Special Economic Zones and firm performance: Evidence from Vietnam

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Outline

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Introduction and research question

Special Economic Zones (SEZs) are geographically designated areas where governments use fiscal localized incentives to attract FDI and transfer skills and technology from foreign/ multinational firms to domestic/local firms in developing and emerging economies.

Nearly 5,400 SEZs in 147 economies by 2018, Over 500 new SEZs planned (UNCTAD, 2019)

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However, their benefits are still in question:

- Success in China (Wang,2013; Lu et al., 2019; Lu et al., 2023)
- Failures e.g. in India (Alkon, 2018, Görg, and Mulyukova, 2022) and Indonesia (Rothenberg et al., 2018): Spillover effect may not be as expected

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Research Question:
Do SEZs help to promote the performance of firms in the case of Vietnam?

Preview of results

- Main results
  - SEZs establishment increased employment and sales for firms located in SEZs areas
  - Positive spillover effects for firms located in the same SEZ communes
  - Limited productivity effects
- Heterogeneity
  - Firm size: SMEs increased their employment and sales, large firms benefit in sales and productivity
  - Types of firms: private domestic firms benefit most
  - Types of industry: supplier-dominated firms benefit most
  - Types of SEZs: industrial zones with most benefits, increased labor productivity
- Mechanisms
  - Preference to bank loans
  - Input-output linkage
  - Technology gap

Outline

Special Economic Zones in Vietnam

Between 1991 and 2019, Vietnam has established 422 national SEZs in 61/63 provinces and 698 provincial SEZs

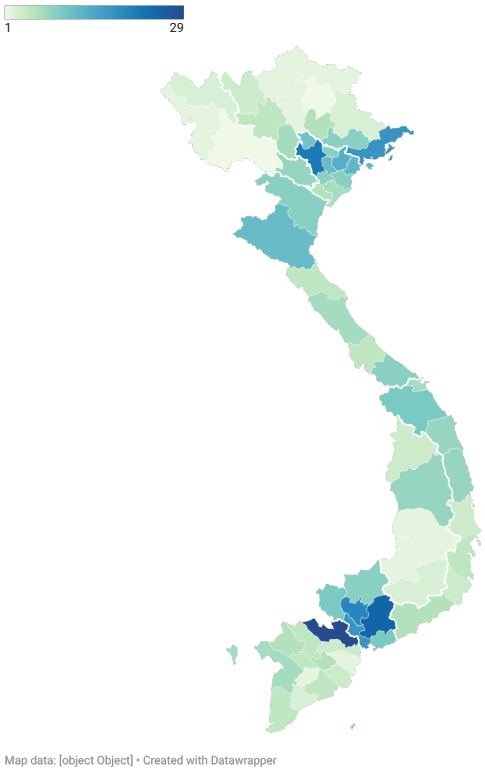


Figure 1: Map of national SEZs development in Vietnam (1991-2019)

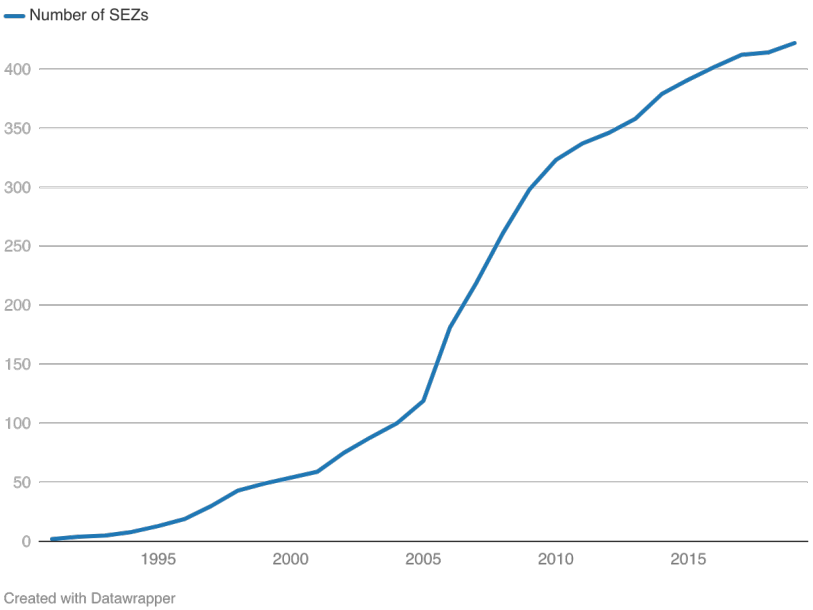


Figure 2: Number of national SEZs over time (1991 - 2019)

Source: Authors' representation based on data from the Ministry of Foreign Investment and Planning of Vietnam, 2022

Outline

Data - firm level

→ Identifying exposure to SEZ at firm level as well as firm performance indicators

Source and coverage

- Annual enterprise survey conducted by the General Statistics Office (GSO) of Vietnam, 2007-2019.
- All enterprises in Vietnam, by type (state-owned, foreign, private domestic).

Available information

- *Location*: commune and information whether they are located in SEZ areas → link to SEZ areas and SEZ communes
- *Sector*: 5-digit VSIC code → link to ISIC code
- *Balance sheet variables*: sales, labor productivity

Data - Commune level

→ Identifying SEZ communes, their location, when they were established

Source and coverage

- Annual commune-level information, manually collected, 1991-2019 (yearly reports from the Ministry of Foreign Investment and Planning of Vietnam and Government's laws and regulations and additional news)
- Scraped from government and news websites to identify cancelled SEZs

Available information

- year, address, name of SEZs

Outline

Empirical strategy

Outcome variables

- Firm size: Nb of employees, Sales
- Labour productivity

Approach

- Exploit variation of establishment of SEZs across communes and time
- Treatment: firm in SEZ commune

Empirical strategy

Treated firms

- *Firms in SEZ area* [Direct effects]
  - A SEZ area is a smaller area than a commune
  - Directly received benefits from the government
- *Firms in SEZ communes (but not in SEZ area)* [Spillover effects]
  - Neighbouring the SEZ area
  - Indirectly affected by SEZ establishment

Control group

- *Non-SEZ firms* [Control]
  - Firms located in communes which had their SEZs cancelled (never established)
  - Robustness: Never-treated firms in non-neighboring communes

Empirical strategy

$$Y_{i,t} = \alpha + \sum_{g \in G} \sum_{t=t_0}^{g-1} \theta_{g,t}^{\text{pre}} D_{i,g,t} + \sum_{g \in G} \sum_{t=g}^{T} \theta_{g,t}^{\text{post}} D_{i,g,t} + \xi_i + \xi_t + \varepsilon_{i,t} \quad (1)$$

- Y_{it}: firm i's outcomes in year t
- $D_{i,g,t}$: dummy variable that equals 1 if firm i in the treatment group g at period t and 0 otherwise
- G: treatment year
- ξ_i and ξ_t: firm and year fixed effects
- clustered at the commune level

Staggered dif-in-dif approach (different timings of treatment)

- Method: ETWFE by Wooldridge (2023)
- Covariates: 2-digit sector and firm's size

Outline

Baseline results

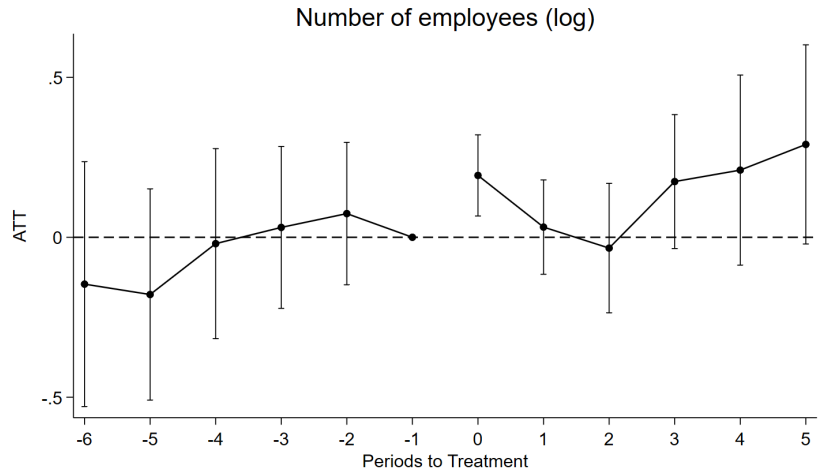
Table 1: Main results

Dep var:	**Number of employees**		**Sales**		**Labour productivity**	
Effect	Direct	Indirect	Direct	Indirect	Direct	Indirect
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A. Control group is never-treated firms in the cancelled SEZs						
SEZ	0.183**	0.071**	0.553***	0.292***	0.259**	0.085**
	(0.073)	(0.026)	(0.128)	(0.035)	(0.106)	(0.041)
Obs	21,962	146,800	21,947	146,681	18,072	118,377
Panel B. Control group is never-treated firms in non-neighboring communes						
SEZ	0.162**	0.074***	0.494***	0.339***	0.245**	0.138***
	(0.065)	(0.011)	(0.113)	(0.024)	(0.095)	(0.029)
Obs	3,608,392	3,611,910	3,603,769	3,607,242	3,054,861	3,048,655

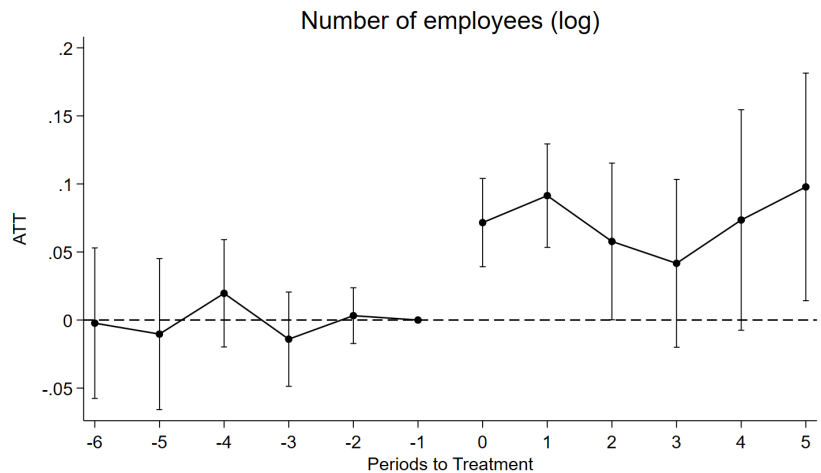
- Sales: strong direct and indirect effects
- Employment and Labor productivity: moderate direct and indirect effects
- Direct effects are stronger than indirect effects

Baseline results - Employment

Direct effects (firms within SEZs)

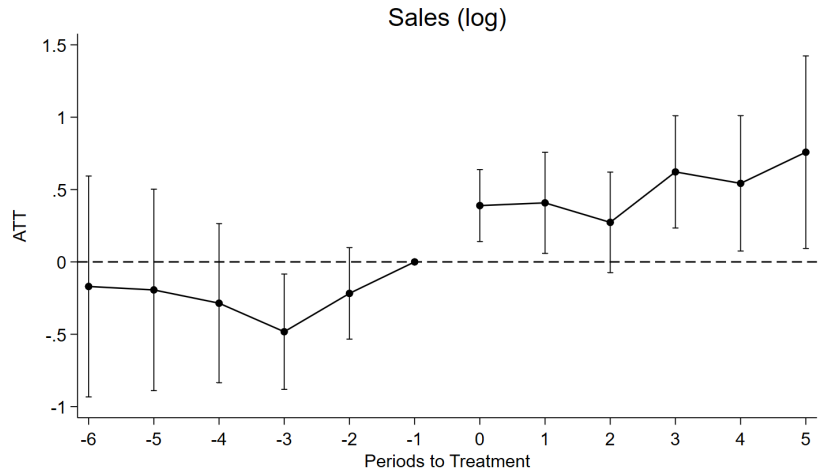


Spillover effects (firms in SEZ communes)

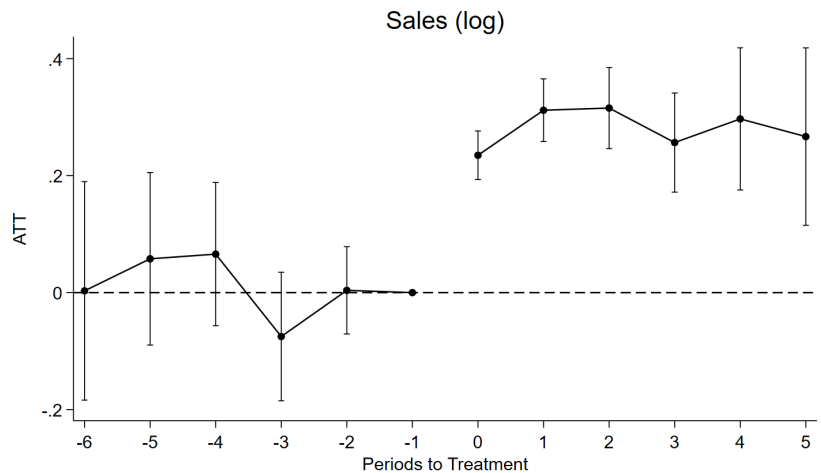


Baseline results - Sales

Direct effects (firms within SEZs)

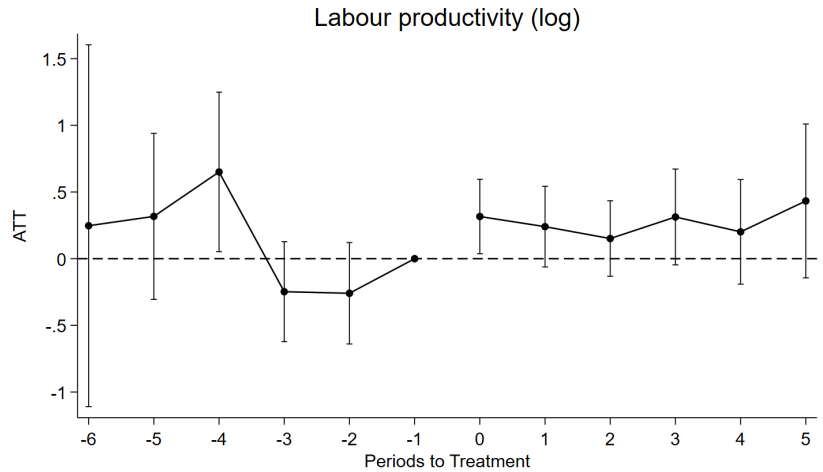


Spillover effects (firms in SEZ communes)

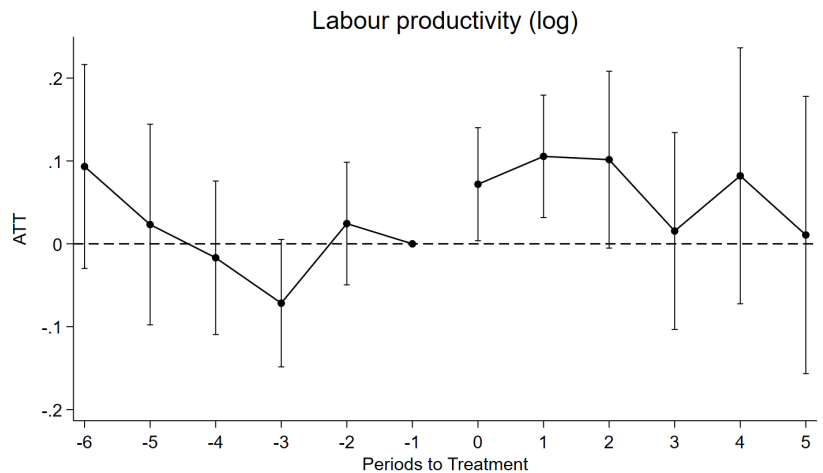


Baseline results - Labor productivity

Direct effects (firms within SEZs)



Spillover effects (firms in SEZ communes)



Validity check and Robustness checks

- Validity check
  - Bounding violations of parallel trends ⏩ More info
- Robustness check
  - Propensity score matching + Wooldridge (2023) ⏩ More info
  - Remove two star cities ⏩ More info

Outline

Heterogeneity analyses

- By types of SEZs ⏩ More info
- By firm size ⏩ More info
- By types of firm (foreign-owned/domestic) ⏩ More info
- By industry (Pavitt's taxonomy) ⏩ More info

Outline

Mechanisms - Input-Output Linkage

Why do treated firms grow (employment and sales) ?

Table 2: Mechanism - Input-Output Linkage

Dep var:	**Number of employees**		**Sales**		**Labour productivity**	
Effect	Direct	Indirect	Direct	Indirect	Direct	Indirect
Panel A. High input demand						
SEZ	0.408**	0.361***	1.043**	0.543***	0.286	0.255**
	(0.194)	(0.088)	(0.404)	(0.149)	(0.228)	(0.109)
Obs	1,884	3,336	1,859	3,330	1,592	2,827
Panel B. Low input demand						
SEZ	0.108	0.309**	0.115	0.537**	-0.016	0.269
	(0.131)	(0.134)	(0.269)	(0.226)	(0.229)	(0.188)
Obs	922	2,080	921	2,072	762	1,524

- Firms with high input linkage and demand from SEZs: Significant direct and indirect gains in employment and sales More info

Mechanism - Access to credit

Why are the effects stronger for firms within SEZs (direct effects)?

Table 3: Mechanism - Probability of Getting Credit

Dep var:	**Probability of getting credit**	
Effect	Direct	Indirect
SEZ	0.072***	0.004
	(0.013)	(0.005)
Obs	34,854	127,337

- Financial access channel confirmed

Mechanisms - Technology gap

Why are the productivity effects limited?

Table 4: Mechanism - Origins of FDI

Dep var:	**Number of employees**		**Sales**		**Labour productivity**	
Effect	Direct	Indirect	Direct	Indirect	Direct	Indirect
Panel A1. FDI only from developed countries						
SEZ	0.241**	0.186***	0.115	0.407***	-0.077	0.043
	(0.116)	(0.034)	(0.202)	(0.059)	(0.196)	(0.051)
Obs	19,648	37,396	19,456	37,337	16,338	30,455
Panel A2. FDI only from developing countries						
SEZ	-0.850**	0.211***	-0.843**	0.577***	0.544***	0.201***
	(0.345)	(0.018)	(0.350)	(0.036)	(0.184)	(0.029)
Obs	18,575	96,464	18,472	96,413	14,071	77,092

- Developed Countries' FDI: No productivity gains due to the technology gap
- Developing Countries' FDI: Productivity increases

More info

Conclusion

- **Increased firm size**:
  - SEZ establishment significantly increased employment and sales for firms located within SEZs (direct effects).
- **Positive spillovers**:
  - Firms in the same SEZ communes increased their employment and sales (indirect effects), but weaker effects.
- **Limited productivity effects**
- **Heterogeneity**:
  - Effects vary by firm size, type, industry, and types of SEZs.
- **Mechanisms**:
  - Access to credit, input-output linkages, and technology gaps.

Thanks!

Appendix

Descriptive statistics

Our sample

- Drop observations with employment, revenue, assets negative and 0

Sample	**Nb of firms**	**Nb of obs**
All sample	172,004	285,762
SEZ firms	13,985	113,712
Firms in SEZ communes	152,826	565,455
Non-SEZ firms	5,193	19,224

Descriptive statistics

Our sample - Panel B

- Drop observations with employment, revenue, assets negative and 0

Sample	**Nb of firms**	**Nb of obs**
All sample	985,293	4,141,739
SEZ firms	13,985	113,712
Firms in SEZ communes	152,826	565,455
Non-SEZ firms	818,482	3,875,201

Robustness check: PSM

Potential issues

- Firms selection into SEZ areas

Approach

- **Step 1**: Adjust for selection bias by using propensity score matching
- **Step 2**: Run year-to-year matching
- **Step 3**: Match each treated firm with 3 other never treated firms based on 2-digit dummy industries, province, log of lagged interested outcomes (employees, revenue, and assets), and foreign dummy
- **Step 4**: Run ETWFE by Woodridge (2023)

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Robustness check - PSM

Table 5: Main results

Dep var:	**Number of employees**		**Sales**		**Labour productivity**	
	In SEZ	**In commune**	**In SEZ**	**In commune**	**In SEZ**	**In commune**
Effect	Direct	Indirect	Direct	Indirect	Direct	Indirect
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A. Control group is matched never-treated firms						
SEZ	0.186***	0.091***	0.216***	0.154***	0.009	-0.066**
	(0.062)	(0.017)	(0.079)	(0.030)	(0.056)	(0.033)
Obs	25,375	287,011	25,278	286,890	21,912	250,532

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Robustness test - Remove two star cities

Table 6: Main results

Dep var:	**Number of employees**		**Sales**		**Labour productivity**	
	In SEZ	**In commune**	**In SEZ**	**In commune**	**In SEZ**	**In commune**
Effect	Direct	Indirect	Direct	Indirect	Direct	Indirect
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A. Control group is never-treated firms in the cancelled SEZs						
SEZ	0.147*	0.006	0.661***	0.250***	0.381***	0.061
	(0.080)	(0.018)	(0.153)	(0.034)	(0.114)	(0.040)
Obs	12,177	104,314	12,171	104,250	9,879	83,753

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Validity test - Bounding violations of parallel trends

Table 7: Bounds on Treatment Effects (Log of Outcomes)

M	Nb of Employees (log)		Sales (log)		Labour Productivity (log)	
	lb	ub	lb	ub	lb	ub
.	0.233	1.379	0.476	2.619	-1.134	0.360
0.5	0.045	1.752	-0.139	3.494	-1.467	0.758
1	-0.256	2.232	-0.943	4.544	-1.970	1.313
1.5	-0.652	2.715	-1.893	5.635	-2.547	1.949
2	-1.110	3.224	-2.912	6.752	-3.150	2.595

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Heterogeneity analysis - Types of SEZs

National SEZs

- Industrial parks (or Industrial zones)
- High-tech zones
- Export processing zones
- Border economic zones
- Coastal economic zones

Provincial SEZs

Heterogeneity analysis - Types of SEZs

National SEZs

	1991-1993	1994-1996	1997-2002	2003-2011	2012-2019
National-level SEZs	**5**	**14**	**56**	**262**	**85**
By type					
Industrial zones	3	14	43	237	77
High-tech zones	0	0	2	1	1
Export processing zones	2	0	0	1	0
Border economic zones	0	0	11	9	4
Coastal economic zones	0	0	0	14	3
By region					
Northern region	0	4	15	97	34
Middle region	1	3	18	59	30
Southern region	4	7	23	106	21

Table 8: SEZ Wave Establishment by Type, and Region

Provincial SEZs

	Northern region	Middle region	Southern region
Province-level SEZs	311	270	117

Table 9: Province-level SEZs by Region

Heterogeneity results - Types of SEZs

Table 10: Heterogeneity Results: By Types of SEZs

	Number of employees		Sales		Labour productivity	
	Direct	Indirect	Direct	Indirect	Direct	Indirect
Panel A. Industrial zones						
SEZs	0.114*	0.083***	0.369***	0.383***	0.235***	0.147***
	(0.058)	(0.020)	(0.087)	(0.039)	(0.074)	(0.035)
Obs	24,862	55,785	24,791	55,739	20,537	45,306
Panel B. Economic zones						
SEZs	0.215***	0.141***	0.107	0.297***	-0.003	-0.140**
	(0.036)	(0.029)	(0.098)	(0.062)	(0.096)	(0.066)
Obs	22,327	23,366	22,317	23,351	18,561	18,567
Panel C. Border zones						
SEZs	0.019	0.177***	0.097	0.352***	0.065	-0.265***
	(0.056)	(0.032)	(0.125)	(0.067)	(0.125)	(0.065)
Obs	21,530	25,532	21,498	25,519	17,590	20,074
Panel D. Provincial zones						
SEZs	0.135***	0.085***	0.351***	0.252***	0.006	0.060**
	(0.047)	(0.014)	(0.083)	(0.029)	(0.066)	(0.026)
Obs	23,710	99,698	23,678	99,620	19,803	82,056

- Industrial zones: gain in both sizes and productivity (direct and indirect) (FDIs, large investments)
- Provincial zones: Gains in employment and sales, but not on productivity (SMEs, not large investments)
- Border/economic zones: No clear effects

Heterogeneity analysis - Firm size

Table 11: Heterogeneity Analysis - Firm Sizes

	Number of employees		Sales		Labour productivity	
	Direct	**Indirect**	**Direct**	**Indirect**	**Direct**	**Indirect**
Panel A. Very Small Firms						
SEZs	0.061	0.133***	-0.177	0.331***	-0.014	0.029
	(0.062)	(0.035)	(0.169)	(0.049)	(0.185)	(0.046)
Obs	13,099	81,253	13,092	81,219	10,928	65,269
Panel B. Small and Medium Firms						
SEZs	0.194**	0.010	0.585***	0.283***	0.218	0.145***
	(0.084)	(0.029)	(0.156)	(0.051)	(0.141)	(0.053)
Obs	8,210	61,892	8,207	61,863	6,651	50,258
Panel C. Big Firms						
SEZs	-0.149	0.026	0.822***	0.489***	0.715	0.290**
	(0.277)	(0.111)	(0.243)	(0.161)	(0.462)	(0.129)
Obs	653	3,655	648	3,599	493	2,850

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Heterogeneity analysis - Firm type

Table 12: Heterogeneity analysis - Types of Firms

	Number of employees		Sales		Labour productivity	
	Direct	Indirect	Direct	Indirect	Direct	Indirect
Panel A. Foreign Firms						
SEZs	0.663***	-0.072	1.611***	0.442*	0.476**	-0.198
	(0.124)	(0.101)	(0.230)	(0.252)	(0.185)	(0.232)
Obs	971	2,344	965	2,320	719	1,716
Panel B. Private Domestic Firms						
SEZs	0.161**	0.086***	0.397***	0.299***	0.130	0.079*
	(0.079)	(0.026)	(0.123)	(0.035)	(0.127)	(0.043)
Obs	20,411	135,882	20,402	135,798	16,893	109,431
Panel C. State Domestic Firms						
SEZs	0.078	-0.037	2.179**	0.168	0.227	0.150
	(0.279)	(0.076)	(1.018)	(0.156)	(0.344)	(0.129)
Obs	569	8,267	569	8,256	449	7,017

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Heterogeneity analysis - By industry

Table 13: Heterogeneity analysis - By industry: Pavitt Taxonomy

Dep var:	Number of employees		Sales		Labour productivity	
Treated group	In SEZ	In commune	In SEZ	In commune	In SEZ	In commune
Effect	Direct	Indirect	Direct	Indirect	Direct	Indirect
Panel A. By Pavitt taxonomy						
Panel A1. Only supplier-dominated firms						
SEZ	0.105***	0.081***	0.278***	0.361***	0.143**	0.111***
	(0.037)	(0.013)	(0.069)	(0.029)	(0.062)	(0.027)
Obs	24,036	94,096	23,988	94,031	19,200	75,765
Panel A2. Only scale-intensive firms						
SEZ	0.110	0.038	0.306**	0.179**	0.125	-0.060
	(0.076)	(0.040)	(0.135)	(0.077)	(0.112)	(0.065)
Obs	4,454	10,457	4,422	10,445	3,619	8,605
Panel A3. Only science-based firms						
SEZ	0.370*	0.126	1.143***	0.158	0.915***	0.128
	(0.220)	(0.155)	(0.130)	(0.242)	(0.273)	(0.233)
Obs	1,145	2,242	1,115	2,236	891	1,859
Panel A4. Only specialized suppliers firms						
SEZ	0.156	0.110**	0.509*	0.180	0.083	0.015
	(0.119)	(0.052)	(0.243)	(0.111)	(0.217)	(0.097)
Obs	2,644	8,355	2,641	8,338	2,069	6,663

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Mechanisms - Input-Output Linkage

Objective: Isolate the impact of SEZs' demand for inputs while controlling for sector-specific pre-trends and annual fluctuations.

Formula:

$$\text{SEZ}_{st} = \sum_i w_{si}^U \times w_{it}^m$$

Explanation:

- w_{si}^U: Input coefficient from the Vietnam Input-Output (IO) table (2007).
  - Represents the importance of sector s in the production of industry i.
- w_{it}^m: Sector weight.
  - Reflects the dominance of industry i at time t.
  - Calculated as:

$$w_{it}^m = \frac{\text{Sales of firms in SEZ areas of industry } i \text{ at } t}{\text{Total sales of industry } i \text{ at } t}$$

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Mechanisms - Technology gap

Objective: Classify communes with SEZs based on the prevalence of firms with Foreign Direct Investment (FDI) from developed or developing countries.

Methodology:

1. Firm-Level Classification:
   - Firms were categorized based on FDI origins:
     - FDI source = 1: Developed countries.
     - FDI source = 0: Developing countries.
2. Commune-Level Aggregation:
   - For each commune with an SEZ:
     - Counted the number of firms with FDI from developed countries.
     - Calculated the median number of such firms across all SEZ communes.
3. Classification Using Median Threshold:
   - **Only from developed countries**: Communes where the number of firms with FDI from developed countries exceeds the median.
   - **Only from developing countries**: Communes where the number of firms with FDI from developed countries is equal to or below the median.

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