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Analysis of the Employment Effects of Economic Zones in the US, France and Poland: Methodological and Socio-Economic Challenges

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Abstract

Theoretical background: Countries around the world use a variety of instruments to intervene in economic processes to promote regional development and attract foreign investment. One such tool is the creation of economic zones, which offer a range of incentives and concessions to companies operating within their boundaries. The theory of economic zones fits into the concept of selective interventionism, whereby the state provides special benefits in selected areas in order to, i.a., stimulate economic growth, employment or reduce unemployment.

Purpose of the article: The article presents a synthesis of previous research on the effectiveness of economic zones in terms of their impact on employment and unemployment reduction, analysing experiences from the USA, France and Poland. It aims to identify the factors that may account for the significant differences in research findings across these countries.

Research methods: This article is a theoretical review of the literature on the evaluation of the impact of economic zones in the USA, France and Poland. The analysis of the literature focuses on the methodology, results and conclusions of different studies, taking into account the diversity of research approaches, data analysis techniques, sampling criteria and socio-economic factors. The information gathered is synthesised to identify key trends, consistency and inconsistency of findings, and methodological challenges.

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Main findings: Differences in the efficiency of SEZs in the US, France and Poland are mainly due to differences in tax policies applied at different administrative levels. In addition, the effectiveness of zones is strongly influenced by local socio-economic conditions and the heterogeneity of beneficiaries. Important methodological challenges include the identification of zone areas and the selection of appropriate control groups. Analysing the impact of employment in zones, taking into account local conditions and the heterogeneity of enterprises, can significantly improve the effectiveness of these programmes.

Introduction

The state intervenes in economic processes in many ways. The introduction of new instruments and solutions to economies involving, i.a., the creation of special mechanisms – tax geographic programmes – is one of them. The concept of creating economic zones, in which operating entities receive various types of privileges and support, has rapidly gained popularity. As an effective method of promoting economic development, it has been used in developing countries and in many developed countries (Abdi et al., 2022; Aggarwal, 2023).

The long-standing evolution of tools to promote economic development, the different phases of economies' development and the specific political and socio-economic conditions in different countries have resulted in the literature being replete with examples of a variety of approaches to the operation of privileged areas. A variety of terminologies and typologies are used to describe programmes very often with similar objectives (Aggarwal, 2022; Bost, 2019; Cicha-Nazarczuk, 2021). Therefore, the article uses the general term "economic zones" to describe the various areas that offer incentives to potential investors such as enterprise zones or corporate zones.

The theory of economic zones, as Jensen (2018) notes, is part of the concept of selective interventionism which, due to the variety of instruments, has not undergone significant development. The contemporary approach to the concept of economic zones is mainly based on endogenous growth theory, institutional economics and the legacy of the New Economic Geography (NEG). The implementation of such approaches and policies in different countries illustrates a territorial approach to stimulate growth and economic development in areas in need of support (Barca et al., 2012). Zones are an example of the so-called territorialisation of public intervention (Zaucha et al., 2015), supporting the development of specific areas, often within the framework of national regional aid programmes, as is the case in Poland, for example (Ambroziak, 2009).

Countries around the world have launched zone projects to pursue similar objectives. These are mainly to attract foreign capital (Davies et al., 2018; Pakdeenurit et al., 2017), to stimulate economic growth (Aggarwal et al., 2009; Aritenang & Chandramidi, 2020; Chaudhary & Potter, 2019; Moberg, 2015) and to promote regional development and entrepreneurship (Zheng et al., 2016). Foreign capital is also expected to contribute to the transfer of knowledge, modern technology, innovation (Bartlett et al., 2017; Dubinina, 2023; Kanungo, 2016), facilitate access to advanced marketing methods and management systems at a global level (Palit,

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2009). In addition, zone programmes aim to strengthen links between local and national economies with global markets, supporting the development, promotion and diversification of exports (Davies & Mazhikeyev, 2019; Defever et al., 2019; Nazarczuk & Uminski, 2018, 2019).

Zones, as a tool of regional policy, are also widely considered to have a significant impact on improving the socio-economic well-being of local communities (Capik, 2013). They act as "safety valves," helping to solve labour market problems (Ambroziak, 2016; Farole, 2011).

The experiences, successes and failures of many countries with regard to economic zones provide a rich body of research seeking empirical evidence on the impact of the instrument on employment levels and unemployment reduction. Outside the Polish context, this issue is more extensively analysed in foreign literature. Privileged areas have a longer history there. Moreover, this type of objective was primarily pursued by place-based policies in the USA, France and the UK (Dániel, 2022). Some of the most frequently analysed cases are the corporate zones in France or enterprise zones in the USA. They are examples of place-based policies aimed at addressing the lack of economic activity and thus the lack of jobs in so-called deprived areas. Although the idea of establishing enterprise zones in Poland was somewhat different, creating jobs in underdeveloped areas soon became their key challenge.

The mechanism for the impact of zonal policies in the countries mentioned is therefore similar in nature, although the solutions used, incentives and principles of state intervention may differ. Analyses of their effectiveness often lead to contradictory conclusions, even if they concern the same programmes. In addition, the standardisation of solutions in a given country does not always translate into unequivocal results. The varying nature of employment effects in zones in the literature is often explained by the different socio-economic context of the region, the specifics of the community studied and the method of analysis adopted.

Therefore, when assessing the impact of this type of intervention on employment or unemployment levels, it is worth looking at international experience in this area. This article aims to identify factors that may be responsible for significant differences in research findings. Understanding these discrepancies can contribute to better economic policy-making and provide directions for future research that could produce more consistent findings and deepen our understanding of the effectiveness of economic zones.

This article is therefore a synthesis of previous academic research on the effectiveness of economic zones in creating jobs or reducing unemployment on the example of the Polish, French and American experiences. In order to better understand the potential of SEZs as a tool to address labour market difficulties, there is a need for a coherent, integrated overview of relevant empirical approaches in this regard. Such an analysis is important for several reasons. First and foremost, it allows for a synthesis of existing knowledge and research on economic zones operating in different regions and socio-economic contexts. This allows for a better understanding of the diversity of

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approaches and results that have been achieved in the scientific literature. The approach also allows the identification of trends and patterns in the functioning of economic zones worldwide. By juxtaposing the different strategies and methods used in different countries, it is possible to isolate the factors determining the success or failure of such initiatives. This, in turn, can be useful for the formulation and adaptation of economic policies, both at national and international levels. Providing a comprehensive overview of the available research can support the decision-making process, enabling a better understanding of the potential benefits and challenges of zonal operation. Finally, it is expected that such analyses can identify new lines of analysis and questions that require further exploration, inspiring future research into the effectiveness of zoning policies.

Literature review

Economic zones have become an integral part of the modern global economy. The popularity of the concept has led to countries at different levels of economic development turning to this solution. Empirical research to date evaluating their effectiveness in solving labour market problems has focused primarily on developed countries, mainly the United States and Europe. Only recently, due to the increasing availability of microdata, has there been an increased interest in such analyses in developing countries. Nevertheless, these issues remain poorly understood in these economies, where there are significant economic differences between regions and limited labour mobility (Chaurey, 2017).

This article aims to identify the factors responsible for the significant differences in the findings on economic zones in the US, France and Poland. Therefore, it is important to understand the origins and nature of the functioning of these instruments in the analysed economies. Knowing the context of the emergence and development of the zones allows for a more precise interpretation of the research results and an assessment of the effectiveness of different job creation strategies. Furthermore, a comparison of the historical and structural differences between the economic zones in the countries mentioned makes it possible to identify the specific factors affecting their effectiveness, both locally and internationally.

In contrast to zoning policies in Asian countries, which are responsible for the way in which the spatial (re)organisation of industry has been stimulated (Huang et al., 2017), the concept of economic zones has evolved in developed countries within the framework of so-called place-based policies, i.e., spatially-oriented policies. These were primarily aimed at economic development and the revitalisation of less developed areas. The United Kingdom, France or the United States introduced geographically targeted tax concessions to promote economic development, entrepreneurship, job creation and environmental improvement in so-called "at-risk areas" (Chaudhary & Potter, 2019; Mayer et al., 2013; Neumark & Simpson, 2015). In Poland, on the other hand, the zones were not just a geographically targeted tool to counteract social prob-

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lems. Their creation was a direct response to the negative and unpleasant effects of the transformation, which required intervention at the national level.

From the early 1980s, in response to deteriorating economic conditions in many areas of the US, some states began to implement economic revitalisation programmes known as enterprise zones (EZs) (Bondonio & Greenbaum, 2007; Chaudhary & Potter, 2019; Dániel, 2022). These initiatives introduced tax breaks aimed at attracting investment and generating jobs in economically deprived areas (Billings, 2009; O'Keefe, 2004). In addition, EZ programmes were designed to stimulate local economic activity and improve the availability of services, such as healthcare, which could encourage further economic development and attract further investors through the spillover effect (Givord et al., 2018).

The French *Zones Franches Urbaines* (ZFUs) were similar to US programmes in their conception. They were established in the 1990s in poor urban areas of French municipalities in response to high unemployment, poverty and other economic challenges. These programmes provided tax relief aimed at attracting investment to economically difficult neighbourhoods. Their main objective was to promote local economic development, improve employment and increase the overall prosperity of the selected locations (Gobillon et al., 2012; Mayer et al., 2013).

In Poland, the creation of privileged areas in the 1990s was a direct response to the negative consequences of economic transformation. The systemic changes resulted in clear differences in socio-economic development between different regions, as well as spatial concentration of the negative effects of the reforms in the form of recession, poverty and high structural unemployment in certain areas. Effective management of the freed labour resources required strong pro-investment incentives. Job creation in the zone and its close surroundings became the overarching goal that all established special economic zones (SEZs) indicated in their original development plans (Cicha-Nazarczuk, 2021; Dugiel et al., 2022). These programmes have long played a role in alleviating tensions on the Polish labour market.

The original idea of establishing SEZs in Poland changed over time into a more market-based model of site selection for subsequent subzones. They became a form of state aid dedicated to specific investors, which initiated a debate on their continued rationality. In the context of the evolving needs of the Polish economy, increasing regional polarisation (Ambroziak, 2009) and the saturation effect associated with locating investments in economically well-developed areas (Trzciński et al., 2016), the instrument of zones has been completely transformed.

Research methods

This article is theoretical in nature and reviews the literature on the evaluation of the effects of economic zones in the USA, France and Poland. It is based on a systematic and critical approach to the selection and analysis of existing studies.

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The literature review synthesises the state of knowledge on the effects of economic zones and identifies key challenges and research gaps in the field.

The analysis of the literature includes an assessment of the methodologies used in each study, their results and conclusions. Particular attention was paid to the variety of research approaches, data analysis techniques, sampling criteria used and socio-economic factors considered. The information collected was then synthesised to identify key trends, consistency and inconsistency of results and methodological challenges.

Results

There have been many descriptive case studies and sophisticated economic and geospatial analyses around the world looking for evidence of the impact of economic zones in stimulating employment or reducing unemployment. So far, however, it has not been possible to establish conclusively whether they have achieved their intended objectives and why they have succeeded in some countries and failed in others.

Despite a rich literature on the impact of zonal policies on the labour market in different countries, the empirical evidence regarding their effectiveness is mixed. The following tables summarise some of these by country, i.e. the US, France and Poland, method and level of analysis and research findings.

Enterprise Zone (EZ) programmes in the USA offered tax breaks to attract investment and create jobs in economically underdeveloped regions. The effectiveness of these programmes has been analysed in a number of states such as Ohio, Indiana, Kentucky, Illinois, New Jersey and California. Empirical evaluations of the effects of these measures, however, are mixed and heterogeneous in nature (Table 1).

The success and effectiveness of enterprise zones in the US is controversial and the empirical evidence is mixed. Indeed, a review of the literature suggests that there is no consensus on the actual impact of these interventions on the labour market. On the one hand, some studies suggest that Enterprise Zones can increase employment, as in the case of some federal initiatives (Busso et al., 2013; Freedman, 2013; Ham et al., 2011; Hanson, 2009) and reduce the unemployment rate (Ham et al., 2011; Papke, 1994; Sridhar, 2000, 2001). On the other hand, some researchers do not find clear evidence of a significant impact of the programme in solving labour market problems (Boarnet & Bogart, 1996; Bondonio & Engberg, 2000; Elvery, 2009; Greenbaum & Engberg, 1998; Neumark & Kolko, 2010). Furthermore, a study of the same programme, The Empowerment Zone, using the same propensity score matching method, yielded conflicting results (Busso & Kline, 2008; Oakley & Tsao, 2006). In addition, a number of publications highlight the heterogeneity of effects across sectors and industries (Billings, 2009; Freedman, 2013; Lynch & Zax, 2011) or depending on the size and status of the company (new, existing, disappearing) (Billings, 2009; Lynch & Zax, 2011). Other studies, on the other hand, do not confirm

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Table 1. Review of research findings on the impact of enterprise zones on the labour market/employment/unemployment in the US

Study	Program	Methods	Level of analysis	Employment increase or unemployment reduction	Comments
(Papke, 1994)	Indiana Enterprise Zone	estimation methods using a panel of local tax jurisdictions	tax district	+	Significant reduction in unemployment claims resulting from the Indiana EZ programme
(Boarnet & Bogart, 1996)	New Jersey's Urban Enterprise Zone	econometric regression	municipality	–	No evidence of the impact of the programme on municipal employment or the sectoral employment model
(Greenbaum & Engberg, 1998)	Enterprise Zone – California, Florida, New Jersey, New York, Pennsylvania and Virginia	difference-in-differences	zone identification – based on postcode	–	No impact on employment by establishment type – employment gains in new establishments offset by employment losses in existing establishments
(Sridhar, 2000, 2001)	Ohio's Enterprise Zone	developed unemployment model that shows how tax incentive programmes affect unemployment in areas that adopt them	unemployment rate estimated from census data	+	Significant impact on reduction of unemployment rate, but sustainability of this effect is unclear. For the effect to be sustained, the duration of tax concessions should not exceed 3–5 years
(Bondonio & Engberg, 2000)	Enterprise Zone – California, Kentucky, New York, Pennsylvania and Virginia	random growth rate approach and propensity score matching	zone identification – based on postcode	–	No significant effect on local employment growth, regardless of the features of the scheme or the amount of incentives. No employment effect in specific sectors
(O'Keefe, 2004)	California's Enterprise Zone	propensity score matching	census data and confidential company-level data		Impact on employment growth – about 3% per annum for the first 6 years, over 7–13 years the opposite effect – a decline in employment of 3.2% per annum
(Bondonio & Greenbaum, 2005, 2007)	Enterprise Zone in 11 states	propensity score matching	zone identification – based on postcode, use of data at company level	–	No impact on net employment growth. Differential impact by establishment status: impact on employment in new and existing establishments, offset by loss of employment in closing or relocating firms

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Study	Program	Methods	Level of analysis	Employment increase or unemployment reduction	Comments
(Oakley & Tsao, 2006)	The Empowerment Zone (Baltimore, Chicago, Detroit, New York)	propensity score matching		–	No or little impact of programmes on the socio-economic situation of the community: poverty, employment, income
(Busso & Kline, 2008)	The Empowerment Zone	propensity score matching	panel data from censuses	+	Impact on an increase in local employment levels (by 4 p.p.) and a decrease in unemployment rates and poverty at similar levels (by about 3.8 p.p.)
(Elvery, 2009)	California's and Florida's Enterprise Zones	propensity score matching		–	No evidence that the zones have a significant impact on local employment
(Billings, 2009)	Colorado Enterprise Zone	propensity score matching and border-matching	company-level data	+	Positive impact of the programme on job creation: generate between 1.5 and 1.8 additional jobs in new plants and between 0.0 and 0.3 in existing plants. In addition, the impact on employment varies by industry
(Hanson, 2009)	Federal Empowerment Zone	least squares (OLS) and instrumental variables (IV) estimated regressions			OLS estimates: positive and statistically significant impact of the programme on employment and poverty. IV estimates: the programme had no impact on employment and poverty but instead had a statistically significant impact on property values
(Neumark & Kolko, 2010)	California's Enterprise Zone	regression models including interaction variables	zone identification – digital plotting of zone boundaries and mapping of companies; company-level data	-	No positive effects on job creation (employment)
(Ham et al., 2011)	State Enterprise Zones, Federal Empowerment Zones, Federal Enterprise Communities	instrumental variables method (IV); Heckman–Holz Random Growth model	zone identification – based on census tracts and postcodes	+	All three programmes have positive, statistically significant effects on local labour markets in terms of unemployment rates, poverty rates, wages and employment

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Study	Program	Methods	Level of analysis	Employment increase or unemployment reduction	Comments
(Lynch & Zax, 2011)	Colorado Enterprise Zone	Tobit models and Heckman's selection model	company-level data	–	No positive employment effects in urban zones (no effect on employment by industry). Negative employment effects in major establishments and in agriculture. Rural economic zones had little positive impact on employment
(Busso et al., 2013)	Federal Empowerment Zone	difference-in-difference, regression models	identification of zone/residents – based on confidential census microdata and a database of businesses (census tracks)	+	Significant impact on employment in zone neighbourhoods and wage increases for local workers
(Freedman, 2013)	Texas Enterprise Zone	regression discontinuity	zone identification – assigning EZ status to groups, so-called census block group	+	Positive impact on employment for zonal residents, mainly in lower-wage industries (in construction, manufacturing, retail and wholesale trade)
(Neumark & Young, 2021)	EZ program in 13 states	triple-difference, propensity score matching, heterogeneous effects estimation	census tract level analysis	–	Both in the long term and in the context of programme differentiation, there is no significant evidence of beneficial employment effects of enterprise zones, and long-term effects may even be negative

Source: Author's own study.

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the differential effects of zones, given the heterogeneity of the programmes and the set of incentives they offer or the time horizon (Neumark & Young, 2021).

In France, the corporate zones programme (ZFU) has been launched at national level, but opinions on its effectiveness are also divided (Table 2). Analyses by Givord et al. (2013, 2018), conducted at the firm level, indicate a positive and significant impact of the programme on employment and business creation. In contrast, Briant et al. (2015) highlight the heterogeneity of these effects across municipalities. They explain the differences in programme effects by geographical heterogeneity.

Despite the increase in the number of Polish SEZs in recent years, there are relatively few empirical studies analysing their actual impact on regional and local labour markets. Most of the available studies are limited to simple statistical descriptions and basic analysis of the zones' impact on direct employment and unemployment levels. The conclusions of such studies are unequivocal. The effectiveness of this type of labour market intervention is also confirmed by more advanced research methods (Table 3).

Empirical evaluation of the effectiveness of economic zones in Poland in terms of their impact on the labour market has been conducted at three levels of analysis: counties, municipalities and firms.

Using difference-in-difference techniques and panel data modelling, Ciżkowicz et al. (2014, 2016) showed a positive impact of zones on employment at the county level. They also found that there is a spillover effect of a positive impact on employment in counties neighbouring the zones. The results of their analysis indicate that an increase in employment in a zone translates into a similar increase in the county as a whole and twice as much growth in neighbouring areas. Another study, by Nazarczuk and Cicha-Nazarczuk (2016), also confirms the positive impact of zonal investments on employment levels, as well as on the reduction of the unemployment rate, regardless of the model used or the size of the studied group of counties. Ambroziak and Hartwell (2017), on the other hand, found that zoning policies contributed to a reduction in the unemployment rate primarily in the poorest and least developed counties. Their research shows the relevance of local economic conditions, the level of development of a region and the intensity of support, in the context of assessing the effectiveness of economic zones.

Evaluating the effectiveness of economic zones at the municipal level provides mixed results. The work by Jensen and Winiarczyk (2014), based on advanced econometric models, indicates a moderate but statistically significant positive effect of zones on employment levels in municipalities. In addition, Jensen (2018) identifies a negative spillover effect on neighbouring municipalities, which may be a result of the rapid spread of zones. On the other hand, an analysis by Trzcinski's team (2016) found that zone investments did not contribute to reducing unemployment levels in municipalities. The authors explain this fact by, i.a., the selection of the location of the zones, which were often created in municipalities with a rapidly growing economy and the preference of economically strong companies operating in the

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Table 2. Review of research findings on the impact of corporate zones on the labour market/employment/unemployment in France

Study	Program	Method	Level of analysis	Employment increase or unemployment reduction	Comments
(Gobillon et al., 2012)	Greater Paris region	Cox's model, OLS, FGLS, difference-in-differences; propensity score matching	municipalities (location by postcode)	+	A small statistically significant effect (3%) on the rate of transition from unemployment to employment in the short term (3 years)
(Givord et al., 2013)	Zones Franches Urbaines	propensity score matching	company-level data (geolocation)	+	Positive and significant effect on employment and business creation. Heterogeneous effects across industries. A large number of new jobs involved workers from outside the intervention area. Negative impact on neighbouring areas – evidence of spatial externalities
(Briant et al., 2015)	Zones Franches Urbaines	extended difference-in-difference models		–	The impact of the zones is highly heterogeneous across municipalities. Geographical heterogeneity explains the differences in programme effects that occur. Transport accessibility (road and rail) increases the programme's ability to attract firms and create jobs
(Givord et al., 2018)	Zones Franches Urbaines	propensity score matching, conditional difference-in-differences	company-level data (geolocation) and employer and employee data	+	Significant positive impact of the programme on the number of companies and the level of local employment during the first 5 years. After this period the effects stabilise. Resident and unemployed workers account for only a small proportion of employment resulting from the EZ programme

Source: Author's own study.

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zones. The researchers also noted that municipalities with SEZs experienced higher employment growth compared to control municipalities, suggesting a reduction in circular migration and the emergence of a substitution effect.

Previous analyses on the employment effects of SEZs in Poland have mainly focused on the regional aspect, covering counties and municipalities. The lack of availability of micro-data and the high cost of obtaining them have limited attempts to identify these effects at the firm level to a few items (Cicha-Nazarczuk, 2021; Dugiel et al., 2022; Nazarczuk & Cicha-Nazarczuk, 2024).

Cicha-Nazarczuk (2021) stresses the need to take into account the heterogeneity of the areas covered by support and the diversity of enterprises that are the recipients of state aid. The author emphasises that these differences can significantly affect the effectiveness of SEZ investments in the context of the local labour market and employment in firms. Her research indicates the existence of positive and statistically significant effects of zones on the labour market, with the scale of these effects depending on the specific contextual conditions. In contrast, an analysis by Dugiel et al. (2022) shows that public support provided to SEZs is not significantly associated with the creation of additional jobs. Similar conclusions are reached by Nazarczuk and Cicha-Nazarczuk (2024) analysing the impact of public support granted in the Polish Investment Zone on employment in enterprises. As the authors point out, the lack of a statistically significant impact of the programme on employment in firms can be interpreted as a failure of the programme to address labour market problems. However, as the situation on the Polish labour market improves, the quantitative aspects of job creation seem to lose importance in favour of the quality of jobs, employment stability or support for employees in acquiring education and professional qualifications. By focusing on these aspects, the programme can support sustainable employment and contribute to the long-term sustainability of lagging regions.

The differences between the research results presented reflect the complexity of the issue of evaluating the effectiveness of economic zones. Determining whether this type of intervention can actually stimulate employment growth and reduce unemployment, a key issue, is not an easy task. To date, no unanimous consensus has been reached in this regard. Identifying the factors responsible for the significant differences in survey results therefore appears to be important from the point of view of shaping economic policies and setting directions for future research. Such an approach may lead to more consistent conclusions and a deeper understanding of the effectiveness of economic zones.

Discussion and Conclusions

The assessment of the effects of economic zones in the USA, France and Poland is complicated and depends on many factors. One of the main sources of inconsistent results, discussed in the literature, are the differences in the nature of policy

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Table 3. Review of research findings on the impact of corporate zones on the labour market/employment/unemployment in Poland

Study	Program	Method	Level of analysis	Employment increase or unemployment reduction	Comments
(Ciżkowicz et al., 2014)	SSE	difference-in-difference, panel models of employment size and value of fixed assets in enterprises	counties	+	Significant positive impact on employment growth. An increase in employment in SEZ enterprises by 10 people results in an increase in the number of people employed in a given county outside the SEZ by 3 to 6 people
(Jensen & Winiarczyk, 2014)	SSE	difference-in-difference, partial least squares model, random effect random effect model, fixed effect model	counties and municipalities	+	A small but positive impact of SEZ policy on employment at the municipal level
(Ambroziak, 2016)	SSE	difference-in-difference		+	The largest reductions in the unemployment rate were observed in the poorest and less developed counties, where the intensity of the state aid granted may have a much greater indirect impact on the labour market
(Trzciński et al., 2016)	SSE	propensity score matching and difference-in-difference; qualitative research (survey and interview questionnaire)	municipalities	–	No impact of SEZs (positive or negative) on the reduction of the average number of unemployed people and the unemployment rate in municipalities. Higher increase in the number of people employed in SEZ municipalities than outside the zone
(Ciżkowicz et al., 2016)	SSE	set of panel and spatial panel data models for employment and capital expenditure	counties	+	Significant positive impact on employment. Employment in the SEZ creates employment of a similar magnitude outside the SEZ in the SEZ host county and almost twice as much in neighbouring counties
(Nazarczuk & Cicha-Nazarczuk, 2016)	SSE	panel models	counties	+	Positive impact of SEZs both on the volume of employment and on reducing the unemployment rate in the counties
(Ambroziak & Hartwell, 2017)	SSE	difference-in-differences	counties	+	Partially confirmed hypothesis – capital inflows into SEZs reduce unemployment in the least developed counties
(Jensen, 2018)	SSE	difference-in-difference, Mahalanobis distance matching, spatial lags, Granger causality test, fixed effects	municipalities	+	Statistically significant and positive effect of SEZs on employment in municipalities with a negative spillover effect on neighbouring municipalities due to the rapid spread of SEZs

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Study	Program	Method	Level of analysis	Employment increase or unemployment reduction	Comments
(Cicha-Nazarczuk, 2021)	SSE	Kernel-based difference-in-difference combined with a propensity score matching	counties and company-level data	+	The effects of SEZs on the labour market were identified as positive and statistically significant. The magnitude of the employment effects of SEZs varies according to the structural characteristics of the intervention areas (counties) and the sector and subsection of economic activity. It was not possible to clearly establish whether firms with domestic and foreign capital generate different employment effects
(Dugiel et al., 2022)	SSE	difference-in-difference with fixed effects	company-level analysis	–	The regional state has no effect on the number of employees, compared to the lack of regional tax credits
Nazarczuk & Cicha-Nazarczuk, 2024)	PSI	difference-in-difference with fixed effects	company-level analysis	–	No statistically significant effect of the programme on employment in firms. No significant ATEs were observed in the year of the treatment or in one to three years following treatment. This outcome remains robust to variations in the econometric approach, the set of variables considered, and alterations in the length of both pre- and post-treatment periods

Source: Author's own study.

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solutions and the level of tax relief applied in individual areas. The socio-economic context in which these zones operate is also an important aspect. The methods and techniques used to analyse the data also affect the results, as the estimated effect size is sensitive to them.

From the point of view of the research methodology, the process of identifying the geographical areas of the zones is particularly questionable, as the boundaries of the zones do not always correspond to administrative boundaries. Incorrect classification of these areas can lead to erroneous results. The American and French experience in identifying enterprise zones has evolved over the years. At first, zones were defined on the basis of tax jurisdictions (Papke, 1994) or postal codes (Bondonio & Engberg, 2000; Bondonio & Greenbaum, 2005, 2007; Gobillon et al., 2012; Greenbaum & Engberg, 1998). Some researchers have analysed areas at the municipal level (Boarnet & Bogart, 1996) or used census data (Busso & Kline, 2008; O'Keefe, 2004; Sridhar, 2000, 2001). In subsequent years, more sophisticated geolocation techniques were implemented to precisely define their boundaries (Givord et al., 2013, 2018; Neumark & Kolko, 2010).

Another challenge associated with evaluation using counterfactual methods is the appropriate selection of a control sample for the intervention group and the identification of factors affecting the accuracy of the matches (observable as well as unobservable). The quality of these matches is crucial for the quality of the estimated intervention effect (Denkowska, 2015). The studies used a variety of approaches to selecting control groups. Some studies adopted an overly broad scope for defining the control group, e.g., including all regions of Colorado that were not zoned (Lynch & Zax, 2011). Other researchers opted for border effects to account for unobservable factors, e.g., limiting the control group to firms in the near vicinity of the zones (approx. 300 m) (Givord et al., 2013; Neumark & Kolko, 2010). In subsequent studies, the control group was selected from areas that were eligible but eventually rejected, i.e., so-called rejected applicants (Boarnet & Bogart, 1996; Busso & Kline, 2008; Busso et al., 2013).

The selection of an appropriate control sample is crucial when empirically assessing the effectiveness of zones. First and foremost, most of these programmes target regions with lower economic levels. The precise selection of the control group for comparisons with unsupported areas is driven by the need to minimise the impact of potential differences between the groups, which may be due to natural conditions rather than the actual effects of the intervention.

Another important issue relates to the aforementioned socio-economic context in which the privileged areas (states, regions, counties, municipalities) operate and the diversity of economic actors that are targeted for support. Previous studies have either not taken these factors into account at all or have done so insufficiently. For this reason, the diversity of approaches and local economic contexts can be considered as potential differentiating factors for the results obtained. Firstly, the use of different statistical methods by researchers often does not sufficiently take into account the local context

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in which zonal enterprises operate (regardless of the level of data aggregation). This includes both factors related to the local economy, the heterogeneity of the programmes themselves (e.g., in the US) and differences in approaches to selecting firms for the control group. Secondly, it may lead to an underestimation of the heterogeneity of employment effects in regions with different degrees of economic development and structural characteristics. Of relevance here are potential differences in the impact of programmes that may go unnoticed in analyses at the national level if local specificities are not taken into account. This problem was addressed to some extent by Briant et al. (2015), Ambroziak and Hartwell (2017) or Cicha-Nazarczuk (2021). Neumark and Young (2021), on the other hand, emphasised the importance of an analysis that takes into account the diversity of programmes both in the short and long term.

On the other hand, the heterogeneity of zones' employment effects may be the result of differences in industry specificity, the source of capital of zone firms, which often adopt different business strategies or depending on the size and status of the firm. This problem has been highlighted by studies by Billings (2009), Lynch and Zax (2011), Givord et al. (2013) or Cicha-Nazarczuk (2021). In addition, the effectiveness of the programme may be conditioned by the institutional efficiency of the entities managing such areas and the availability and quality of investment land offered by them.

An analysis of the impact of employment in the zones, taking into account the diversity of firms benefiting from the support and the local economic conditions of the regions covered by the intervention, may help to better understand the mechanisms of operation of such programmes. This will allow them to be implemented and adapted more effectively, e.g., through more precise criteria for selecting companies for the zones or by taking into account the specific characteristics of the regions where the zones can be most successful.

In summary, the differences in the performance results of SEZs in the US, France and Poland can be attributed to the different policies and levels of tax relief applied in each state, municipality and region. Each of these countries has a unique approach to the creation and management of the zones, which directly affects the performance of the zones. The effectiveness of zones is also strongly influenced by local socio-economic conditions, such as the economy, demographic structure and industry specifics of the companies receiving support.

The results of the study may vary depending on the methods and data analysis techniques used. Methodological challenges mainly include the identification of zone areas and the selection of control groups. Errors in these processes can lead to less reliable results. Evolving analysis techniques, including advanced geolocalisation technologies and more accurate counterfactual methods, allow for more precise assessments of zone effects.

The diversity of employment effects may be due to the level of regional economic development, the industry specificity of firms and their business strategies, local economic conditions and infrastructure availability. For a more effective implemen-

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tation and adaptation of economic zones, it is important to take into account local specificities and more precise criteria for the selection of companies. An analysis of the impact of employment in the zones, taking into account local conditions and the heterogeneity of firms, can improve the effectiveness of these programmes.

Future research on economic zones should focus on comparative analysis of tax policies and reliefs, regarding a variety of local socio-economic conditions. Methods for identifying geographical areas of zones and selecting control groups should be developed and improved, minimising methodological errors. It is also important to study the impact of advanced data analysis techniques on the precision of zone effect assessments. Research on the diversity of employment effects and the long-term effects of economic zones can contribute to the development of more effective support programmes. In addition, it is worth analysing the impact of institutional efficiency and the quality of investment infrastructure on the effectiveness of economic zones.

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