	21.17	82.97	17.03	5.25	-19.56
Administrative and support services	84.34	15.66	87.51	12.49	3.76	-20.22
Public administration and defence	93.88	6.12	97.38	2.62	3.72	-57.12
Education	92.94	7.06	95.64	4.36	2.91	-38.25
Human health and social work	90.60	9.40	94.13	5.87	3.91	-37.63
Arts and entertainment	49.46	50.54	40.17	59.83	-18.78	18.38
Other service activities	29.09	70.91	29.07	70.93	-0.08	0.03
Activities of household as employers	95.11	4.89	97.62	2.38	2.64	-51.27
Activities of extraterritorial	100.00	0.00	100.00	0.00	0.00	N/A
Unknown	88.21	11.79	95.45	4.55	8.21	-61.43

Source: NSO (2022)

Another important issue is that while SEZS have been established since 2015, some have not been successful due to inadequate infrastructure (e.g., customs checkpoint, electricity and roads). Each SEZ also has different progress in terms of infrastructure development and labor, public health, and security management (NESDC, 2022). This has resulted in vast differences in the number of projects applying for investment promotion from the BOI. While Songkhla and Tak together attracted 44 projects out of 73 projects, SEZs in Trat and Nakhon Phanom received only a few investment applications. Because of this, the impact of SEZs on employment may vary between successful SEZs and less successful SEZs. I assessed this concern by examining changes in employment in successful and less successful SEZs. Using the number of investment projects and the value of investment approved by the Board of Investment, successful SEZs are SEZs in Songkhla, Tak, Sakaeo, Nong Khai, and Kanchanaburi. However, the data showed that both successful and less successful SEZs saw a significant decrease in the number of workers after 2015. Therefore, this is unlikely to drive the average treatment effect of the treated (ATET) shown in Table 2.

The null effect on migrant workers may be due to difficulties in importing migrant workers because of amendments to Thailand's laws. A One Stop Service Center (OSS) has been set up in all ten SEZs to facilitate migrant workers working on a temporary basis. Between October 2017 and October 2022, about 457,195 Myanmar and Cambodian workers registered to work on a temporary basis, while the number of migrant workers rose by about 800,000 during the same period. It is important to note that this null effect does not mean that there was no increase in migrant workers in SEZ areas after the SEZ policy was implemented, but rather such an increase was not significantly different compared to non-SEZ areas.

Conclusion

In 2015, Thailand established ten Special Economic Zones (SEZs) located in border provinces of the country. The purpose of this paper was to examine the employment effects of SEZ policies, with a focus on native-born employment and migrant workers. The results from the difference-in-difference (DID) approach, which compares provinces that established SEZs since 2015 to other provinces without SEZs, suggest that treatment provinces saw a 7% decrease in native workers compared to if they had not established SEZs. In addition, this policy did not significantly increase the use of migrant workers, as intended. Several tests were conducted to ensure the validity of the parallel-trends assumption, and no treatment effects were observed before the implementation of SEZs, indicating no evidence of anticipatory treatment. These results suggest the need to revamp the policy and consider ways in which SEZs can be a catalyst for local economic development and inclusive growth by placing more emphasis on their employment effects.

Conflict of interest

The author declares that there is no conflict of interest.

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