

# **Special Economic Zones effectiveness assessment based on the adjusted “enclave” model. The Case of Poland**

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# Problem

Special Economic Zones (SEZ) are economic enclaves, created by the state in order to attract domestic and foreign investors, so as to stimulate economic growth and development in the region. SEZs have a long history, however, for this analysis, the last 40 years is important.

It was the development of SEZs in countries such as South Korea, China, Malaysia, the Philippines, Mexico and other Latin American countries showing the opportunities and threats inherent in this form of support for regional development. SSE impact on the economy of the country - the host, is not easy to assess. As it was shown by the results of many research, there are several examples of positive impact, **but there are many countries in the world where there were no benefits from the presence of SSE, as well as a few examples of countries where the foundation of such enclaves had negative consequences.**

## Problem (2)

The aim of this article is to verify the assumptions made in the original model of enclaves [Warr's model] and adapt them to the real economic conditions in force in transforming economy. The study will be carried out on the example of the Polish economy.

The following hypothesis is verified that the **adjusted Warr model, after appropriate modifications, can be an effective tool for calculating the value added impact of SSE on the economy.**

# Previous research

**K. Hamada** first tried to capture SEZ finances into one model [1974]. Hamada focused on investors' financial decisions motives, he did not explain clearly the impact of SEZ on the national economy of zone founder. Then, based on the theories of foreign trade, other models were developed, whose authors were: **Hamada, Young [1987], Miyagiwa [1986], Miyagiwa and Young [1987]**. They have been developed on the basis of the effects of zones functioning in China, other Asian countries, the Caribbean and the United States.

## Previous research (2)

Another model analyzing the effectiveness of the SEZ, taking into account the real cash flow was the **Warr** model [1983, 1985, 1989]. He used the influence of different micro and macroeconomic factors that determine the accumulation of capital in the country, that arranged SEZ. Thus he showed that the zone had been beneficial to the national economy and served its purpose as a tool of economic policy

## Previous research (3)

The main trends of research in the area of SEZ impact on economic growth are represented by Willmore [1996], who analyzed the Caribbean SSE, Kung [1985] Ge [1999] and Park [1997], who performed a detailed analysis of the SEZ in China. Rolfe and others [2004] studied the operating privileges in Kenyan SEZ. Aggarwal, Hoppe and Walkenhorst [2008], Aggarwal [2005], Shah [2008] performed a comparative analysis of the operating conditions of SEZs in India, Sri Lanka and Bangladesh and Willmore [1996] Caribbean zones. Devereux [2007] examined the impact of taxation on investment locations. Litwack and Qian [1998] developed the theory of transition economies (for example China), where there was development strategy based on the SEZ.

## Previous research (4)

Summarizing the review of existing studies the analysis describing Polish SEZs are also worth mentioning, especially the findings of Siudak [2011], who generally studied Polish SEZ, Pastusiak [2011], who analyzed the effectiveness of SEZ and Ambroziak [2009] dealing with legal issues.

# Methodology

$$N_p = (L_t w + M_t P_M + E_t P_E + R_t + T_t) \times S_F^* - (L_t w^* + M_t P_M^* + E_t P_E^* + B_t S_K^*) - A_t - K_t$$

Where:

$N_p$  – Net benefit,

$L_t$  – employment in year  $t$ ,

$w$  – wage paid,

$M_t$  – domestic raw material used in year  $t$ ,

$P_m$  – price paid for this raw material,

$E_t$  – utilities used in year  $t$ ,

$P_e$  – Price paid for the utilities,

$R_t$  – interest and principal repayments of domestic loans in year  $t$ ,

$T_t$  – taxes paid in year  $t$ ,

$S_f^*$  - ratio of the social value of foreign exchange to the official exchange rate,

$w^*$  – shadow price of labor,

$P_m^*$  – shadow price of domestic raw materials,

$P_e^*$  – shadow price of utilities,

$B_t$  – domestic borrowing in year  $t$ ,

$S_k^*$  – ratio of the shadow price of capital to its market price,

$A_t$  – the administrative costs of the zone in year  $t$ ,

$K_t$  – capital cost (including maintains) of SEZ physical infrastructure in year  $t$ ,

# Model adjustments

Due to the differences between the Polish economy and the economy of countries that have been an example for the development of the model, it was decided to adjust the model, which are dictated by different economic conditions, they are:

- Omission of differences in economic conditions of business in SEZ and beyond,
- Reducing the importance of alternative cost model, which is associated with very small differences between the economic conditions of doing business in the SEZ and beyond. In Poland, SEZs are not enclaves business, it is simply a group of companies operating in one place that have permission to the use of tax incentives.
- The results of operations of administrators are related to SEZ management companies, organizations that generate profits or losses, so their results are part of increasing or decreasing the impact of the added value of the SEZ.

# Model adjustments

$$N_p = (R_{kw} + E_x + CIT + S_{kSSE} - I_{mp} - P_{publ} - I_{infr} + W_{SSE}) - (R_{kw} + E_x + CIT^* + S_{kSSE} - I_{mp} - I_{infr}) \times S_F^*$$

Where:

$N_p$  – Net benefit,

$R_{kw}$  – annual remuneration costs,

$E_x$  – export of enterprises in SEZ,

CIT – income taxes paid by companies in the SEZ,

$CIT^*$  – income taxes paid by firms in the economy without SEZs, they are identical to the taxes paid in the economy with SEZ, enlarged by public assistance,

$S_{kSSE}$  – value of sales of domestic production to the zone,

$I_{mp}$  – value of import of zone enterprises,

$P_{publ}$  – public support offered by the state,

$I_{infr}$  – infrastructure investments incurred by municipalities, management of SSE and media providers,

$W_{SSE}$  – performance results of the SEZ management companies,

$S_F^*$  – „shadow cost” indicator,

# Input data

- Number of companies
- Capital expenditures in SEZ
- Revenues from sales
- Export and import
- Domestic sales of the means of production to the zone
- Employment in the SEZ and the average annual cost of employing an employee
- State aid - Tax relief
- CIT Taxation
- Management activities result in Special Economic Zones
- Expenditures in the SEZ infrastructure and communities

# Results

Structure of the NPV for the Polish SEZ for 2013 [in million zł]

<b>Specification</b>	<b>NPV</b>
<b>Annual salary costs in million zł</b>	28 161,6
<b>Export in million zł</b>	54 924,1
<b>Import in million zł</b>	-56 187,4
<b>Taxes CIT in million zł</b>	2 163,5
<b>Domestic sales of the means of production to the zone in million zł</b>	92 510,2
<b>Public aid in million zł</b>	-3 919,7
<b>Expenditure on infrastructure in million zł</b>	-821,3
<b>Administrative expenses / operating result of SSE (-loss + profit) in million zł</b>	-227,9
<b>NPV</b>	116 498,1

# Discussion

Impact of "enclaves" model elements on NPV in selected zones (US \$ million 1982)

<b>Factors</b>	<b>Bataan (Philippines)</b>	<b>Penang (Malaysia)</b>	<b>Masan (Korea)</b>	<b>(Indonesia)</b>
<b>Employment</b>	59	111	39	4
<b>Foreign exchange gains</b>	72	94	65	0
<b>Domestic raw materials</b>	3	18	16	5
<b>Domestic capital</b>	0	10	0	0
<b>Tax revenues</b>	11	10	18	23
<b>Utilities</b>	-4	-53	-13	-1
<b>Administrative costs</b>	-23	-4	-17	-13
<b>Infrastructure costs</b>	-196	-43	-68	-3
<b>Domestic loans</b>	-147	0	0	0
<b>NPV</b>	-225	143	15	26

# Discussion (2)

Following factors can be the most interesting points of discussion:

- Increased dynamics of the Polish economy in relation to the previously studied economies is related with a greater impact of the investment in SEZ,
- Optimal conditions offered by the SEZ for investors, resulting in increased effectiveness of investments and real benefits for the economy of the host country,
- Errors in calculation or incorrect assumptions.