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DEVELOPMENT OF ENVIRONMENTAL INFRASTRUCTURE IN EU: POSSIBILITIES FOR EVALUATION

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Abstract

With total financial resources of €347 billion for the 2007-2013 planning period European Cohesion policy is the important topic of research for many both due to huge financial value as well as unprecedented number of participating states, sectors and goals. Present planning period follows previous programming periods, which are described as successful in making difference to standards of living across European Union (European Commission, 2007), not very effective (de la Fuente, 2003) and failed to deliver a satisfactory growth performance (Sapir et al., 2004). Some researchers note that no evidence is found that the policies adopted are the most appropriate (Boldrin, Canova, 2001) and the Cohesion Funds should be terminated with the end of the previous spending cycle (2006) (Boldrin, Canova, 2003).

Since the raising awareness on environmental topics and the fact that most of the European states (particularly in EU) as one of the funding priorities mark environmental issues as part of sustainable development strategy, one of the specific issues considered is the impact of the Cohesion policy on environment protection efforts. Present paper discusses different aspects of policy's impact evaluation with particular accent on possibility to apply counterfactual impact evaluation for environmental infrastructure (e.g. construction of iron removal plants, waste water treatment plants, networks).

The research method is comparative and logical analysis of the theoretical concepts, methods and conclusions, published in scientific literature including policy analysis.

Keywords: impact evaluation, EU policies, public infrastructure, environmental protection

Introduction

In 1994 Piasecki and Wolnicki reminded of Kindleberger's publication dated 1988: "Kindleberger wrote that a theory of economic development could not be compared to a theory of economic growth, as the latter is simple, elegant and easy to explain. In contrast, theories of economic development are general, vague and chaotic – much like the mass poverty with which they attempt to come to terms" (Piasecki, Wolnicki 2004). The issue is still current as we struggle to determine optimal development strategy of the state as the number of theoretical concepts is growing.

The size of government expands as an economy develops over time. Results of empiric studies suggest that this tendency is, in part, a natural consequence of structural transformation. This economic explanation for increasing government size complements explanations based on the spread of political voice as democracies develop and mature. Rising tax revenues allow the government to increase the level of public investment over time. Increasing levels of investment help to offset the diminishing returns associated with public capital accumulation. Thus, as the public sector expands, the economy's growth rates do not necessarily decline (Mourmouras, Rangazas 2009). This proves that economic development may cause increase of public investments under certain conditions.

On the other hand in case of *new* EU Member states (joining EU since 2004) the amount of public investments includes financing under Cohesion policy, financed by different EU financial instruments, particularly structural funds and Cohesion fund. The amount of this funding depends on EU budget, dividing Member states into two different "camps": *net payers* (directly receive less than pay in the budget of EU) and *net beneficiaries* (receive more than pay). Therefore increase of public investments in given EU country may be caused not only by the development of country economy but also by the level of development when comparing to other EU countries and is being financed by EU tax payers – non-residents of the country. Evident conclusion may be mentioned based on this fact: national governments of net beneficiaries countries are directly responsible for providing clear message for the tax payers of net payers states, either the financing has been used in the most efficient way and created certain long-lasting results or not. The question therefore is how to determine these results and to measure efficiency. This issue largely arises from the lack of theoretical and practical concepts on how the evaluation techniques could achieve rigorous estimations of the investment impact on the state of environment or other processes. Moreover the issue of measuring the impact comprises itself in other possible components: impact of what, on what and for whom or in other words if policymakers must decide whether to expand, contract or maintain a program, or simply want to improve it, they need more than accountability information, they need to learn what works and what doesn't, and why. Thus, evaluating the impact of (cohesion) policy does involve a variety of cognitive tasks, with varying degrees of complexity (Martini 2009).

The purpose of this paper is to demonstrate that impact of the policy has to be measured to achieve better future performance as well as to propose application of counterfactual impact evaluation for infrastructural projects, particularly in the field of environment.

Role of government and evaluation of the policy

This part of the paper is devoted to discussions of renowned economists on the government and the role of it in setting appropriate investment policy. It is important to note that governmental investments (including financing of EU structural funds) in certain sectors of many EU countries are the main financing source for development of particular infrastructure, e.g. environmental infrastructure. Porter notes that:

> "Government inevitably plays a variety of roles in an economy. Its most basic role is to achieve macroeconomic and political stability. A second role of government is to improve general microeconomic capacity through improving the quality and efficiency of general-purpose inputs to business and the institutions that provide them identified in diamond theory such as an educated workforce, an appropriate physical infrastructure, and accurate and timely economic information. The third role of government is to establish the overall microeconomic rules and incentives governing competition that will encourage productivity growth. A fourth role of government is to develop and implement a positive, distinctive, long-term economic action program, or change process that mobilizes government, business, institutions, and citizens. Economic progress often is thwarted by inaction and by a lack of consensus on what steps are necessary." (Porter 2000).

According to Phillips and Edwards: "The historical evolution of development paradigms and associated practice owes much to modernist theories premised on rationalism. Development practice continues to be dominated by notions of cause and effect and the assumption that what is defined by the developer as 'underdevelopment' is the result of a lack of development which can be potentially solved by the delivery of certain inputs" (Phillips, Edwards 2000). Thus when discussing the development of public infrastructure in EU in relation to Cohesion policy we divide EU member states (or even regions) into two different groups: the ones with developed infrastructure and the ones that need to develop the infrastructure. EU acts as a "developer", which also sets the standards and goals of the development. In the detailed

summary of different development concepts by Greig et all (Greig et al 2007) one is a concept of development as a loadstar. That can be related to the way how environmental investments are being performed in EU by EU funds. There is a need for achieving certain targets (e.g. directives) and the issue of efficiency of the *direction* is not being discussed. However the issue of efficiency of spending is still current. Commenting the importance of public infrastructure Marrero wrote*:*

> "Early empirical work by Aschauer (1989) and Munnell (1990) identified the significant impact that public infrastructure has on economic growth. The public sector has gradually lost influence in the productive activity of most developed economies since 1960. Although total public outlays have represented meaningful shares of GDP during the last four decades, public investment-tooutput ratios have generally declined over the same period. By 2000, public investment represented 3.7% of total real GDP in the OECD and 3.1% in the U.S. These figures fall well below the optimal public investment-to-output ratios predicted by most recent studies under a standard calibration" (Marrero 2008).

The concept of public infrastructure may is not universal or say it in another way: not in every country the public infrastructure includes the same elements. For example water utilities providing drinking water and dealing with the treatment of wastewater may belong to public companies or local authorities or may be entirely private companies. For the purpose of this paper we consider the public infrastructure is the infrastructure which is created for the need of general population and is serving significant part of it. Since we established the importance of public infrastructure for economic development, out next task is to discuss the issue of evaluation of investments into public infrastructure. According to Salih:

> "In many developing societies, policymakers' ability to promote sustainable development can be affected adversely by government's lack of political will and limited ability to enforce the law, particularly in remote rural areas. On the other hand, policymakers may not be immune to corruption and/or the influence of special-interest and political groups in the more developed societies. Therefore, it is possible that policymakers in both developed and less developed societies help in steering growth and development away from their desirable, sustainable, path" (Salih 2003).

Thus policymakers in Member states pushed by EU binding legislation in the field of environment (discussed further in the present paper) are "forced to invest" and the question of effectiveness arises. The Impact Assessment Board (IAB, 2009) estimates that some 60–80 percent of impact assessment studies currently provided to the European Commission supply the kind of information that does not inform policy makers as to whether their global objectives can be met (Radej 2011). Van Den Berg notes that:

> "International discussion on effectiveness of aid emphasizes results, results, results and results. Many bilateral and multilateral donors are moving in the direction of management for results or by results, or have done so in the past few years. One element that contributed to this shift was the general feeling that aid had not sufficiently demonstrated its results. Although the importance of impact assessment is recognized by many in the development aid community, there is also a concern that it is either too difficult or too expensive to carry out substantial work on impact assessment. Yet, pressure to 'show results' is increasing, from the media, politics, boards, parliaments, and the general public. One solution to this – currently being discussed in many donor agencies – is to show results continuously through monitoring systems. Often, these are promoted in systems of 'results-based management', 'management for results' or similar public management approaches" (Van Den Berg 2005).

As already mention in introduction we should not only evaluate but to perform it in the most rigorous way, more *accountable*. Schweigert mentions: "as a basic concept, *accountability* can be quite simply defined as "the ability of one actor to demand an explanation or justification of another actor for its actions and to reward or punish that second actor on the basis of its performance or its explanation" (Rubin 2005). As Rubin (2005) points out, accountability assumes an administrative hierarchy of some kind with superiors controlling subordinates, with the control being mediated through judgments based on predetermined standards" (Schweigert 2006).

Notes on counterfactual impact evaluation

Evaluation techniques or methods are numerous, scientific discussion on most appropriate methods for evaluation of different process is ongoing and seems to be eternal. Van Den Berg wrote:

> "First of all, our use of the concept 'cause' is influenced heavily by physics, which is considered to be the most successful natural science. What do physicists mean by causality? A causal relationship in physics refers to a linkage that has been established both theoretically and empirically. Typically, a causal linkage is not researched by physicists after it has been 'proven'. If a natural law describes that B will happen if you initiate A, then of necessity B happens and a physicist may just check whether A was indeed put in place, because B will then automatically follow. We (and the physicists) know that in an actual situation B may not happen – however, in 99 percent of cases this does not lead physicists to doubt the causal linkage" (Van Den Berg 2005).

According to White: "Amongst evaluators, 'impact' typically refers to the final level of the causal chain (or log frame), with impact differing from outcomes as the former refers to long-term effects.". To make more universal formulation White also notes that: "impact is defined as the difference in the indicator of interest (Y) with the intervention (Y^1) and without the intervention (Y^0). That is, impact = Y^1 - Y^0"(White 2010). Y^0 is a hypothetical value (counterfactual) since it is not possible to know what would have happened in case of reallocations of funds to different beneficiaries or to other field of interventions. Saunders mentions that there are some daunting methodological problems in identifying robust causal links between interventions, programmes and policies and desired outcomes: "The processes linking funding allocations, policy priorities, mechanisms and effects are likely to be indirect, hard to identify and even harder to measure. Hence the problem of *attribution,* i.e. the difficulty in identifying the extent to which a particular intervention has created a specific outcome" (Saunders 2011). Counterfactual impact evaluation is a method when we compare actual (*observable*) outcome Y^1 with unobservable Y^0, the result shown by the projects, regions or countries, which are covered by the policy but are comparable (similar) with the units covered by the policy (*treated units*). Such comparison can be done using numerous approaches (experiments, establishing the control group, surveys, etc.).
Particularly the attribution problem makes it difficult for evaluators to proceed with counterfactual impact evaluation in the field of infrastructure. Accountability information for environmental projects includes length of pipelines, number of waste water treatment plants built, number of agglomerations treated, and number of protected areas included in the project. This information does not allow us to suggest improvements for the policy since there is no linkage between single indicators (e. g. length) and the goal of the environmental policy. Same problem will be current for road projects, projects related to energy efficiency issues (e.g. buildings), etc.
Di Tillio reminds that "starting with the work of Stalnaker (1968) and Lewis (1973), philosophers and logicians have studied the logic of counterfactuals, distinguished among types of counterfactuals, and considered their semantics" (Di Tillio 2011). Van den Berg also notes that:

> "Conceptually, undertaking impact assessments raises major difficulties. These difficulties are generally related to causal linkages and attribution on the one hand and the counterfactual on the other. First of all the question of causal linkages is of crucial importance to the design of the evaluation. What impact is being looking for? What are expected results beyond the direct reach of the activities and how were these results supposedly achieved? By definition these linkages grow weak beyond the immediate reach of the activities and become more hypothetical in nature" (Van Den Berg 2005).

To conclude this part White's opinion is relevant: "An impact evaluation is a study which tackles the issue of attribution by identifying the counterfactual value of Y (Y^0) in a rigorous manner." (White 2010). However the concept is rarely being used for infrastructural projects and some other methods have been advised by European Commission (e.g. *ex post* cost benefit analysis). I believe that there is a problem with not the possibility of application but the issue of attribution and finding the causality.

Role of environmental legislation in EU and possibilities for evaluation of the policy

A policy imperative for the EU is cohesion, integration and a drive to reduce the disparity in social and economic development across member states. This is an issue for all citizens within the EU who provide the resources through taxation that fund the expenditure on European policy. It constitutes, as Sauders suggests, *the logic of policy intention* (Saunders 2011).
According to the general information published on European Commission's web page: "Water management is one of the European Commission's environmental priorities. The framework directive on water sets out the guidelines for water policy in Europe for the decades ahead. It more especially promotes the use of pricing and taxation as an incentive for consumers to use water resources in a more sustainable manner and to recover the cost of water services per sector of the economy".
Moreover it is mentioned that: "In order to achieve the environmental aims and to include the major economic principles, water pricing policies must reflect the following costs:

- Financial costs: direct costs embracing the costs of supply and administration, operation and maintenance, and also capital costs.
- Environmental costs: cost of the waste caused by water use on the ecosystem, for example: salination or degradation of productive soils).
- Resource costs: cost of resource depletion leading to the disappearance of certain options for other users".

Coming back to the concepts of "developer" and "development as loadstar" it is possible to discuss EU environmental policy as part of development concept and as a field for evaluation. According to the note on European Commission's web

page: “In the past 30 years the EU has adopted a substantial and diverse range of environmental measures aimed at improving the quality of the environment for European citizens and providing them with a high quality of life”. If so, the policy impact should be evaluated.
Example of previous evaluations held by note on European Commission shows that we are way behind the rigorous estimates of policy’s impact on the state of environment:

> “Regarding the fulfillment of European directives requirements, it is mainly positive. But weaknesses were identified in the ERDF’s contribution to sustainable regional development. If the ERDF is to be used to address the important environmental needs, a new approach is required. Public support demands in the environmental fields are indeed huge and they are now a shared among all institutional levels. A consensus is emerging on the need to integrate environmental issues into economic growth strategy”.

Although this is not the only take on evaluation of the policy (and many successful examples are there) too many open questions are open, e.g. is the policy implementation really effective or is it truly the best option for public interventions?
According to Working Document No 4: Guidance on the Methodology for carrying out Cost-Benefit Analysis, the Polluter Pays Principle is one of the principles of Community environmental policy (Art. 174 EC Treaty) and applies throughout the European territory. According to the Water Framework Directive (2000/60/EC) of the European Parliament and of the Council, “Member States shall take account of the principle of recovery of the costs of water services, including environmental and resource costs, in accordance in particular with the polluter pays principle” (European Commission 2006). There is price for such regulation: tariffs after investing should be raised (at least theoretically).
Therefore I consider that after the completion of the projects the payment for more qualitative services should increase:

- in absolute terms;
- as percentage of household expenditures (if the same amount of services is supplied and demanded).

Moreover we can measure future investments of the treated and not-treated units following the investment phase (since the goal of improving the quality of the environment for European citizens is a long lasting one). This is the way to establish the causality between the policy and the results achieved. Undoubtedly to estimate the performance of the policy the estimates of desired outcome should be part of the policy.

Conclusions

Counterfactual impact evaluation may be used in infrastructural projects. Because of its hypothetical nature it is not possible to prove that the results of the method are absolutely rigorous (this is also true for other economic methods), but these may give addition to other methods of economic planning and forecasting. We have already started application of the method in Latvia with more precise results to be achieved in 2012.
Establishing causality between policies related to infrastructure and particularly environment is possible, but there is problem with explaining the results of evaluation since specific goals (like setting appropriate pricing policy for drinking water and waste water) generally are not quantified in policy’s documents and probably it will never be possible since units intended for treatment vary. However this should not stop such evaluations on national or regional (more homogeneous) level. The issue of rigorous estimates of policy’s impacts is the important step towards proof of efficiency of the policy, which is major precondition for its continuation.

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