IMPACT OF SPECIAL ECONOMIC ZONES ON REGIONAL INVESTMENT IN UKRAINE

by

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ABSTRACT

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This paper examines the impact of certain incentive schemes called special economic zones (SEZs) and territories of preferential treatment (TPDs) on investment distribution across Ukrainian regions. Theoretically, due to lower taxes, administrative units (oblasts) with SEZs and TPDs should receive increased flow of investment, everything else held constant. Empirical evidence shows that SEZs and TPDs result in significant crowding in effect on investment at the oblast level. Yet, our analysis shows that privileged territories affect investment distribution within oblast, and induce a relocation of investment to privileged areas. However, estimations do not show a significant impact of SEZs and TPDs on the inter-regional distributions of investment across Ukraine. Based on our analysis, we recommend that SEZs and TPDs should not be extended to the developed regions if the goal is to reduce regional disparity across different regions of Ukraine.

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GLOSSARY

ATU – Administrative territorial unit

CM – Cabinet of Ministers of Ukraine

EPZ – Export processing Zone

FDI – Foregn Direct Investment

FEZ – Free Economic Zone

ME – Ministry of Economy of Ukraine

OBLAST – a subnational administrative unit in Ukraine. There are 24 oblasts in Ukraine and Autonomous Republic of Ukraine. Kiev and Sevastopol cities are treated as separate administrative units in Ukraine.

SEZ – (Special Economic Zone) is a bounded territory where the special tax and custom regime is established. Granted status should be secured by the Law, which is adopted separately for each zone.

STA – State tax administration

TPD - Territory of preferential development is established within the administrative bounds of the city or rajon (administrative unit in Ukraine). This territory has first rate status in receiving state investment.

WTO – World Trade Organization

Chapter 1

INTRODUCTION

The issue of regional tax privileges, especially in the form of special economic zones has been not only one of considerable academic interest, but is also of great policy significance for Ukraine. This is particularly important in the light of the current debate on the Tax Code in the parliament. Many territories and branches of industries request tax privileges and some of them have already succeeded. Should Ukraine continue granting tax privileges to promote regional economic growth? There are few studies that investigate the impact of Special Economic Zones on reducing regional disparity. The new Tax Code is to be adopted by the Parliament next year and I hope my thesis will contribute to an informed debate on this issue.

Granting tax privileges have become a popular tool of regional policy in transition economies. Governments usually face serious problems in reducing budget deficit because of large social expenditures inherited from the planned economy and squeezed revenues attending upon the transition to a market economy. Recent experience raises new important questions about economic policies of allocation of limited investment resources. The success of Special Economic Zones in China appears to offer support for an unbalanced growth policy in the interest of regional parity in the country. Since 1980, when the first SEZ in Shenzhen was established, Shenzhen's annual GDP has been growing at an annual rate of 31.2%.[1] With the help of a prudential tax policy and simplified administrative procedures, the Shenzhen region has served as a magnet for FDI in China

[1] Wei, Ge. 1997. Special economic zones and the economic transition in China, p.41

Relative efficiency of a balanced growth strategy as opposed to an unbalanced (leading sector) investment strategy for achieving faster growth is one of the most arguable issues in the theory of economic development. Supporters of the balanced growth theory, such as Rosenstain-Rodan (1943), Nurkse (1953), and Scitovsky (1954), argue that due to important economic linkages and complementarities, all sectors of the economy should be developed simultaneously. Later on, Murphy, Shleifer, and Vishny (1989) developed a formal model, which suggest that unless all sectors grow together, any one of them cannot be profitable because of lack of complementary support from the lagging sectors. Even the opponents of the balanced growth theory like Hirshman (1958), emphasize the importance of backward and forward linkages and interactions between sectors and regions in the economy. However, in the absence of massive external finance, developing and transition countries may often face lack of resources to invest in all sectors simultaneously. Thus, these countries may have no recourse but to choose a policy of unbalanced growth to attract investment in leading sectors or regions of the economy to create positive spillovers.

Since Ukraine has adopted the [2]European Charter of Local Self-Government, it has an incentive to comply with the general principle of the charter as laid down in art. 9 which states: "The necessity to defend financially weaker local governments requires implementation of the procedures for financial equalizing or alternative steps that are aimed at adjusting and smoothing of the unevenly distributed financial resources and tax burdens." Thus, privileges are to be granted to the less developed regions for financial equalization. Unfortunately, in many cases, political considerations tended to outweigh economic justification for granting tax privileges. In the context of a transformation recession that had hit all regions of the country, political lobbyists managed to obtain privilges for

[2] European Charter of Local Self-Government. 1985. ETS no. : 122

certain regions, which on pure economic grounds should not have been granted tax exemptions.

Given the background in which the policy of tax privileges was implemented, a careful analysis of the impact of the policy is warranted. Such an analysis would show whether these actions were reasonable, and whether SEZs and TPDs actually promoted regional economic growth and reduced regional disparity among different oblasts in Ukraine.

Despite the success of China such strategies of unbalanced growth have remained controversial. Previous work on Ukraine has shown that in most cases tax holidays failed to substitute for the weak fundamentals (Oleksiv 2000). Important potential drawbacks include: inefficient distribution of resources, increased regional inequality, and the probability that reduced investment in other regions can slow down the overall process of economic development. Also, by granting privileges, government has to accept a reduction in its tax revenue and share its power with the local authorities or the industry managers. This may have the unintended effect of reduction in government's ability to control and implement central Government's decisions at the local level. Despite all the above potential hazards, the policy of granting privileges has remained a populist method in the last decade of Ukraine's economic history.

The main idea of this research is to verify whether tax exemptions are effective in providing sufficient investment growth in the regions of Ukraine. The paper will investigate economic performance of tax exempted territories in Ukraine called special economic zones (SEZ) and territories of preferential development (TPD). Currently there are 20 SEZ's and TPD's and they are located in 12 administrative units of the country (See Fig. 4, Appendix F). Generally the idea of establishing SEZ is to attract additional investment and enlarge the tax base in the long-run through the more

preferable tax regimes, which after some period should more than offset the revenue effect of privileges granted. Naturally, regions that have established zones should have the higher level of investment growth, compared to other oblasts of Ukraine. Using oblast as a benchmark is very convenient, because, it helps to make *'ceteris paribus'* condition analysis and besides the data on the economic performance of the oblasts' is reported rather precisely. The data are particularly suitable for econometric analysis as they arise from a "natural experiment".[3] Oblasts without privileged territories can be used as a "control group" in this experiment. Empirically, we will test economic performance of oblasts that have established SEZ's and TPD's compared to the economic activity of the other oblasts. The paper will attempt an answer to the question: Do territories with tax exemptions perform better in terms of investment growth? The answer to this question will help us choose effective policy strategy for the Government. The suggested criteria of measurement are: value added generated by the territory, attracted investment, quantity of job saved/created. We expect that tax exemptions will have positive significant investment crowding in effect in the targeted regions. However, the effect of investment distortions between and within regions might not be quite obvious and requires careful examination. Similar results were received on testing Russian sub-federal tax exemptions (Kolomak 2000).

The structure of the thesis is as follows. Chapter 1 provides the theoretical framework and reviews the literature on the main experiments in tax exemptions and growth stimulating policies. Chapter 2 covers markets and institutional set up of SEZ's and TPD's in Ukraine and describes the features of institutions and actors which are analyzed in the paper; it also describes the data used for the analysis. Chapter 3 presents models and

[3] The test of a hypothesis under controlled conditions in which subjects are divided into target and control group. Target group is subject to influence of factors of interest. At the end of the experiment both groups are compared.

empirical estimations by testing stated hypothesis. In this chapter, we also consider the chosen econometric technique, as well as justify the specification of the model. The concluding chapter suggests possible strategies for the Government to improve SEZ's and TPD's regulations in Ukraine.

THEORY AND LITERATURE REVIEW

Special economic zones received special attention in recent years, thanks to the success of the Chinese and the Asian Tigers. A comprehensive overview is presented in the World Bank working paper on Free Economic Zones[4] providing good insight on the concept of FEZ. The paper does not provide any formal proofs of their existence or its development strategies. However, it gives a number of examples of FEZ activity, detailed description of organizational structure, cost-benefit analysis of their creation. Mainly the paper is valuable as institutional description of the FEZ and SEZ creation. Comprehensive description of SEZ's and TPD's activity in Ukraine is prepared by the Institute of Reforms (Y.Davydenko, M.Datsyshyn, 2000)[5] and presents some practical issues on activity of SEZ's and TPD's, where special economic zones (SEZ) are usually modeled as territories with free capital flows, tax exemptions, simplified tax and custom procedures imposed on economic agents. Unfortunately, this paper does not provide any theoretical background; therefore generalization of the implications is impossible.

The idea of tax privileges seems to exist since the taxes themselves were invented. However, a number of previous researchers provide ambiguous conclusions for different cases. Estimation of the impact of the tax privileges granted to the Russian regions for regional investment by Kolomak (2000) shows that "there is no systematic evidence of investment level growth in regions with tax breaks and concessions".[6] The paper provides some examples where tax exempted regions with similar economic factors outperformed other regions but generally this relationship is weak.

[4] World Bank working paper, 1999, p.12
[5] Rating of investment attractiveness of Ukrainian regions, 2000, p.46
[6] Kolomak, E. 2000, p.22

Therefore, the author attempts to find some other explanations of the regional growth differentiation, like degree of confidence in the regional administrations, level of public goods provision, and the like.

Change of the market structure after introducing tax exemptions has been studied by Myagiva (1999), Litwack and Qian (1998). The paper of Kaz Myagiva (1999) – "Top dogs, puppy dogs, and the tax holidays" - investigates the effects on the local markets structure, which is highly important from the viewpoint of unfair competition. This paper gives prospect on very important problem of preventing monopolization of the local market of the host country. "Host-country governments often encourage foreign investment as a means for promoting technology transfer to local industries. However, diffusion of technology may not occur as expected because foreign multinational firms can take preemptive measures to suppress local competition".[7] The paper shows how tax holidays can foil the foreign firm's anti-competitive strategy and promote entry of domestic firms. The idea belongs in tax holiday that allows the local firms to enter the market dominated by the foreign firm. In contrast, the tax break accorded on a permanent basis makes the foreign firm tougher at all times, and offers no reason for the local firm to delay entry. Unable to become a 'puppy', local firm stands no chance of entry (Fudenberg and Tirole 1984).

Tax holidays also work as a signaling mechanism. Bond and Samuelson (1986) portray tax holiday as a signal sent by the better-informed government to the less-informed foreign investor within the standard two-period setting with two sender types. Both described cases use the condition that the host country government cannot commit to the future tax rates, and therefore they apply to countries whose governments suffer from credibility problems for various reasons J.Litwack and Y.Qian (1998). The paper mainly emphasizes two points: 1.political pressure to satisfy certain

[7] Miyagiva, K.F., Ohno Y. 1999, p.24

social expenditure 2. the lack of institutions to constrain state from expropriation. Due to the absence of the developed institutions to constrain the state, if profits and tax revenue are low, the government can respond by increasing taxes ex post, and, thereby, depress incentives for restructuring. Consequently, transition economies like Ukraine appear to be in a trap of continual budgetary pressures, high and unstable taxation, significant tax evasion, and low investment in the economy as a whole. The paper proposes the following possible strategies for SEZ policy in transition countries: "type-1 strategy combines high investment with very low taxation in order to create proper incentives in certain areas; type-2 strategy combines high investment with significant taxation in order to exploit spill-over effects into the rest of the territory".[8] The paper also provides a mathematical proof and conditions under which each strategy will be optimal. The weak point of the paper is the strong assumption about homogeneity of firms, an assumption hardly applicable in the real world.

The pioneering study of welfare effects of EPZ by Hamada (1974) used 3-sector, 3 factor Ricardo-Viner model to investigate the welfare effect of FDI flows into an EPZ. He concluded that a foreign capital inflow into an EPZ decreases the host country's welfare due to the induced loss of tariff revenue. An inflow of foreign capital aggravates resource misallocation caused by the distortion in the domestic prices by drawing labor away from the rest of the economy, and forces domestic producers to use more capital-intensive technologies. Thus the inflow of foreign capital induces an expansion in the capital intensive sector which is import-substituting. This import substitution causes a loss of tariff revenue. Rodrigues (1976) extended Hamada's analysis by explicitly considering factor trade between both regions, and concluded that the EPZ will take over the whole economy and turn into free-trade equilibrium if factors are mobile and consumption is allowed in EPZ.

[8] Litwack, John, and Yingyi Qian. 1998, p.3

Comprehensive welfare analysis was conducted by Woo (1997) in his paper "A theory of Free Economic zones" supply a number of economic models, which can be applied to the case of Ukraine. The paper studies welfare effects of foreign direct investment flowing into an EPZ in an economy under the import-protecting regime, assuming no import restrictions in the EPZ. Author try to investigate under what kind of trade policy, economic conditions, structure would the benefits of establishing EPZ outweigh its cost. His ideas about welfare effects from establishing duty free zones are supported by G.Faccini and G.Willmann's paper – "The gains from duty free zones". Key assumptions used in this research are imperfect competition and increasing returns, which looks quite reasonable for the current Ukrainian economy. The model provides necessary mechanism for calculating optimal tariff for the given level of FDI into EPZ. These models may be beneficial for calculating optimal tax rates for the SEZ in Ukraine under the given level of investment in welfare maximization models. However, in our research we will mostly focus on the investment distribution effects rather than on trade effects of tax exempted territories.

Lack of capital especially investment inflows are the most troublesome for the transition economies and slowdown their growth. Variety of models discussing FDI attraction that can be used for transition economies are presented in the Kolomak's (2000) paper. Hypothesis tested in this paper can be highly useful for testing similar factors in other transition countries and especially in Ukraine, as it has similar industrial and organizational structure. For instance, discovering the impact tax exemptions on rates of investment growth in the regions with highly developed extracting or export oriented industries, estimating minimum period and size of privileges for attracting investment. Key problem of investment concentration in Moscow - up to 80% the capital of the country, while the similar problem is observed in Ukraine. Unfortunately, the paper generalizes different kinds of

privileges, like industry or territory privileges, which disable to investigate the real effect of their granting. Oleksiv (2000) in her research concentrates on foreign direct investment inflow in Ukraine, and tries to evaluate whether tax holidays can compensate for weak fundamentals. The research is based on the macro data and investigates impact of the tax-holidays on the national level. The aim of the research was to show whether tax exemptions policy was effective and did it really substituted for the weak fundamentals, the proper model was created to make empirical conclusions. The model uses: total income of employees, tax index, dummy for tax holiday and import tariff index as a determinants of foreign direct investment. However, this model cannot be treated as effective criteria for Government policy evaluation due to the following reasons: foreign direct investment is also measured on the macro data without specifying definite territories or industries, which can provide misleading conclusions; In my opinion, the work is to be well motivated within the classical foreign direct investment framework with ceteris paribus assumption, but cannot be directly applied to the transition economies, where some narrower evaluation criteria should be investigated.

Investment is considered to be one of the most important factors in every economy. The level of investment influences significantly the volume of the national revenue of the society; many macro processes depend on their dynamics. Investment is a flow of output in given period that is used to maintain or increase the future productive power of the economy (Lindert 1986).

Generally, investment consists of portfolio investment, which is investment in securities, and direct investment, which are investment in residential structures, fixed business investment and inventory investment. Investment in residential structure includes both expenditures on maintenance of housing and on the production of new housing. Fixed business investment

is "spending by businesses on 'plant' (the physical structure occupied by a factory or business office) and 'equipment' (machinery and vehicles)".[9] According to Berndt (1996) inventory investment are used as "buffers against variations in the sales of goods and services".[10] They are also used to prevent temporary shortages of production inputs. Therefore investments are very sensitive to economic conditions in the country and idea of a favorable investment climate is very important. General features are favorable investment conditions are economic and political stability, infrastructure development, regulations, and especially tax benefits and exemptions.

Under the rational approach investments are on the basis of the highest present value of the project accounting all possible risks, which means that individuals tend to invest in project which bring the highest possible profitability. By offering tax benefits and exemptions under the *ceteris paribus* conditions, the projects or the certain areas are artificially made more attractive and thus able to attract more investment. According to theory oblasts that have established SEZ's and TPD's should perform better investment attraction, comparing to other regions of the country, which is under common tax regime. Different theories propose different factors for investors, which we generalize for the case of Ukraine and use it to verify validity of proposed factors. Most models define as basic determinants: level of taxation, interest rates, and tariffs. In this research we improve the model by incorporating the value added, population, strategic regional location and infrastructure development as determinants. Since Ukraine is unitary country it does not have significant distinctions in legislation between regions and naturally, there are no trade barriers between oblasts. Thus for proposed analysis including tariffs does not make much sense. Moreover share of taxes and payments established by the local governments in the

[9] Sachs J, Larrain B. Macroeconomics in the Global Economy. *Prentice-Hall, Inc. 1993,* p.116
[10] Berndt, E. The practice of Econometrics: Classics and Contemporary. *Addison-Wesley Publishing Company 1996,* p.226

total taxation burden is also small, which enables us to make an assumption of equal taxation across regions, except the tax exempted territories. Tax exempted territories benefit from special taxation regimes. Thus to measure the taxation it is enough to create dummy variable, which will capture the effect of lower taxation. Basically the same reasoning is used to justify dropping interest rate from the proposed model. This indicator does not vary significantly across oblasts. Value added is proposed to be used in the model as a proxy for the market share. Many studies support the idea that companies are interested in the share of the potential market. Willingness to invest depends on the size of the market for the firm's products. I assume that investors are looking at the purchasing power of the economic agents. At the same time the market share depends also on the amount of population on the potential market that can buy firm's products. Thus increase in the population and values added implies larger size of the potential market and should create positive effect on investment. In our model we assume geographical location as a possible factor that can affect investment. The reasoning behind this is that bordering oblasts may benefit from international cooperation with neighboring countries and receive additional investment.

Infrastructure is commonly used determinant of the investment growth. In 1986, a two volume report, published by the European Commission (Biehl, 1986), entitled "The Contribution of Infrastructure to Regional Development" is demonstrated that there are a large number of modified Cobb-Douglas production functions and QPFAs that are statistically significant, and that support the thesis that infrastructure significantly contributes to regional productivity, income and employment. A region with a large infrastructure capacity in relation to its area and inhabitants can also provide a larger bundle of services to its enterprises and private households than a less well endowed one. It is the sum of all these service bundles incorporated into the fixed infrastructure capacities that represents one of

the factors determining the development potential of the region concerned. The regional infrastructure endowment or the stock of public capital of a region is usually used as a determinant of the regional development potential. It can be used by the government in order to directly influence the regional development potential either by increasing productivity or by decreasing cost. Infrastructure has to be conceived as a broad notion that comprises a large number of public capital stock elements: transportation infrastructure (rail, road, airports, waterways, harbors) lowers transportation cost, telecommunication reduces information cost. Backward region with low growth may attract significant amount of investment through infrastructure development, in particular highways or waterways. If a new highway is built, this does not only reduce transportation cost in favor of the enterprises already located in the region concerned, but also acts like a reduction in interregional tariffs that previously restricted the access of enterprises form other regions. Efficient producers outside the backward regions also profit from the new or improved road, rail or waterway, allowing them to extend their markets. As a consequence, competitive pressures on the producers in the backward regions are increased. According to the regional potential development approach, the transport infrastructure possesses a high degree of publicness, in particular due to the immobility and indivisibility of the networks involved. In the European studies, roads, rails, waterways, airports and harbors had been used as subcategories. In the preliminary analysis of the Ukrainian regions, only data for road and rail length are available. Given their network character, the indicators for roads and rails are defined in relation to regional area in order to obtain spatial density figures. It has not (yet) been possible to obtain information for road width as a qualitative characteristic.

Hence, we propose the following relationship functions for the determinants of regional investment in Ukraine:

$$INV = F(Y, P, Tax, Loc, Inf),$$

where *Y* stands for value added,
P – population,
Tax – taxation regime,
Loc – strategic location,
Inf – infrastructure development.

For our investigation we will use multiple regression analysis, which involves dummy variables. Firstly, we will estimate the effect of investment attraction by the tax exempted territories. This model will not particularly focus on the sources of attracted investment, while this analysis will be presented in the second and third models. Secondly, we are particularly interested in the sources of new investment and especially verify the effect of redirection existing investment to tax exempted territories. Hence we focus only on the regional investment to non-tax exempted territories in oblast where previously there was no tax exempted territories. After the opportunity of lower taxation appeared, acting rationally economic agents will relocate investment from initial location (reduction of investment flow on these territories) to the areas with lower taxation. Thirdly, continuing the investigation of the sources of new investment to the tax exempted territories we propose that similar redirection effect may be observed from the neighboring oblasts, which do not have tax exempted territories.

The following research aims to investigate the issue of regional investment distribution for the case of Ukraine. We will attempt to identify regional structure of tax exemptions and their impact on the investment distribution

across the Ukrainian regions. Thus this research attempts to fill an important gap in the literature on Ukraine.

C h a p t e r 2

MARKETS AND INSTITUTIONS

On the regional revel administrative structure of Ukraine consist of Republic Crimea, 24 oblasts and cites Kyiv and Sevastopol, which have oblast status. Although inequalities in level of economic development in Ukraine are not as significant as in other countries these inequality is increasing and thus requires careful regional policy investigation (Benini 2001).

The main actors, which are to be investigated in my thesis, are Special Economic Zones and Territories of Preferential Development located in certain oblasts' of Ukraine. *Special economic zone* is a bounded territory where the special tax and custom regime is established. Granted status should be secured by the Law, which is adopted separately for each zone. *Territory of the preferential development* is established within the administrative bounds of the city or rajon.[11] This territory has first rate status in receiving state investment.

Creation of Special Economic Zones (SEZ) in Ukraine is regulated by the law of Ukraine "On General Foundations for Creation and Operation of Special (Free) Economic Zones" of October 13, 1992, #2673-XII and the CM's resolution "On the Conception of Creation of Special (Free) Economic Zones in Ukraine" of March 14, 1994, #167. Subject to these documents, creation of each SEZ envisages adoption of a separate law. Creation of a new SEZ can be initiated by the President, the CM or local self-governments and local state administrations.

[11] Administrative unit in Ukraine on the sub-oblast level.

Ukrainian mechanisms for SEZ creation are those characteristic of free economic zones, but don't fall under the classic definition of the free economic zone that was described in the special amendment D2 of the International convention on simplification and coordination of customs procedures (Kyoto, May, 1973), put in force September 25, 1974.[12] Their main differences lie in as follows:

- The SEZ territory in Ukraine is not excluded from the country's customs territory. It is only accorded a special customs regime. The SEZ territory, however, remains within customs territory of Ukraine.
- The concessionary customs and taxation terms do not automatically spread on all business entities based on the SEZ territory, but only those that have received the SEZ-entity status.

The main distinctions between SEZ's and TPD's are presented in the table1 below.

Table 1: Distinctions between SEZ's and TPD's

Special Economic Zone (SEZ):	Territory of the Preferential Development (TPD)
has clearly-cut boundaries, its territory is provided with facilities subject to customs requirements; therefore, control of commodity flow is real;	Has no clearly-cut boundaries. Those are the administrative borders of communities or whole districts. Concordantly, control of export and import of commodities is complicated.
SEZ is governed by a special body that is responsible for operation and development of the SEZ;	Special governing body is absent. Governing functions are laid on local administrative agencies.

[12] www.wcoomd.org/kyoto/spdver7e.pdf

SEZ has an established list of the kinds of business activities, which are given tax and customs benefits;	Priority projects are defined by the local administrative agencies, which is potentially dangerous in terms of possible corruptive practices.
SEZ has a rigidly established list of benefits for implementation of appropriate investment projects;	Local authorities may receive these or other benefits, though the limits of the latter are defined by the law.
The right to implement investment projects is granted on competitive basis. SEZ shall not receive credit on concessionary or government-guaranteed terms.	The investment projects enjoy priority for attraction of government-guaranteed foreign credits, provided by foreign states and international financial institutions.

Calculation of the Investment Total, Actually Made into SEZ's and TPD's; Their Share in National Investment Total (Internal and Foreign)

SEZs' and TPDs' share of gross investment in the framework of gross investment into Ukraine's economy, has been growing steadily since up since 1999, and made up for 5%, 7% and 10% in the years 1999,2000 and 2001 correspondingly. The SEZ and TPD share in the general framework of direct foreign investment made up 18% in 2000. Despite the fact that the SEZ and TPD investment share in the framework of investments into Ukraine's economy has shown certain growth, the short term of SEZ's and TPD's' existence impedes making weighty conclusions.

Table 2: Investments into SEZ's and TPD's in 1999-2001 (in mln USD)

	1999	2000	2001
Gross investment	187.07	249.4	268.3

FDI	n/a	104.3	78,6

Source: the Ministry of Economy, SEZ and TPD monitoring figures as of January 1, 2002

In the aggregate, over the time of operation, the SEZ's and TPD's have received investment in the amount of over USD 690 Mln.

Empirical evidence suggests that the share of investments into SEZ's and TPD's in the general investment scheme is growing. Importantly, the tendency of investment attraction into territories other than SEZ's and TPD's[13] remains positive. Although it is hard to state point-blank that privileged territories actually promoted attraction of additional investments into Ukraine, it is essential that they have not caused considerable reorientation of investment capital towards privileged territories.

In 2001 gross investment grew by approximately 14,6%. Such 2,9% growth was made possible at the expense of investment into SEZ's and TPD's; and by 11,7% into the remaining territory of the country.[14] In the future we should expect further growth of investment volumes in SEZ's and TPD's, as well as their share increase in the general investment framework. As investment in SEZs' and TPDs' account for only 10% of the Ukrainian total investment, we can argue that these territories experienced faster investment growth then the rest of the country.

It is difficult to predict the situation regarding the rest of the territory because of the information lack. There is a risk of investors' reorientation towards the privileged territories; therefore, despite the increase in gross volumes, the amount of investment into the rest of the territory may reduce.

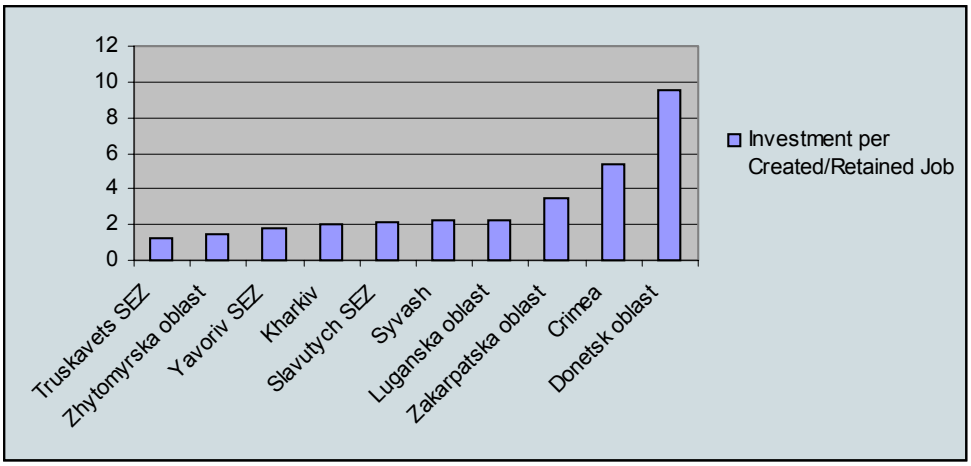
[13] Source: the Ministry of Economy, SEZ and PDT monitoring figures as of January 1, 2002.
[14] Source: State Committee for Statistics of Ukraine.

The formal investigation of this issues be introduced in the empirical part of this paper.

Featuring investment distribution by industry sectors leading industries in attraction investment are food industry - 21%, metal industry – 18,2%, coal industry 15%, and chemical industry 11%, which totals up to 70% of all investments in SEZs' and TPDs'. While the lagging industries are: machinery – 3,8%, agriculture – 2,8%, and light industry. 2,7%. Study of investment distribution across industries goes beyond the scope of this paper and may be proposed for the future research.

The main declared objective of SEZ and TPD creation in Ukraine is to attract investment with the purpose of creating new and retaining existing jobs. The Zakarpattya SEZ, Truskavets Kurortopolis and Porto-franko (Odessa) do not set an *increase of employment* as initial objective. The chart below features SEZ's and TPD's' ratings as to the ratio of attracted investments per one created or retained job.

Figure 1: Investment per Created/Retained Job
(thous. UAH per worker)



Source: the Ministry of Economy, SEZ and PDT monitoring figures as of January 1, 2002.

The smaller the ratio, the more jobs have been created and retained per one dollar of attracted investment. To an extent, this ratio demonstrates the conformity of zone's activity with the declared purpose. As a shortcoming, the ratio calculations do not allow for industry's production structure. Naturally, there are relatively capital-intensive and labor-intensive industries. Therefore, for final conclusions it would be advisable to confront these calculations with the production structure in each zone. Today such analysis is impossible due to the lack of industry structure data upon each separate zone. According to this chart the leading position is with Truskavets Kurortopolis SEZ. Its ranking is fully explainable by the industry structure – the implemented projects in the resort area call for more human resources as compared to other branches of economy. The Krym and Donetska oblast TPDs are a big contrast, where prevailing industrial projects call for greater capital resources. Receiving efficient indices needs basing on balanced data with regard to industry structure in the relevant territories.

Inflow of investments according to the declared business plans increased in 2000 as compared to 1999. Noteworthy, the increase of this index took place alongside considerable growth in number and volume of declared investments. That is, there was an influx of investment both on previously approved projects and new projects that had been approved and received investment the current year. The factors that favored this development were: growing trust to the economic situation in SEZ's and TPD's, country's stable macroeconomic situation, economic growth and positive expectations. Unfortunately, absence of data on specific investment projects makes it impossible to give grounded explanation of the fairly high proportion of invested capital, in comparison with the declared investments.

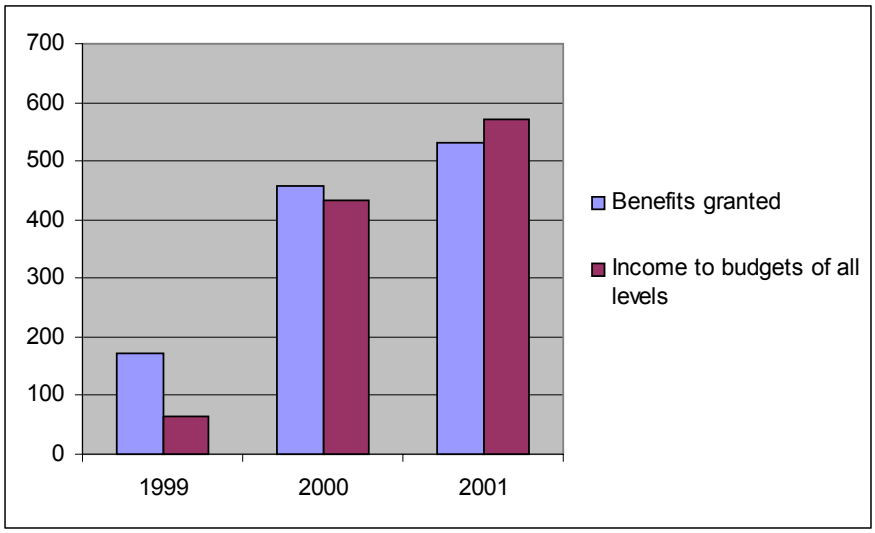
Table 3: Comparative Analysis of SEZs' Business-Plan Figures and Actual Performance Indices percentage of attracted investment

	1999	2000	2001
Number of approved projects	130	225	157
Percentage of attracted investment of the total cost of investment projects	25%	34%	39%

Source: the Ministry of Economy, SEZ and PDT monitoring figures as of January 1, 2002

As of January 1, 2002, the registered investment projects in SEZ's and TPD's envisage creating over 14,000 and retaining over 38,000 jobs. The planned figures in keeping the existing jobs have been fulfilled ~70% and in creating new jobs ~40%. Hence, creation of new jobs caused greater difficulties to SEZ's and TPD's than retaining the existing work places. This can be explained by a few factors: (1) New-job-creation estimates are more complicated than those of preserving the existing jobs. More often business plans cite optimistic prognoses. (2) In the course of project implementation, keeping the existing work places is procedurally simpler, as is often associated with available staff, having required qualifications, and is of higher priority than the task of creating new jobs. Owing to the fact that the percentage of planned investment funds is only ~39%, there is likelihood of faster growth of new jobs in the near future. (3) A number of projects have not reached the business-plan capacities; therefore, owing to item 2, there is a gap between the created and retained jobs.

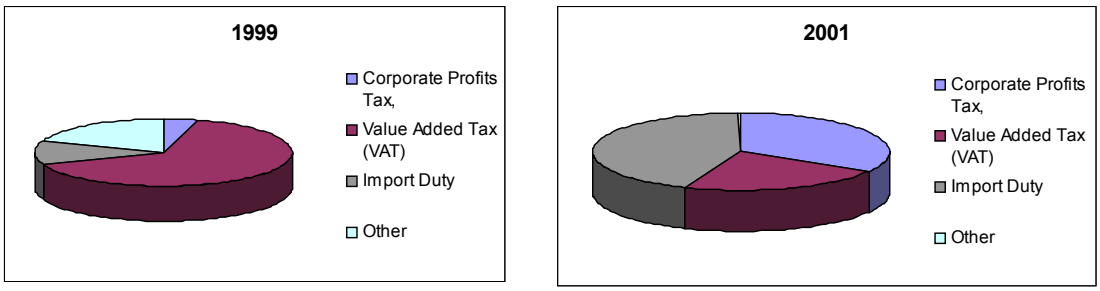
Figure 2: Comparative Analysis of Budgetary Losses from SEZ-Granted Benefits and Received Income (in mln UAH)



Source: the Ministry of Economy, SEZ and PDT monitoring figures as of January 1, 2002

Hence, in 1999, because of the granted benefits, creation of SEZs cost the Government Budget UAH 171.2 Mln in unpaid levies, or 0.86% of the Budget revenues. Budget's pure costs of SEZs' creation made up ~ UAH 106.2 Mln. In 2000 this index considerably improved. Despite the balance of Budget income and exemptions had been remaining in the red, there was a positive tendency to its reduction. As compared to 1999 the negative balance had reduced more than 4-fold. The dynamics of income increase was almost twice as fast as the dynamics of exemptions increase, granted to investment projects. The balance in 2001 finally has become positive. This may suggest that many producers in SEZ's and TPD's shifted from the beginning stage where mainly equipment imports were done to the production stage.

Figure 3: Breakdown of Benefits in 1999 and 2001.



Source: the Ministry of Economy, SEZ and PDT monitoring figures as of January 1, 2002.

Despite the fact that the share of VAT exemptions is the largest, its proportion decreased in 2001 as compared to 2000. In contrast, the proportion of Entrance Duty and Corporate Profits Tax benefits grew. The increase of Entrance Duty benefits is explained by the growth of the number of registered investment projects. The considerable growth of the Corporate Profits Tax benefit proportion demonstrates the business entities' transition to a new stage of development, that is earning profit from their own operation. Owing to the fact that private businesses' main goal is to earn income, in the future we can presume growth of the Corporate Profits Tax benefit share in the overall structure of benefits, since the number of businesses that have already imported the equipment and started operation will grow.

Ukraine's economy is to undergo considerable changes during its transition from administrative system to market. This transition will display inefficient enterprises that cannot survive in the competitive environment. Availability of benefits on this or another activity puts the national producers that are not entities of SEZ's and TPD's in unequal conditions. Under such circumstances less efficient businesses can outdo their competitors. This calls for regulatory barriers to be set up to restrict this phenomenon. For example, Korean SEZ is obliged to export USD 150 worth per one square

meter of its area and USD 300 worth per each square meter of production capacity.

This problem can be resolved in two ways. (1) Provision of expert conclusion concerning the competitiveness of the product in Ukrainian market. Such expertise cannot be provided by local administrative bodies as they do not have sufficient information, as well as motivation to assess the project. The function of the final conclusion can be referred to the ME. Expertise within the ME, in turn, would have a shortcoming - causing protraction of investment-project approvals. (2) Creation of a limited list of commodities that can be manufactured and sold by a specific SEZ or TPD in Ukraine. Such scheme removes a lot of red tape in approval of the investment project; however, it is fairly inflexible. There is dual danger: adoption of too extensive list of products that can be manufactured in the SEZ or TPD, which will not be effective restraint; or, vice versa, adoption of a too-limited list that will restrain the inflow of investments.

So far, legislation has been adopted for 11 Ukrainian SEZs (Azov, Donetsk, Slavutych, Zakarpatya, Yavoriv, Kurortpolis Truskavets, Interport Kovel, Mykolayiv, Port-franko, Port Krym, Reni) and 9 TPDs (in the Crimean Autonomous Republic, Volynska oblast, Donets oblast, Zakarpatska oblast, Zhytomyrska oblast, Luganska oblast, Chernigivska oblast, the city of Kharkiv, the town of Shostka (Sumska oblast)) located in 12 oblast's of Ukraine.

SEZ and TPD entities are not restricted by the kings of economic activity, provided that this business is not prohibited by the Law. Commonly, special management unit created by the City Council manages SEZ or City Administration, while for the TPD City Council takes management responsibilities itself. The formal purpose for creation of most SEZ's and TPD's in Ukraine has been attraction of investments for making new and

preserving existing jobs. In the empirical part of the paper we will attempt to verify the success of this policy.

DATA DESCRIPTION

Empirical analysis relies on legislative base "Rada" (www.rada.kiev.ua). This legal database contains all documents issued by central and local authorities, including normative acts that regulate SEZ's and TPD's activity in Ukraine. Database is continuously updated, but the most recent data used in this research will be used for the December of 2001. It is the principal source of data on import tariffs and all kind of taxes.

Financial data for the research is obtained from the Ministry of Economy of Ukraine (ME). The regional scope determine 27 regional entities twelve of which have already established SEZ's and TPD's, for the year 1996-2001 on an annual basis. The panel is constructed on this basis contain 162 entries for each variable. Panel data is a repeated observations on the same set of cross-section units. It provides very useful information on thy dynamic behavior of the considered objects. In my case it is extremely important, because the time series of the SEZ's and TPD's activity are rather short which limits the usage of econometric instruments for the analysis (Green 2000).

Regional economic indicators such as Investment, value added, employment, population are monitored on the oblast level. The data for SEZ and TPD is also available from the MEEI, since in 1998 the Government issued an order on monitoring SEZ and TPD activities by a number of indicators that simplified greatly data obtaining process. The order clearly defines types and structure of the indicators that are to be submitted in the reports by STA and Custom administration to the ME. Therefore a variety of indicators in these reports can be tracked over time and as reported by the same authorities can be treated as trustworthy or at least comparative should provide significant results. Monitoring of SEZ and TPD activity is available on the monthly basis with rather broad variety of indicators.

Variable *(INV)*, which measures gross investment in oblast accounts all investment, including those in zone. In order to measure investment that are received by non-tax exempted territory we calculate difference between total investment and investment in zone:

$nIo_{it} = INV_{it} - IZ_{it}$

Gross Value Added is used as a proxy for the level of production in the oblast. This indicator is computed by the MEEI instead of GDP on the oblast level. However this estimator can be treated as a good substitute for the GDP as method of calculation is similar.

To estimate effect of zone presence we construct dummy variable (DumZ). This dummy will equal to 1 if the zone is present in the oblast *i* at the time *t* and to 0 otherwise. Another dummy variable used in the model is to estimate effect of zone presence in the "neighboring" oblast. The oblast is considered to be "neighbor" if it has geographical borders with the considered oblast in the given period of time. Thus "neighbor" dummy equals to 1 if there the zone in the neighbor oblast at period *t* exist.

For the estimation variables are defined in per capita terms. We following indices: *i* to indicate oblast and *t* to indicate time period considered. All indicators are normalized to real terms using 1996 as a base year.

Chapter 3

EMPIRICAL ESTIMATION

In this part of the thesis we will construct three formal models to study following effect of zone establishment on regional investment distribution in Ukraine. The first model evaluates the effect zones on investment attractiveness of the region. The second model evaluates the effect distortions within the region created by zone establishment. And finally, the last model attempts to estimate possible interoblast distortions by providing regional privileges on certain territories. Based on the significance of the coefficients we will attempt to define whether chosen factors matter for the investment. Analysis of coefficients itself will enable to estimate the impact and make the conclusions how variability in investment is explained by given factors.

In this research we involve panel data and thus have to use whether simple pooled OLS regression or Fixed/Random effects estimation. To make the decision we perform Breush-Pagan Lagrange multiplier test for the random effects model based on the OLS residuals. Under the null hypothesis, LM is distributed as a chi-squared with one degree of freedom. The results of the estimation for all three models are presented in the appendix B. Lagrange multiplier test statistics for proposed models rejects null hypothesis at reasonable confidence level in favor of the random effects model. At this point we can conclude that the classical regression model with a single constant term is inappropriate for these data. But it is the best to reserve judgment on that because there is another competing specification that might induce these same results, the fixed effects model. Thus we develop the subsequent discussion to make the choice.

There are two options of using random or fixed effect for our estimations. When only a few observations are available from for different oblasts over time, it is exceptionally important to make the most efficient use of the data across oblasts to estimate that part of the behavioral relationship containing variables that differ substantially from one individual to another, in order that the lesser amount of information over the time can be used to best advantage for estimation of the common part of the relationship studied. The fixed effect model is viewed as one in which investigators make inferences conditional on the effects that are in the sample. The random effects model is viewed as one in which investors make unconditional or marginal inferences with respect to the population of all effects. In general, the choice between the effects depends greatly on the data, the manner in which they were gathered, and the environment from which they came (Hsiao 1986). Besides, by using fixed effect estimation we do not make an assumption of non correlation individual effects with other repressors, as it is assumed in the random effect model. Empirically Hausman specification test is used to facilitate the choice between fixed and random effect models. However test results may not always provide us with uniqueness decision, as it happed in our case. The results of the Hausman test are presented in appendices C,D,E with estimation results for all three models respectively. In such case we should use theoretical approach to make the final decision.
In my case oblasts are not chosen randomly, but the whole sample is investigated. Thus to address the differences between each oblast fixed effect model is more appropriate.

In this model I suggest using fixed effect. Oblasts vary on size significantly, thus different coefficients should be employed.

The description of the variables employed in our model presented below:

Dependant variables	**Description**	**Expected Sign**
INV_POP_{it}	Gross investment per capita in given oblast *i* at *t* time period.	
$NetINV\_POP_{it}$	Net investment per capita in given oblast *i* at *t* time period, excluding investment in SEZ's and TPD's.	
Independent variables		
$VAperC_{it}$	Stands for value added per capita measured in uah per capita. Higher value added per capita generated in the region is expected to have positive effect. There are two explanations for this effect: 1) existing business attracts new investments. 2) higher value added per capita represents potential share of the local market. The higher share of the potential market the more attractive is the region for the investors.	+
Zir_pc_{it}	Stands for volume of investment to SEZ's and TPD's in uah per capita. Volume of investment to SEZ's and TPD's per capita is expected to have positive sign in the first model. By using level indicator we can distinguish high and low invested tax exempted territories. If positive spillover effect exists it should be higher for the oblasts with larger volume of investment to the tax privileged territories. In the second model this variable is used to measure crowding out	"+" - first model; "-" – second model

	effect from the non exempted territories, thus its sign is expected to be negative.	
$DumZ_{it}$	Dummy variable that takes value 1 if zone is present in the *i* oblast at time period *t* and 0 otherwise. Presence of the tax privileges according to our assumptions should be positive and significant. The territories with more favorable tax regimes are expected to have higher profitability, thus investment and should be higher.	+
$neigbDumZ_{it}$	Dummy variable that measures expected effect of the neighbor zone is to be negative. But probably the coefficient will be insignificant due to bad infrastructure, underdeveloped financial institutions and administrative barriers for interaction between oblasts may cause this effect to be insignificant.	-
$Dumborder_{it}$	Dummy for the border oblast takes value 1 if the oblast has border with other countries and 0 otherwise. Dummy for the border oblast is expected to show positive effect from cooperation with neighboring countries. Due to the favorable geographical location border regions are expected to be more likely to get additional investment.	+
Den_auto_{it}	Density of paved roads (in km per 1000 sq km) in the given oblast is to be used as a proxy for the infrastructure development of this oblast. Roads were generally under develop din the Soviet countries thus growth of the road network can be used as infrastructure	+

	development. The coefficient is expected to have positive sign as the region with better developed infrastructure is more likely to attract additional investment.	
Den_rail_{it}	Density of roads (in km per 1000 sq km) in the given oblast is also to be used a proxy for the infrastructure development and probably it may have positive effect on investment. However some difficulties may arise This finding may be attributed to the fact that rail transportation infrastructure was overdeveloped in transitional economies to provide industrial linkages in accordance with the central plan. (World Bank, 1994, 2001). During the periods of investment decline the rail network utilization rates decline, despite the fact that the structure remained the same. Thus its sign may be negative.	+,-

Constructed models aimed to evaluate crowding in and crowding out effects of the SEZ's and TPD's policy in Ukraine.

FIRST MODEL

The first model estimates the effect of zone on the gross investment per capita the oblast. The suggested determinants are the size of the marked for which Value Added per capita is used, infrastructure development dummy variable of zone presence and level investment per capita in the SEZ's and TPD's. We also include the special dummy for the border regions of the country as there are more likely to attract additional investment through cooperation with neighboring countries. According to the presented theory presence of zone should have positive effect on gross investment per capita.

Due tax exemptions and lower regulations, return on investment should be higher on these territories, thus this effect should produce higher gross investment in the oblast containing zone compared to ordinary oblast, and consequently investment per capita is expected to be higher.

If the coefficient at dummy variable and level value of investment in the zone appears to be positive and significant we can suggest that zone creates investment spillover effect. Possible explanation is that faster development of the certain territory stimulates growth of complementary production on the rest territory of the oblast, thus attracting additional investment.

$$INVperC_{it} = \alpha_1 + \alpha_2 VAperC_{it} + \alpha_3 DumZ_{it} + \alpha_4 Dumborder_{it} + \alpha_4 Den\_auto_{it} + \alpha_5 Den\_rail_{it} + \varepsilon_{it}$$

To estimate level effect we include variable of level investment in zones per capita Zir_pc:

$$INVperC_{it} = \alpha_1 + \alpha_2 VAperC_{it} + \alpha_3 Zir\_pc_{it} + \alpha_4 Dumborder_{it} + \alpha_4 Den\_auto_{it} + \alpha_5 Den\_rail_{it} + \varepsilon_{it}$$

Results of the panel data regression estimation with fixed effects are provided in the table below:

Table 4: Results of the estimation with fixed effects. First model.

Variable	First regression Coeficient (standatd deviation)	p-value	Second regression Coeficient (standatd deviation)	p-value
$VAperC_{it}$	.201735 (.0462789)	0.000	.2290282 (.0496522)	0.000
$DumZ_{it}$	35.25496 (8.867242)	0.000	-	-

Zir_pc_{it}	-	-	.2715986 (.158723)	0.095
$Dumborder_{it}$	14.13105 (6.176376)	0.024	10.79703 (6.446143)	0.096
Den_auto_{it}	.5085197 (.5815151)	0.383	.7647018 (.6137313)	0.215
Den_rail_{it}	2.949452 (4.405774)	.504	.5486105 (4.576749)	0.905
R-sq (overall) :	0.4058		0.4989	

This estimation is made under the assumption of homoscedasticity. To verify our assumption we employ Breusch-Pagan(1979) test for heteroskedasticity. Null hypothesis means homoscedasticity of the error term. To perform this test we compose the pooled sample of our observations. This test may not provide us with precise results, since in the pooled sample used for the test fixed-effects are not accounted. Thus in case of absence of heteroscedasticity the test may show positive result. The results of the test are presented in the Appendix C. Examining p-value statistics we can reject null at all reasonable levels of significances.

To correct our results for heteroscedasticity we use generalized least squares, which estimates panel data linear models using with presence of heteroscedasticity. The results of the estimation are presented in the Appendix C. Summary of the results is presented in the table below.

Table 5: GLS estimation results. First model.

Variable	First regression Coeficient (standatd deviation)	p-value	Second regression Coeficient (standatd deviation)	p-value

$VAperC_{it}$	.236431 (.0102443)	0.000	. .2502205 (.0089889)	0.000
$DumZ_{it}$	25.12598 (6.171492)	0.000	-	-
Zir_pc_{it}	-	-	.2089584 (.1227741)	0.089
$Dumborder_{it}$	19.10355 (4.580784)	0.000	20.26987 (4.066366)	0.000
Den_auto_{it}	.3050525 (.0652057)	0.000	.3107248 (.0564567)	0.000
Den_rail_{it}	-1.042937 (.2831814)	0.000	-1.16681 (.3159555)	0.000

The results of the estimation by both methods support our assumptions. In both regressions GDP per capita shows positive impact on investment. Increasing GDP per capita by 1 UAH will cause investment to rise approximately by approximately .20 -.25UAH. Parameters of our particular interest also showed expected sign. Dummy variable has positive sign and large effect, however standard deviation is also big. This estimation with dummy may seem to be not completely persuasive, but estimation in levels also supports the expected effect. Taking investment in levels, gives positive coefficient about .20-.27, so on each investment in zone additional .27 UAH in oblast is attracted. Data suggest (coefficient Dumborder) that regional location of the oblast has positive and statistically significant effect on investment attraction. The coefficient of infrastructure development appeared to be statistically insignificant in the estimation under the homoscedasticity assumption although has positive sign as expected. Employing GLS estimation infrastructure coefficients appeared to be significant. Density of paved roads has positive effect on investment. Negative effect of the railroads density may be due to the above mentioned

reasons of overdeveloped rail structure in post Soviet countries. Generally we can suggest that zone plays positive role in investment attraction.

SECOND MODEL

The second model estimates the distortions that are created inside the oblast after establishment of the zone. We are particularly interested in investment distribution inside the oblast between the zone and the rest of the non tax exempted territory of the oblast, by employing this model we attempt measure crowding out effect. To estimate crowding out effect we take variables in per capita terms and restrict our sample only to those oblasts that have SEZ's and TPD's, in order to track investment flows to tax exempted territories within oblasts after they have been created. The model is constructed on identify the effect of net investment in oblast excluding investment in the zone. According to theory if the zone has a more favorable tax regime, it may induce relocation of investment that otherwise would go to non-privileged territory. Therefore we expect the coefficient for investment in privileged territories to be negative and significant, in case when crowding out effect within the oblast exists. To verify this effect we regress:

$nIo\_perC_{it}=\alpha_1+\alpha_2 VAperC_{it}+\alpha_3 zir\_perC_{it}+\alpha_4 Dumborder_{it}+\alpha_5 Den\_auto_{it}+\alpha_6 Den\_rail_{it}+\varepsilon_{it}$

The results of the estimation are presented in the table below.

Table 6: Results of the estimation with fixed effects. Second model.

Variable	Coeficient (standatd deviation)	p-value
$VAperC_{it}$	.4291771 (.0955758)	0.000

Zir_pc_{it}	-.9993722 (.2000124)	0.000
$Dumborder_{it}$	12.11735 10.01979	0.232
Den_auto_{it}	2.306946 (1.069187)	0.035
Den_rail_{it}	-4.875297 (8.7903)	0.581
R-sq :	0.5029	

The results of the test for heteroscedasticity presented in the appendix D do not reject null hypothesis. Thus we can suggest that assumption of homoscedasticity holds and employ panel data estimation with fixed effects.

The signs of the regression coefficients are consistent with the theory. Coefficient for VAperC is positive and significant supporting the idea of favorable effect of the market size, which is consistent with the first model. Estimation for the Zir_pc produced negative coefficient. The coefficient is statistically significant at all reasonable levels of significance. This can imply presence of the crowding out effect. Thus, as expected growth of investment in privileged territories is partially secured by the redirecting investment from the rest of the territory of the region. Presence of zone affects investment decisions in favor of zone and investments, which otherwise would be done on the non-privileged territories tend flow to the more favourable tax regime areas, thus redistributing investments inside the oblast. According to the estimation coefficient for the location is statistically insignificant. This may be caused by the restriction of our sample. Since most of the tax exempted areas are located in the bordering oblasts the effect of location may not be important. According to data development of road system has positive and statistically significant effect on investment. R

squared implies that 50,29% of variation in net investment in oblast is explained by the suggested factors.

THIRD MODEL

This model evaluates distortions that may be created on the interoblast level due to the presence of zone in the neighboring oblast. We assume that existence of the privileged territories in the neighboring oblasts may produce crowding out effect to the given oblast because of unequal taxation conditions. For empirical measurement of this effect we use "neighboring dummy", which takes value 1 if the zone exist in the neighbor oblast. In case the zone is present in considered oblast and the neighbor oblast, as well we assume these oblasts to be in equal conditions as the negative effect on investment created by the neighboring oblast zone is offset as explained below. We construct following measure:

$$NETneighDUM_{it} = (1\text{-}dumZ_{it})*neigbDumZ_{it}$$

The reasoning behind this is as following: in case the oblast has zone it can efficiently compete with the zone in the neighbour oblast thus preventing investment distortions.
To measure this effect empirically we estimate following equation:

$$INVperC_{it} = \alpha_1 + \alpha_2 VAperC_{it} + \alpha_3 NETneighDUM_{it} + \alpha_4 Dumborder_{it} + \alpha_5 Den\_auto_{it} + \alpha_6 Den\_rail_{it} + \varepsilon_{it}$$

The results of the estimation are presented in the table below.

Table 7: Results of the estimation with fixed effects. Third model.

Variable	Coeficient (standatd deviation)	p-value
$VAperC_{it}$	.2269678 (.0502161)	0.000
Zir_pc_{it}	.2784676 (.1634125)	0.091
$NETneighDUM_{it}$	3.088774 (9.39647)	0.743
$Dumborder_{it}$	10.79636 (6.468371)	0.098
Den_auto_{it}	.7776315 (.6171025)	0.210
Den_rail_{it}	.6448461 (4.601853)	0.889
R-sq (overall) :	0.4885	

For the third model results of the test for heteroscedasticity presented in the appendix E reject null hypothesis. To correct our results for heteroscedasticity we use generalized least squares, which estimates panel data linear models using with presence of heteroscedasticity. The results of the estimation with GLS method are presented in the Appendix E. Summary of the results is presented in the table below.

T**able 8: GLS estimation results. Third model.**

Variable	Coeficient (standatd deviation)	p-value
$VAperC_{it}$	.2457253 (.0094301)	0.000
Zir_pc_{it}	.2038711 (.1238113)	0.100

$NETneighDUM_{it}$	-6.859732 (4.812925)	0.154
$Dumborder_{it}$	19.6283 (4.136811)	0.000
Den_auto_{it}	.3091434 (.0564747)	0.000
Den_rail_{it}	-1.107248 (.3203305)	0.001

Expected signs of the estimation are in general consisted with suggested theory. Estimation for the $VaperC_{it}$ produced similar result to the previous estimations, being positive and significant. The effect of interoblast interaction appeared to be insignificant in both ways of estimation. Constructed dummy $NETneighDUM_{it}$ has highly insignificant coefficient. We may assume that suggested explanation about market imperfection is valid in case of Ukraine. Firstly, according to regulations economic agents that live in one oblast can conduct business activity in another oblast only with additional permission. Therefore local business may be partially locked into their locations unable to relocate production. This year the regulation was cancelled and we may suppose that it will come into effect in 2 or 3 years. Secondly, capital mobility is relatively low in Ukraine. Poorly developed financial system may impose additional constraints on the capital flight effect. Thirdly, high level of shadow economy locks business to the certain areas. Shadow businesses commonly have bribe local tax officers in order to conduct its activity. If the expansion of the business that operates under "umbrella" requires bigger "umbrella". Thus production relocation or expansion to other areas requires either legalize the business or increase expenditures on unofficial payments. These reasons may create sufficient barriers to disable interoblast effect of investments.

Chapter 4

CONCLUSIONS

Privileged territories have become a popular tool in transition economies. Faced with chronic budget deficit the countries have attempted to conduct tax-exemptions policies to promote regional growth and attract foreign investment. The present research confirms a strong effect of SEZs and TPDs on investment allocation in Ukraine, as postulated in the literature.

According to the empirical estimations, the policy of tax privileges appears to have had significant *crowding in* effect in the oblasts that established SEZs and TPDs. However, the fly in the ointment is that establishing tax-exempted territories produce *crowding out* effect within the oblast. This implies that investments that would have been done in the ordinary territories of the oblast tend to flow to the privileged territories. Naturally, investors prefer territories with lower taxes and regulations whenever it is possible.

While the crowding out effect is observed within oblasts, cross-oblast effect does not receive empirical support from the data. Thus, zone establishment in the neighboring oblast does not affect investment in the given oblast. Possible explanations are: weak communication network, underdeveloped infrastructure, proliferation of administrative restrictions, and large share of shadow activities that act as a barrier for investment mobility between neighboring oblasts.

Generally, the policy should be carefully evaluated on a case-by-case basis, as benefits from increased investment in the privileged territory affect the level of investment in the rest of the areas of the oblast. The final decision

on extending privileges should incorporate analysis of additional factors that are beyond the scope of the present study. Such factors include, among others, unemployment, competitiveness, tax revenues, and welfare effects.

The ability to pursue further research depends on data availability. Unfortunately, given the availability of data, we have been restricted to analysis at the macro level of the SEZ's and TPD's policy in Ukraine. As a result, we are unable to make any conclusions on competitiveness and welfare effects on the firm level. In addition to micro level analysis, further investigation within a general equilibrium framework would also be a useful extension of this research. We believe that our findings would generate discussions and stimulate further research in this field.

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APPENDIX A

Data summary

Variable	Obs	Mean	Std. Dev.	Min	Max
Value added per capita	162	1196.677	297.7505	676.5475	2100.501
Population	162	1847.772	954.3099	387	5141
Investment in oblast	162	424.0203	354.1437	48	1757.434
Investment in oblast per capita	162	211.855	93.11268	64.391	510.8173
Investment in zone in oblast per capita	162	6.403834	24.98222	0	188.451
Density of paved road network	162	276.2037	52.07044	176	386
Density of rail road network	162	7.80864	10.81323	16	62

APPENDIX B

Results of the Breusch and Pagan Lagrangian multiplier test
(Estimates as reported by the Stata7.0 Program)

The first model (a)

. xttest0

Breusch and Pagan Lagrangian multiplier test for random effects:
inv_pop2[obl,t] = Xb + u[obl] + e[obl,t]
Estimated results:

Var	sd = sqrt(Var)
inv_pop2	8669.972	93.11268
e	1220.343	34.9334
u	1914.725	43.75757

Test: Var(u) = 0
chi2(1) =130.23
Prob > chi2 = .0000

The first model (b)

Breusch and Pagan Lagrangian multiplier test for random effects:

inv_pop2[obl,t] = Xb + u[obl] + e[obl,t]
Estimated results:

Var	sd = sqrt(Var)
inv_pop2	8669.972	93.11268
e	1339.593	36.60046
u	1879.045	43.34796

Test: Var(u) = 0
chi2(1) = 116.60
Prob > chi2 = 0.0000

The second model.

Breusch and Pagan Lagrangian multiplier test for random effects:
net_nIo[obl,t] = Xb + u[obl] + e[obl,t]
Estimated results:

Var	sd = sqrt(Var)

net_nIo	5634.654	75.06433
e	1506.829	38.81789
u	887.5504	29.79178

Test: Var(u) = 0
chi2(1) = 3.78
Prob > chi2 = 0.0517

The third model

Breusch and Pagan Lagrangian multiplier test for random effects:

inv_pop2[obl,t] = Xb + u[obl] + e[obl,t]
Estimated results:

	Var	sd = sqrt(Var)
inv_pop2	8669.972	93.11268
e	1368.602	36.99462
u	1890.135	43.47568

Test: Var(u) = 0
chi2(1) = 117.68
Prob > chi2 = 0.0000

APPENDIX C

Estimations for the first model (Estimates as reported by the Stata7.0 Program)

. xthausman

Hausman specification test

	---- Coefficients ----		
inv_pop2	Fixed Effects	Random Effects	Difference
GperPr	.201735	.2401312	-.0383962
dum	35.25496	31.39967	3.855295
dumborder1	14.13105	14.90157	-.7705164
den_rail	2.949452	-1.638374	4.587826
den_auto	.5085197	.3657503	.1427695

Test: Ho: difference in coefficients not systematic
chi2(5) = (b-B)'[S^(-1)](b-B), S = (S_fe - S_re) = 3.85
Prob>chi2 = 0.5715

. xtreg inv_pop2 GperPr dum dumborder1 den_rail den_auto, fe

Fixed-effects (within) regression Number of obs = 162
Group variable (i) : obl Number of groups = 27

R-sq: within = 0.3435 Obs per group: min = 6
between = 0.4270 avg = 6.0
overall = 0.4058 max = 6

F(5,130) = 13.60
corr(u_i, Xb) = -0.4044 Prob > F = 0.0000

inv_pop2	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
GperPr	.201735	.0462789	4.36	0.000	.1101779	.2932922
dum	35.25496	8.867242	3.98	0.000	17.71219	52.79774
dumborder1	14.13105	6.176376	2.29	0.024	1.911831	26.35027
den_rail	2.949452	4.405774	0.67	0.504	-5.766846	11.66575
den_auto	.5085197	.5815151	0.87	0.383	-.6419383	1.658978
_cons	-295.512	223.3112	-1.32	0.188	-737.3065	146.2826

```
-----------------+------------------------------------------------------------------------------
       sigma_u |  71.694302
       sigma_e |  34.933404
           rho |  .80813476   (fraction of variance due to u_i)
------------------------------------------------------------------------------------------------
F test that all u_i=0:     F(26, 130) =     9.40            Prob > F = 0.0000
```

. xtgls inv_pop2 GperPr dum dumborder1 den_rail den_auto, p(h)

```
Cross-sectional time-series FGLS regression

Coefficients:  generalized least squares
Panels:        heteroskedastic
Correlation:   no autocorrelation

Estimated covariances      =        27         Number of obs      =       162
Estimated autocorrelations =         0         Number of groups   =        27
Estimated coefficients     =         6         No. of time periods=         6
                                               Wald chi2(5)       =    954.74
Log likelihood             = -817.2155         Prob > chi2        =    0.0000

------------------------------------------------------------------------------------------------
     inv_pop2 |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
--------------+---------------------------------------------------------------------------------
       GperPr |    .236431   .0102443    23.08   0.000     .2163525    .2565095
          dum |   25.12598   6.171492     4.07   0.000     13.03008    37.22188
   dumborder1 |   19.10355   4.580784     4.17   0.000     10.12538    28.08172
     den_rail |  -1.042937   .2831814    -3.68   0.000    -1.597963   -.4879121
     den_auto |   .3050525   .0652057     4.68   0.000     .1772517    .4328532
        _cons |  -131.4225   16.26188    -8.08   0.000    -163.2952   -99.54979
------------------------------------------------------------------------------------------------
```

. xthausman

Hausman specification test

	---------- Coefficients ----------		
inv_pop2	Fixed Effects	Random Effects	Difference
GperPr	.2290282	.2512453	-.022217
zir_pc	.2715986	.260645	.0109536
den_rail	.5486105	-1.901921	2.450532
den_auto	.7647018	.3971563	.3675454
dumborder1	10.79703	12.77882	-1.981789

Test: Ho: difference in coefficients not systematic
chi2(5) = (b-B)'[S^(-1)](b-B), S = (S_fe - S_re) = 2.39
Prob>chi2 = 0.7927

. xtreg inv_pop2 GperPr zir_pc den_rail den_auto dumborder1, fe

Fixed-effects (within) regression Number of obs = 162
Group variable (i) : obl Number of groups = 27

R-sq: within = 0.2793 Obs per group: min = 6
between = 0.5479 avg = 6.0
overall = 0.4989 max = 6
F(5,130) = 10.08
corr(u_i, Xb) = -0.3098 Prob > F = 0.0000

inv_pop2	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
GperPr	.2290282	.0496522	4.61	0.000	.1307973	.3272591
zir_pc	.2715986	.161514	1.68	0.095	-.0479374	.5911347
den_rail	.5486105	4.576749	0.12	0.905	-8.50594	9.603161
den_auto	.7647018	.6137313	1.25	0.215	-.4494922	1.978896
dumborder1	10.79703	6.446143	1.67	0.096	-1.95589	23.54996
_cons	-301.1114	235.5122	-1.28	0.203	-767.0441	164.8213
sigma_u	61.033799					
sigma_e	36.600457					
rho	.73550483	(fraction of variance due to u_i)				

F test that all u_i=0: F(26, 130) = 8.40 Prob > F = 0.0000

. xtgls inv_pop2 GperPr zir_pc dumborder1 den_rail den_auto, p(h)

Cross-sectional time-series FGLS regression

Coefficients: generalized least squares
Panels: heteroskedastic
Correlation: no autocorrelation

Estimated covariances	= 27	Number of obs	= 162
Estimated autocorrelations	= 0	Number of groups	= 27
Estimated coefficients	= 6	No. of time periods	= 6
		Wald chi2(5)	= 975.45
Log likelihood	= -820.4801	Prob > chi2	= 0.0000

inv_pop2	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
GperPr	.2502205	.0089889	27.84	0.000	.2326026	.2678384
zir_pc	.2089584	.1227741	1.70	0.089	-.0316743	.4495912
dumborder1	20.26987	4.066366	4.98	0.000	12.29994	28.2398
den_rail	-1.16681	.3159555	-3.69	0.000	-1.786072	-.547549
den_auto	.3107248	.0564567	5.50	0.000	.2000718	.4213779
_cons	-141.1946	15.40094	-9.17	0.000	-171.3799	-111.0093

APPENDIX D

Estimations for the second model

. xthausman

Hausman specification test

	---- Coefficients ----		
net_nIo	Fixed Effects	Random Effects	Difference
GperPr	.4291771	.2586793	.1704978
zir_pc	-.9993722	-.7688963	-.2304759
den_auto	2.306946	.5771147	1.729831
den_rail	-4.875297	-1.768241	-3.107056
dumborder1	12.11735	14.272	-2.154653

Test: Ho: difference in coefficients not systematic

chi2(5) = (b-B)'[S^(-1)](b-B), S = (S_fe - S_re) = 15.32
Prob>chi2 = 0.0091

. xtreg net_nIo GperPr zir_pc den_auto den_rail dumborder1 if dum_beg==1, fe

Fixed-effects (within) regression Number of obs = 72
Group variable (i) : obl Number of groups = 12

R-sq: within = 0.4834 Obs per group: min = 6
between = 0.6396 avg = 6.0
overall = 0.5029 max = 6

F(5,55) = 10.29
corr(u_i, Xb) = -0.8912 Prob > F = 0.0000

net_nIo	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
GperPr	.4291771	.0955758	4.49	0.000	.2376389	.6207152
zir_pc	-.9993722	.2000124	-5.00	0.000	-1.400206	-.5985385
den_auto	2.306946	1.069187	2.16	0.035	.1642465	4.449645
den_rail	-4.875297	8.7903	-0.55	0.581	-22.49145	12.74086

```
  dumborder1 |   12.11735   10.01979     1.21   0.232    -7.962756    32.19745
       _cons |  -732.8405   431.6674    -1.70   0.095    -1597.921    132.2402
-------------+----------------------------------------------------------------
     sigma_u |  92.436198
     sigma_e |  38.817892
         rho |  .85008588   (fraction of variance due to u_i)
------------------------------------------------------------------------------
F test that all u_i=0:     F(11, 55) =     3.88                 Prob > F = 0.0004
```

. xtgls net_nIo GperPr zir_pc den_auto den_rail dumborder1 if dum_beg==1, p(h)

```
Cross-sectional time-series FGLS regression

Coefficients:  generalized least squares
Panels:        heteroskedastic
Correlation:   no autocorrelation

Estimated covariances      =        12      Number of obs      =        72
Estimated autocorrelations =         0      Number of groups   =        12
Estimated coefficients     =         6      No. of time periods =         6
                                            Wald chi2(5)       =    347.28
Log likelihood             = -346.6426      Prob > chi2        =    0.0000

------------------------------------------------------------------------------
      net_nIo |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
--------------+---------------------------------------------------------------
      GperPr |   .1971806   .0125564    15.70   0.000     .1725705    .2217908
      zir_pc |  -.8073735   .0973469    -8.29   0.000    -.9981699   -.6165771
    den_auto |   .4635241   .0715884     6.47   0.000     .3232134    .6038349
    den_rail |  -1.178732   .3608477    -3.27   0.001    -1.885981   -.4714839
  dumborder1 |   28.39299   6.227781     4.56   0.000     16.18676    40.59922
       _cons |  -109.1016   22.96868    -4.75   0.000    -154.1194   -64.08386
------------------------------------------------------------------------------
```

APPENDIX E

Estimations for the third model

. xthausman

Hausman specification test

	Coefficients		
inv_pop2	Fixed Effects	Random Effects	Difference
GperPr	.2269678	.2509081	-.0239403
zir_pc	.2784676	.261457	.0170106
netdumint	3.088774	1.075922	2.012852
den_rail	.6448461	-1.895727	2.540574
den_auto	.7776315	.3977847	.3798469
dumborder1	10.79636	12.74266	-1.946292

Test: Ho: difference in coefficients not systematic
chi2(6) = (b-B)'[S^(-1)](b-B), S = (S_fe - S_re) = 2.21

Prob>chi2 = 0.8997

. xtreg inv_pop2 GperPr zir_pc netdumint den_rail den_auto dumborder1, fe

Fixed-effects (within) regression Number of obs = 162
Group variable (i) : obl Number of groups = 27

R-sq: within = 0.2800 Obs per group: min = 6
between = 0.5356 avg = 6.0
overall = 0.4885 max = 6

F(6,129) = 8.36
corr(u_i, Xb) = -0.3228 Prob > F = 0.0000

inv_pop2	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
GperPr	.2269678	.0502161	4.52	0.000	.127614	.3263216
zir_pc	.2784676	.1634125	1.70	0.091	-.044848	.6017831
netdumint	3.088774	9.39647	0.33	0.743	-15.50237	21.67992
den_rail	.6448461	4.601853	0.14	0.889	-8.460033	9.749725
den_auto	.7776315	.6171025	1.26	0.210	-.4433208	1.998584

```
 dumborder1 |   10.79636   6.468371     1.67   0.098    -2.001468    23.59419
      _cons |  -306.4331   236.8782    -1.29   0.198    -775.1024    162.2362
-------------+----------------------------------------------------------------
     sigma_u |  62.157997
     sigma_e |  36.726667
         rho |  .74122643   (fraction of variance due to u_i)
------------------------------------------------------------------------------
F test that all u_i=0:     F(26, 129) =     8.33            Prob > F = 0.0000
```

. xtgls inv_pop2 GperPr zir_pc netdumint dumborder1 den_rail den_auto, p(h)

Cross-sectional time-series FGLS regression

Coefficients: generalized least squares
Panels: heteroskedastic
Correlation: no autocorrelation

Estimated covariances = 27 Number of obs = 162
Estimated autocorrelations = 0 Number of groups = 27
Estimated coefficients = 7 No. of time periods = 6
Wald chi2(6) = 945.80
Log likelihood = -819.5989 Prob > chi2 = 0.0000

inv_pop2	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
GperPr	.2457253	.0094301	26.06	0.000	.2272427	.264208
zir_pc	.2038711	.1238113	1.65	0.100	-.0387946	.4465368
netdumint	-6.859732	4.812925	-1.43	0.154	-16.29289	2.573428
dumborder1	19.6283	4.136811	4.74	0.000	11.5203	27.73631
den_rail	-1.107248	.3203305	-3.46	0.001	-1.735084	-.4794116
den_auto	.3091434	.0564747	5.47	0.000	.1984549	.4198318
_cons	-135.6657	15.76546	-8.61	0.000	-166.5654	-104.7659

APPENDIX F

Figure 4: MAP OF OBLASTS THAT ESTABLISHED SEZ'S OR TPD IN UKRAINE