

# Trade Openness and Sensitivity to Crisis: The Case of Special Economic Zones in Poland

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The presentation was elaborated within the research project entitled 'Foreign Trade in Special Economic Zones in Poland', financed by the National Science Center within the grant decision no. DEC-2013/11/D/HS4/04007 (SONATA 6 programme).

# Outline

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- ▶ Aim and scope of the analysis
- ▶ Regional trade: literature review
- ▶ Trade openness and its consequences
- ▶ Dataset and data limitations
- ▶ Stylized facts on trade openness
- ▶ SEZs' contribution to the national economy and its poviats
- ▶ The model
- ▶ Conclusions

# Aim and scope of the analysis

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## ▶ **Motivation:**

- ▶ Increasing role of SEZs in a global economy, especially exports, which exceed 600 billion USD (Ganesh & Zeng 2014),
- ▶ Yet unknown scale of SEZs in Polish trade flows,
- ▶ Deliberations on further operation of SEZs in Poland,
- ▶ Inconsistent empirical evidence on the effects of regional trade openness on regional growth.

## ▶ **Scope:**

- ▶ Spatial dimension of openness to foreign trade in Poland and its impact on the economic situation of regions taking into account the influence of Special Economic Zones as areas with relatively high trade openness.

## ▶ **Objectives:**

1. to describe the scale and conditions of spatial openness to foreign trade in Poland,
2. to estimate the role of SEZs in the Polish economy,
3. to define the impact of SEZs location on the scale of change of economic situation of poviats during the crisis.

# Why analyses of foreign trade activity at regional level?

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- ▶ Region as a **small open economy** → some concepts from international economics become relevant for regional analysis
- ▶ Strictly **practical aspect** → socio-economic situation of regions is more dependent on exports
- ▶ The principle of **subsidiarity**:
  - ▶ an encouragement to decentralisation and transferring decision-making authority to „as low as possible“ level
  - ▶ promotion of export is more effective at regional than at central level
    - the needs can be better identified „on the spot“

# Why analyses of foreign trade activity at regional level?

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## ▶ **Armington's preferences:**

- ▶ differentiation of features of products by consumers/importers depending on their place of origin
- ▶ promotion of regions as brands

## ▶ Concept of **lumpy countries** of P.N. Courant and A.V. Deardorff (1992)

## ▶ Concept of **seamless world** by P.R. Krugman and A.J. Venables (1995)

## ▶ **Regional competitiveness:**

- ▶ A lively discussion: R. Martin, P.R. Krugman, W. Molle, J.M. de Vet, Ecorys
- ▶ Regions can't „go out of business” but can function „stuck in economic (under)development”
- ▶ Which dimension of competitiveness is more important:  
internal or external

# Research on regional aspects of exports and openness

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- ▶ Definitely *in statu nascendi*
- ▶ for Poland: K. Gawlikowska-Hueckel, S. Umiński, P. Ciżkowicz, A. Cieślik, regional authorities
- ▶ Some research for: Spain (E. Paluzie, S. Gil-Pareja, R., R. Llorca-Vivero, J.A. Martínez-Serrano, J. Oliver-Alonso, A. Sanso, J. Villaverde Castro), Japan (E. Tomiura), Italy (P. Guerrieri, S. Iammarino, L. Becchetti, A. De Panizza, F. Oropallo, R. Strocchio), China (H. Sun, A. Parikh, Y. Wu, A.C. Ma; Coşar & Fajgelbaum), South Africa (M. Matthee, W. Naudé), Brazil and India (Daumal), Mexico (Rivas 2007)
- ▶ Undoubtedly **research for Canada and USA is main inspiration:** J.R. Baldwin, W.M. Brown, M. Polèse and R. Shearmura, J. Dufort and F. Murray, **A. Cassey**, R.M. Leichenko and J. Silva 2004, **C.C. Coughlin**, P.S. Pollard, H.J. Wall, N.E. Coulson, D.P. Clark, W.C. Sawyer and R.L. Sprinkle, T.B. Mandelbaum, R.A. Erickson, E.A. Eff and S.G. Livingston

# Regional trade data for Poland

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- ▶ No entry/exit data for Poland
- ▶ F01 (financial reports) – incomplete data
- ▶ Extrastat/intrastat – according to the location of an entity
- ▶ „Carry along trade” → distracting factors such as intermediate trade, as well as the cooperation between enterprises beyond the boundaries of the regions
- ▶ **What is a real test for competitiveness? → production or trade?**  
**Foreign markets as a test of competitiveness (heterogeneity concept – M. Melitz)**
- ▶ The resulting image of export at regional level should be treated as approximate

# Trade openness – at regional level

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- ▶ Much more research on openness and its consequences for countries than for regions
- ▶ Openness consequences depend on numerous factors: nature of institutional solutions, market structure and social issues (Lee 2011; Arezki & Ploeg 2010)
- ▶ For regions - complexity and impact of endogenous and exogenous factors increases
- ▶ Growth determinants are in: region, country and supranational structures (EU)
- ▶ Many shallow and deep determinants of development (Rodrik 2002) are outside the scope of impact of regional authorities



# Several points of view on openness for regions

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- ▶ Determinant of economic growth (Brodzicki 2014)
- ▶ Factor of differences among regions that has not been noticed earlier (Brülhart 2011; Ezcurra & Rodríguez-Pose 2014; Umiński 2012)
- ▶ Determinant and a measure of investment attractiveness (Ciołek 2014)
- ▶ Variable defining exposure of region to impulses coming from outside (Zaucha et al. 2014)

# Openness - summary

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- ▶ Relationship between openness and economic situation in regions is not unambiguous
- ▶ Conclusions are to a large extent “contextual” and refer to concrete regions - an attempt to generalise means a risk of committing errors or serious simplifications
- ▶ New Economic Geography – depicts openness, agglomeration and its consequences. Agglomeration processes are usually accompanied with growth of openness. Multiple equilibria possible as well as a switch to a new path of development
- ▶ Vulnerability (sensitivity, regional resilience) - Martin 2011, Zaucha 2014:
  - ▶ (low) sensitivity and resistance to economic shocks
  - ▶ renewability – a capacity of the region to **return to the path** of growth or entering the **new path** of growth
  - ▶ recovery – capacity to regain region’s strength after a shock
  - ▶ reorientation – adaptation of region’s economy to changes

# Brülhart (2011)

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- ▶ Spatial differentiation as the third, so far ignored aspect of opening the economy (initial two are: traditional sectoral approach and heterogeneity of entities).
- ▶ Brülhart's main conclusion:
  - ▶ liberalisation is beneficial first of all for regions with good access to foreign markets
  - ▶ if these regions are lagging behind, openness to trade results in convergence of regional development.
  - ▶ however, if such regions are developed, openness to trade results in polarisation of regional development

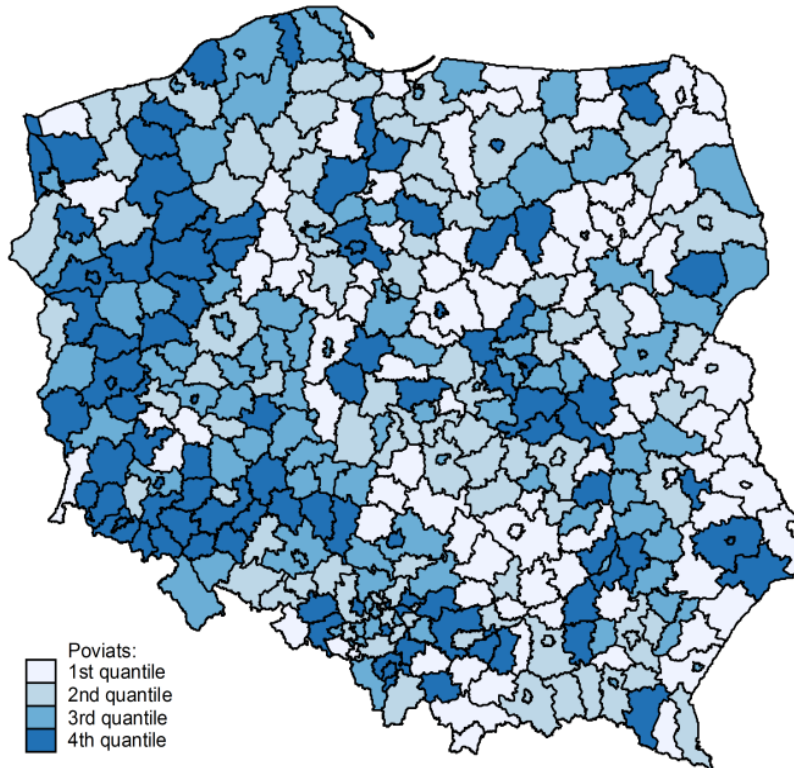
# Dataset and data limitations

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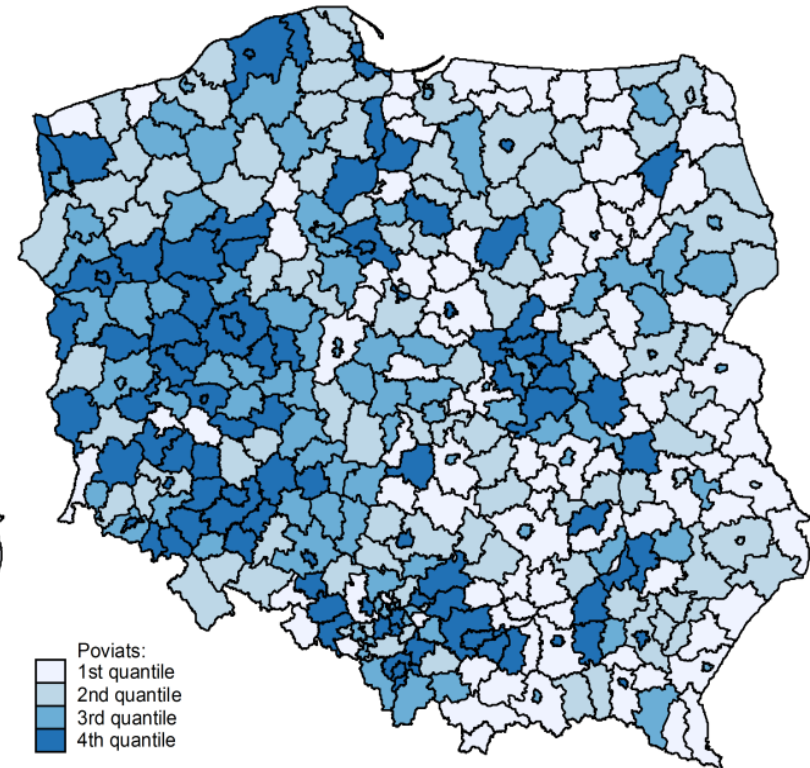
- ▶ **Data sources:** Central Statistical Office, the Ministry of Economy, Customs Chamber
- ▶ Two different sources of data on trade openness
- ▶ **Period:** 2004-2013 or 2005-2012
- ▶ **Level of aggregation:**
  - ▶ National (SEZ vs. non-SEZs)
  - ▶ Local (poviats , NUTS 4 / LAU 1)
- ▶ **Limitations:**
  - ▶ Some difficulties in separating SEZs trade flows - only in the case of companies operating in SEZs and outside of them simultaneously (so called REGON number problem)
  - ▶ Lack of official GDP data for poviats

# Stylized facts on trade openness

Av. trade openness: 2005-2012



Av. export per capita: 2005-2012

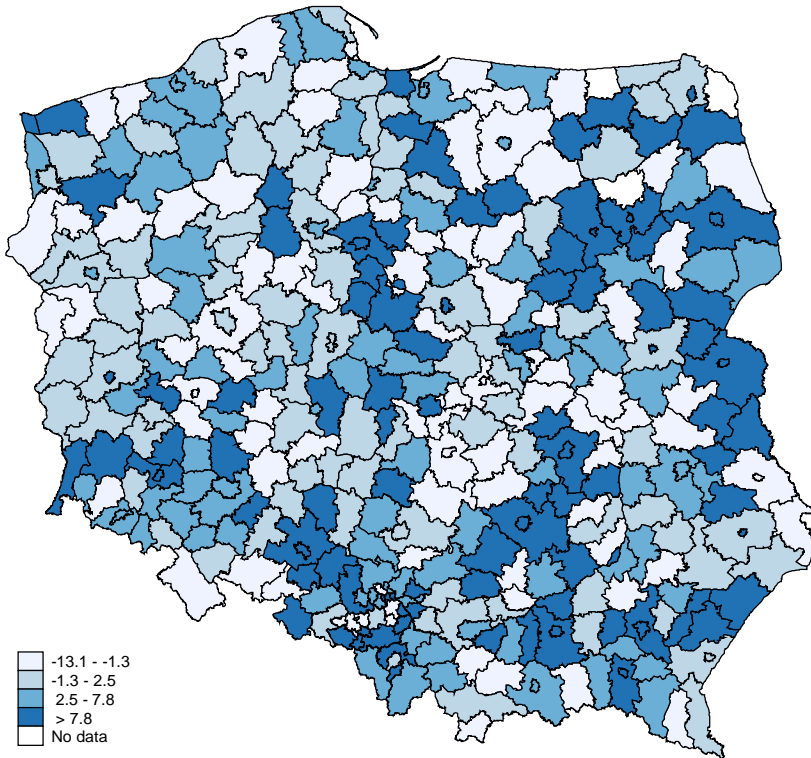


*Source: own compilation.*

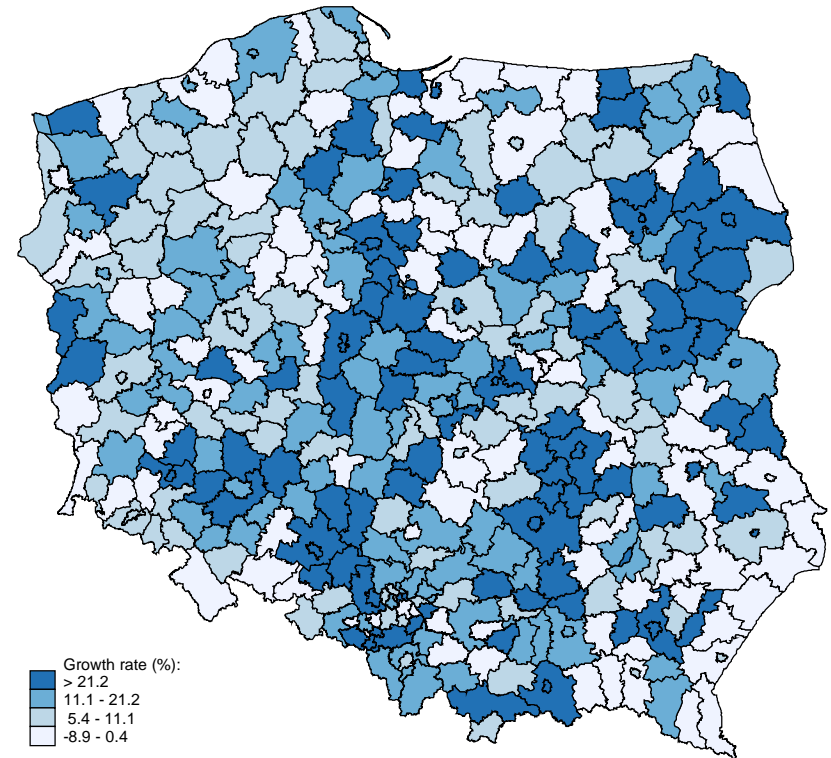
- ▶ Trade openness = (exports + imports) / firms' incomes,
- ▶ High concentration in industrial areas, localised mostly in western and southern part of Poland,
- ▶ Different methods of estimating trade openness bring quite similar results.

# Stylized facts on trade openness (cont.)

Av. annual trade openness growth: 2005-2012



Av. annual export per capita growth: 2005-2012



▶ Eastern areas are converging with more advanced territories.

# SEZs' contribution to the national economy

<b>Contribution (in %)</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>
Area	0.02	0.02	0.03	0.04	0.04	0.04	0.05	0.05	0.05	0.05
Employment	0.8	1.1	1.4	1.7	2.0	2.0	2.1	2.2	2.3	2.4
Investments	6.4	7.3	10.3	8.9	7.9	8.3	5.8	4.9	4.8	5.5
No. of exporters	0.5**	0.9	1.1	1.3	1.6	1.8	1.9	1.8	1.8	1.8
No. of importers	0.6**	1.0	1.2	1.5	1.8	2.0	2.0	1.9	1.8	1.9
Exports*	8.2**	13.8	16.6	18.3	19.2	20.5	20.5	21.3	20.1	20.4
Imports*	6.0**	9.2	11.5	10.9	11.4	13.1	14.8	14.7	14.6	15.4
<i>No. SEZs' permits incr. (%)</i>	<i>1.3</i>	<i>13.0</i>	<i>20.5</i>	<i>14.6</i>	<i>12.9</i>	<i>4.8</i>	<i>8.1</i>	<i>8.3</i>	<i>5.4</i>	<i>10.6</i>

Source: own calculations.

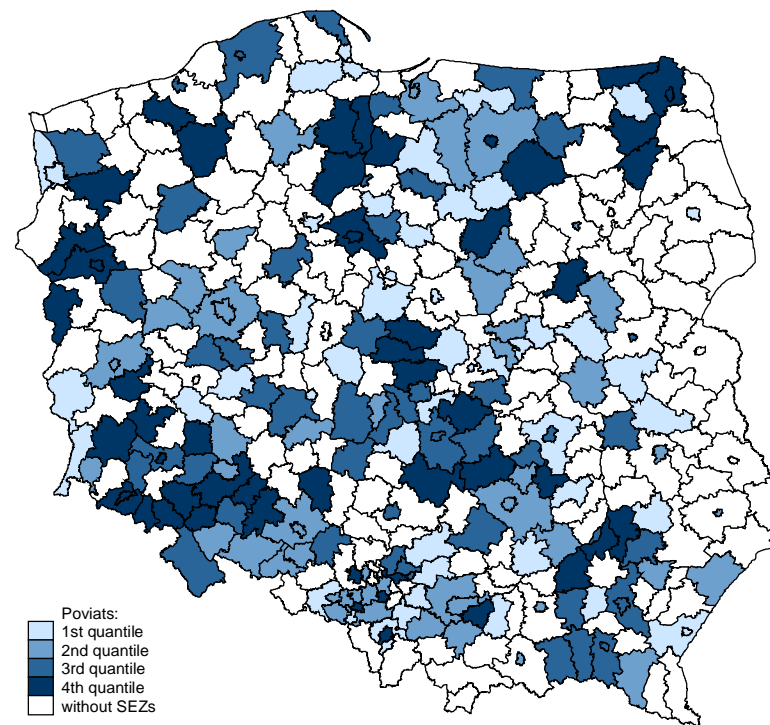
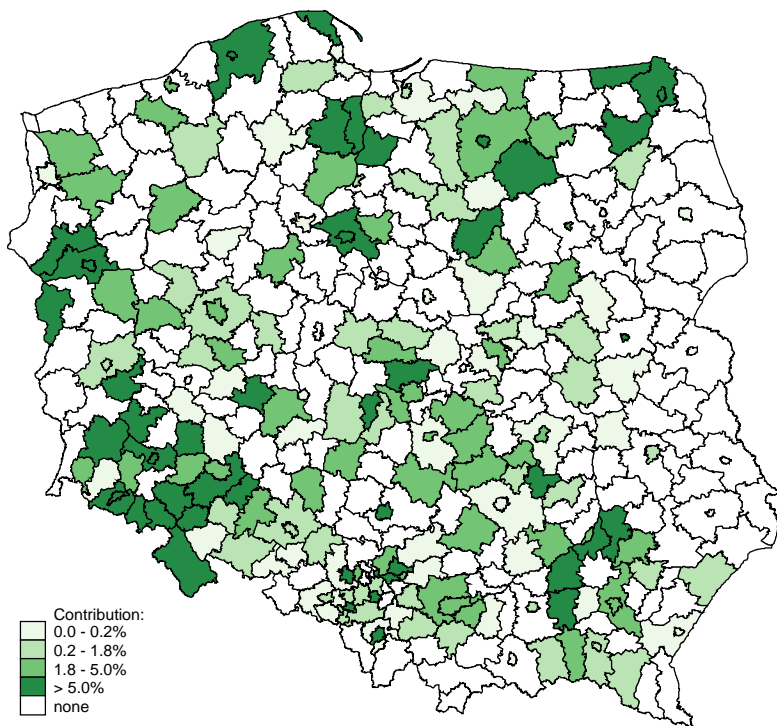
\* Exports and imports of companies having valid permits for operation in SEZs. These can result in a small overestimation bias, stemming from the method of collecting statistical data in Poland

\*\* Break in time-series.

# SEZs' contribution in poviats' economies

Av. SEZs' contribution in employment: 2007-2013

Av. SEZs' contribution in investments: 2007-2013



Source: own calculations.

SEZs' mean contribution (%)	2007	2008	2009	2010	2011	2012	2013
	All poviats						
Investments		7.4	9.6	8.3	5.0	4.4	4.7
Employment	1.7	1.8	1.9	2.0	2.1	2.1	2.3

Source: own calculations.



# Trade openness in poviats with SEZs and without SEZs

Variable	2005		2012		Difference	
	non-SEZs	SEZs	non-SEZs	SEZs	non-SEZs	SEZs
	<b>means</b>					
Trade openness (%)	28,6	<b>37,1</b>	29,4	<b>40,9</b>	0,8	<b>3,8</b>
Exports per capita (EUR)	1059,2	<b>1998,5</b>	1636,5	<b>3013,9</b>	577,3	<b>1015,4</b>
Imports per capita (EUR)	610,8	<b>1114,0</b>	630,9	<b>1489,9</b>	20,1	<b>375,9</b>
Share of tradables in exports (%)	93,3	<b>94,7</b>	92,2	<b>92,6</b>	-1,1	<b>-2,1</b>
Share of FOEs in exports (%)	36,8	<b>49,2</b>	28,3	<b>47,6</b>	-8,5	<b>-1,6</b>
Share of FOEs in imports (%)	51,4	<b>84,2</b>	43,3	<b>80,2</b>	-8,1	<b>4,0</b>
Export growth* (%)	25,5**	<b>23,8**</b>	17,3	<b>11,8</b>	-8,2	<b>-12,0</b>
No. of export directions (no.)	42,9	<b>56,6</b>	47,3	<b>70,3</b>	4,4	<b>13,7</b>

\* Export growth: year-on-year

\*\* Break in time-series in 2004.

# The model

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- ▶ **Crisis:**
  - ▶ natural quasi-experiment for observation of poviats' crisis reaction with a reference to location of SEZs and trade openness
- ▶ **Period:** **2007:** pre-crisis year; **2009:** „crisis“ year
- ▶ **Aim:** to estimate the differences in the depth of decline for selected economic indicators: exports, investments, employment, industrial production in two groups of poviats.
- ▶ **Approach:**

OLS model on pooled data with a set of covariates and dummy variables /  
difference-in-difference strategy

$$y_{it} = \beta_0 + \beta_1 \cdot crisis_t + \beta_2 \cdot sez_i + \beta_3 \cdot crisis_t \cdot sez_i + \beta_k \cdot X_{k,it} + \varepsilon_{it}$$

- ▶ **Where:**
  - ▶  $y_{it}$  – ln increment of dependent variable in time  $t$ , for poviat  $i$ ,
  - ▶  $crisis_t$  – dummy variable indicating the base and the crisis year (2007==0, 2009==1)
  - ▶  $sez_i$  – dummy variable (SEZ in poviat)
  - ▶  $X_{k,it}$  –  $k$ -dimensional matrix of independent variables for poviat  $i$ , in time  $t$

# Estimates

Variables	(1) $\Delta \ln_{\text{exports\_eur}}$	(2) $\Delta \ln_{\text{employed}}$	(3) $\Delta \ln_{\text{investments}}$
<b>Crisis</b>	<b>-0.3275***</b> (0.028)	<b>-0.0349***</b> (0.005)	<b>-0.2678***</b> (0.049)
<b>SEZs</b>	<b>0.0510**</b> (0.026)	<b>0.0096**</b> (0.005)	<b>0.0915*</b> (0.047)
<b>SEZs * crisis</b>	<b>-0.0637*</b> (0.038)	<b>-0.0170***</b> (0.006)	<b>-0.1613**</b> (0.067)
$\ln_{\text{gross\_value\_of\_fixed\_assets\_pc}}$	-0.0928*** (0.021)	-0.0062** (0.003)	
$\ln_{\text{incomes per company}}$	0.0622*** (0.024)		
$\ln_{\text{population\_per\_sq\_km}}$		-0.0028* (0.002)	
$\ln_{\text{commune\_incomes\_pc}}$		0.0250*** (0.006)	
$\ln_{\text{firms' incomes per worker}}$		0.0101** (0.004)	
$\text{industrial\_employment\_ratio}$	0.3083*** (0.098)		
$\text{FOEs\_export\_share}$	0.0964*** (0.037)		
$\text{unemployment\_rate}$	-0.0035* (0.002)		
Constant	-0.9785*** (0.319)	-0.2203*** (0.056)	0.1707*** (0.035)
Observations	686	686	688
R-squared	0.4018	0.2801	0.1479
Adj. R - squared	0.3948	0.2726	0.1442
F-stat	52.0090	44.0219	39.5791
Df	677	678	684
N	686	686	688

Source: own estimates.

Robust standard errors in parentheses, p-values: \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

# Difference-in-Difference estimates

Outcome variable	Control	Treated	Difference	Control	Treated	Difference	DID
	t = 0			t = 1			
$\Delta \ln_{\text{exports\_eur}}$	-0.9785	-0.9276	0.0510*	-1.3061	-1.3188	-0.0128	<b>-0.0637*</b>
$\Delta \ln_{\text{employed}}$	-0.2203	-0.2107	0.0096**	-.2552	-.2626	-0.0074*	<b>-0.0170***</b>
$\Delta \ln_{\text{investment}}$	0.1707	0.2621	0.0915**	-.0971	-.1670	-0.0698	<b>-0.1613**</b>
$\Delta \ln_{\text{industrial manufacturing}}$	0.1254	0.0855	-0.0400	-.0422	-.1014	-0.0593**	-0.0192

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

- ▶ Generally, the growth rates of dependent variables were usually higher in poviats with SEZs vs. non-SEZs.
- ▶ During the „crisis” period: poviats with SEZs experienced higher decline in exports, employment, investment.
- ▶ Short period of the study potentially limits the statistical significance of difference in the volume of industrial manufacturing.
- ▶ There may be potentially different important factors affecting crisis transmission apart from the location of SEZs in Poland.

# Conclusions

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- ▶ High spatial concentration of trade openness in Poland.
- ▶ SEZs in Poland play significant role in generating national exports and imports.
- ▶ Positive impact of SEZs on growth of investments, exports and employment in poviats.
- ▶ Location of SEZs can be one of the dimensions differentiating trade behaviour of local economies.
- ▶ **During the crisis:** high concentration of firms in selected branches of industrial manufacturing, combined with a high share of big-sized companies with foreign capital, associated with the location of SEZs, may affect local economies to be more sensitive to potential crisis transmission.
- ▶ **Before and after the crisis:** poviats with SEZs more often seemed to grow faster than areas without SEZs (exports, employment, investment, industrial manufacturing).
- ▶ Limitation of the study: the need of incorporating more dependent variables to better isolate the effect of trade openness and location of SEZs on potential crisis transmission.
- ▶ Disaggregation of regional GDP data needed to verify the influence of SEZs on GDP growth volatility at local level of analysis.