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The ex-post evaluation of the EU Cohesion Policy Programmes 2004-2006 on Polish regions: the impact on regional income and employment

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Plan of the Presentation:

1. Main goals of the study.
2. The distribution of the EU funds across Polish regions.
3. The review of existing literature.
4. The description of the research method.
5. The impact of the Community Support Framework (CSF) 2004-2006 on regional output and employment.
6. Conclusions with the summary of results and directions for future studies.



' ... the Community shall aim at reducing disparities between the levels of development of the various regions and the backwardness of the least favoured regions ...'

Treaty Establishing the European Community, 1958



Main goals of this study:

- Empirical verification of spatial distribution of EU funding across Polish regions
- An assessment of the impact of European Cohesion Policy (ECP) programmes in Poland at regional level in terms of output and employment
- Empirical verification of the hypothesis concerning uneven effects of similar measures in different locations



Spatial allocation of structural interventions in Poland 2004-2006

- The National Development Plan (NDP) and the CSF contained the main assumptions about structural policy interventions for the 2004-2006 period.
- The NDP was implemented through several Sectoral Operating Programmes (centralised).
- The financial aid from the EU was channelled also via the Cohesion Fund and the Community Initiatives such as EQUAL and INTERREG II.
- According to the NDP the overall cost of all activities including both public and private resources was supposed to exceed 16.7 billion euro expressed in constant 1999 prices.



The absolute and relative magnitude of structural interventions in the period 2004 – 2006.

| Voivodship | Accomplished projects | | | Cost of accomplished projects | | | Cost as % of GDP in 2004 | | Cost per capita | |
|---------------------|-----------------------|------|------|-------------------------------|------|------|--------------------------|------|-----------------|------|
| | Number | % | Rank | Total cost millions PLN | % | Rank | % | Rank | PLN | Rank |
| Dolnośląskie | 3421 | 4.7 | 11 | 9577.0 | 11.6 | 3 | 13.9 | 2 | 3415.6 | 1 |
| Kujawsko-pomorskie | 4710 | 6.5 | 6 | 4375.7 | 5.3 | 9 | 10.0 | 8 | 2155.6 | 9 |
| Lubelskie | 7415 | 10.2 | 2 | 3569.3 | 4.3 | 10 | 10.6 | 5 | 1775.6 | 13 |
| Lubuskie | 1409 | 1.9 | 16 | 1803.9 | 2.2 | 15 | 9.2 | 10 | 1979.0 | 10 |
| Łódzkie | 5723 | 7.8 | 4 | 4908.9 | 6.0 | 8 | 10.4 | 7 | 2311.9 | 7 |
| Małopolskie | 4231 | 5.8 | 8 | 5221.3 | 6.3 | 5 | 8.0 | 13 | 1650.8 | 14 |
| Mazowieckie | 10823 | 14.8 | 1 | 13452.7 | 16.3 | 1 | 7.7 | 15 | 2842.8 | 3 |
| Opolskie | 1988 | 2.7 | 15 | 1615.2 | 2.0 | 16 | 7.6 | 16 | 1581.6 | 15 |
| Podkarpackie | 2968 | 4.1 | 14 | 3018.6 | 3.7 | 11 | 8.8 | 12 | 1484.9 | 16 |
| Podlaskie | 4838 | 6.6 | 5 | 2237.2 | 2.7 | 14 | 10.5 | 6 | 1905.4 | 11 |
| Pomorskie | 4283 | 5.9 | 7 | 5042.1 | 6.1 | 7 | 10.8 | 4 | 2551.3 | 4 |
| Śląskie | 3862 | 5.3 | 9 | 9928.5 | 12.0 | 2 | 7.9 | 14 | 2161.9 | 8 |
| Świętokrzyskie | 3655 | 5.0 | 10 | 2280.3 | 2.8 | 13 | 9.7 | 9 | 1818.6 | 12 |
| Warmińsko-mazurskie | 3010 | 4.1 | 13 | 2768.6 | 3.4 | 12 | 12.9 | 3 | 2413.6 | 5 |
| Wielkopolskie | 7314 | 10.0 | 3 | 7535.9 | 9.1 | 4 | 9.0 | 11 | 2343.6 | 6 |
| Zachodniopomorskie | 3388 | 4.6 | 12 | 5212.9 | 6.3 | 6 | 13.9 | 1 | 3126.0 | 2 |



Conclusions from Descriptive Data Analysis

- The richest Mazowieckie voivodship is the largest recipient of aid when measured both in terms of the number of accomplished projects and in terms of their costs.
- The middle-income Lubuskie and Opolskie voivodships with the smallest number of accomplished projects and the lowest costs.
- Zachodniopomorskie and Dolnośląskie voivodships open the list of regions that have relatively high per capita incomes. The Mazowieckie voivodship still ranks high when we look at the cost of accomplished projects per capita.



Conclusions from Descriptive Data Analysis

- The revised rankings support the conclusion that more developed areas have also higher absorption capacity and receive more aid. The intuition would, therefore, suggest that the greatest impact of the ECP should be expected in the voivodships where the value of structural interventions is the highest when related to regional GDP and population.
- However, the effects of regional policy may vary according to the type of structural spending.
- Therefore, their final outcome is not clear and requires a formal quantitative evaluation.



Review of previous empirical studies

- The recent examples of studies that focus on Poland include Bradley et al. [2007], Bukowski et al. [2008], Nowicki et al. [2003], Kaczor [2006], Kaczor and Socha [2008], Radziwiłł [2008], Rokicki and Socha [2008]. Yet, only few of them consider the impact of the ECP on the economic development at the regional level and evaluate explicitly the impact of the CSF 2004-2006.
- The results of the aforementioned studies are hardly comparable as they employ very different research methodologies. The majority of them are based on the computable general equilibrium (CGE) model.
- None of the aforementioned studies, however, shows the effects of different regional policy measures on regional output and employment in Poland.



Our extension of previous studies

- We apply the supply side approach relying on the data on accomplished projects.
- We study the effects of various regional policy measures.
- We distinguish between the private and the public capital, infrastructure and control for differences in regional levels of technology using FDI data.
- We focus on the role of the road network.



Research Methodology

We take the supply-side approach based on the regional production function originally applied by de la Fuente [2002] for the Spanish regions.

Following Rokicki and Socha [2008] we use a two-step method for calculating the economic effects of the ECP programmes.

- First, we estimate regional production functions to obtain elasticities for each factor of production.
- Second, we multiply the estimated elasticities by an increase in the logarithm of the stock of each factor due to the investments programmed in the CSF to obtain their contribution to the growth of output and employment.



Research Methodology (2)

We distinguish between direct and indirect effects of the structural interventions:

- A direct effect results from the change in the stock of a specific factor.
- An indirect effect results from the change in employment. Hence, the increase in employment also leads to increased output.
- The overall effect is the sum of these two effects.



The model

The empirical framework is based on a simultaneous estimation of the augmented Cobb-Douglas production function and the labour demand function. We allow for increasing returns, so the production function has no additional restrictions and takes a form of:

$$Y_{ijt} = A_{ijt}^{\theta} K_{pr\,ijt}^{\alpha} K_{pu\,ijt}^{\beta} P_{it}^{\chi} H_{it}^{\delta} L_{ijt}^{\phi-1}$$

Labour market equilibrium is determined under perfect competition and no adjustment costs assumptions. This leads to the conclusion that on equalling the marginal product of labour and real wage, the following labour demand function can be obtained:

$$\frac{\partial Y_{ijt}}{\partial L_{ijt}} = \phi A_{ijt}^{\theta} K_{pr\,ijt}^{\alpha} K_{pu\,ijt}^{\beta} P_{it}^{\chi} H_{it}^{\delta} L_{ijt}^{\phi-1} = W$$

where: i denotes a region, j denotes a section and t denotes a year.



The model (2)

- The factors of production include technology (A), private capital (K_{pr}), public capital (K_{pu}), labour (L), public infrastructures (P), and human capital (H).
- Furthermore, it is supposed that different regions and sections of the economy should have different production factor elasticities.
- The estimated factor coefficients: θ , α , β , χ , δ , and ϕ measure the product elasticity with respect to the amount of each factor. For example, a 1% increase in the private capital stock would lead to α % increase of the aggregate product ceteris paribus.



The data

- The model was estimated using the instrumental variables method on the panel dataset for the 1995-2007 period, 12 two-digit NACE sections and each of three groups of voivodships: the high-income (Dolnośląskie, Mazowieckie, Pomorskie, Śląskie and Wielkopolskie), the middle-income (Kujawsko-Pomorskie, Lubuskie, Łódzkie, Małopolskie, Opolskie and Zachodniopomorskie) and the low-income (Lubelskie, Podkarpackie, Świętokrzyskie and Warmińsko-Mazurskie).
- The data sources used in the estimation of the production function and in the calculation of changes in stocks of each production factor due to structural interventions are described in detail in Rokicki and Socha [2008].



The impact of the CSF 2004-2006 on regional output and employment (national elasticities).

| Voivodship | Δ output % | Δ employment % | Δ employment units |
|---------------------|----------------------|--------------------------|------------------------------|
| Dolnośląskie | 3.81 | 0.11 | 713 |
| Kujawsko-pomorskie | 2.86 | 0.09 | 362 |
| Lubelskie | 2.36 | 0.03 | 125 |
| Lubuskie | 3.74 | 0.08 | 166 |
| Łódzkie | 3.24 | 0.07 | 368 |
| Małopolskie | 2.75 | 0.10 | 713 |
| Mazowieckie | 2.81 | 0.08 | 1428 |
| Opolskie | 3.41 | 0.06 | 118 |
| Podkarpackie | 2.33 | 0.08 | 304 |
| Podlaskie | 2.28 | 0.04 | 87 |
| Pomorskie | 2.49 | 0.09 | 438 |
| Śląskie | 3.17 | 0.10 | 1148 |
| Świętokrzyskie | 2.69 | 0.09 | 192 |
| Warmińsko-mazurskie | 2.43 | 0.07 | 183 |
| Wielkopolskie | 3.35 | 0.06 | 517 |
| Zachodniopomorskie | 2.86 | 0.14 | 459 |



The impact of the CSF 2004-2006 on regional output and employment (regional elasticities).

| Voivodship | Δ output % | Δ employment % | Δ employment units |
|---------------------|-------------------|-----------------------|---------------------------|
| Dolnośląskie | 0.01 | 0.01 | 65 |
| Kujawsko-pomorskie | 4.24 | 0.09 | 372 |
| Lubelskie | 1.90 | 0.93 | 3321 |
| Lubuskie | 5.54 | 0.09 | 171 |
| Łódzkie | 4.80 | 0.07 | 379 |
| Małopolskie | 4.07 | 0.11 | 732 |
| Mazowieckie | 0.01 | 0.01 | 127 |
| Opolskie | 5.06 | 0.06 | 121 |
| Podkarpackie | 1.88 | 0.98 | 3777 |
| Podlaskie | 1.91 | 0.90 | 1821 |
| Pomorskie | 0.02 | 0.01 | 54 |
| Śląskie | 0.02 | 0.01 | 126 |
| Świętokrzyskie | 2.19 | 1.12 | 2500 |
| Warmińsko-mazurskie | 2.00 | 1.00 | 2609 |
| Wielkopolskie | 0.02 | 0.01 | 122 |
| Zachodniopomorskie | 4.21 | 0.14 | 472 |



Summary of Empirical Results

- The results reveal important differences between particular regions.
- The voivodships from the middle-income group tend to be most favoured by the structural policy programmes. In all of them output increases more than 5%, however, employment increases only slightly more than 1%.
- The increase in employment in the poor regions hardly exceeds 1%, while the production rises by more than 2%.
- The most developed regions experience no substantial improvement neither in terms of employment nor output.
- Total employment in the entire economy increases only by 56512 persons. This number is much lower compared to forecasts obtained in the previous studies. In particular, Bradley et al. [2007] according to whom the ECP programmes should create up to 300 thousands of new jobs.



Concluding remarks

- We find that once we use regional elasticities, the structural interventions will hardly affect economic performance of the most developed Polish voivodships, while the regions with medium and low level of per capita income may increase their economic growth.
- It is necessary to emphasize that our simulation results are valid in short term only and have been obtained under unrealistic assumption that all projects are accomplished in the same year. Therefore, future studies should take into account the long term impact of structural policies and allow for crowding-out and crowding-in effects of public spending on private investment or capital depreciation.



Concluding remarks (2)

- Even though the CSF 2004-2006 seems to have a positive impact on production and employment in the least developed areas in the short-run, they may eventually become the net losers of the process of European integration in the long-run. In particular, the investment in interregional transport infrastructure may further reinforce the spatial concentration of economic activity, observed over the recent years.
- Some of the medium-income regions may have a chance to catch up with the high-income regions due to the structural interventions. However, the poor eastern border regions will probably remain lagging behind in terms of their economic development.



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Thank you!