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Absorption Capacity of European Union Pre-accession Programs in Croatia

Ivandić Vladimira[1], Ministry of Finance, Zagreb, Croatia
Kandžija Vinko, Faculty of Economics, University of Rijeka, Rijeka, Croatia
Kandžija Jelena, Attorney at Law, Zagreb, Croatia
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ABSTRACT – *The utilization of European Union (EU) financial assistance is one of the central issues for Member States, as well as Candidate Countries like Croatia. In order to fully gain from the allocated resources of the EU budget, each country needs an adequate absorption capacity (AC). This article is about the absorption capacity of EU pre-accession programs in Croatia. The absorption capacity of EU pre-accession assistance is seen from two theoretical standpoints: the first originates from development economics, while the second developed from the theory of multilevel governance (MLG). The purpose of this article is to analyse the factors / determinants of absorption capacity, and the implementation of pre-accession programs in Croatian municipalities. In order to test the relation of AC and implementation (usage) of the EU funds, an empirical multivariable regression model of AC was established. The empirical estimation confirmed the expected positive correlation between the AC and EU funds. Another key issue that was discovered is that AC is very much a dynamic concept in the sense that ability to use EU funds changes over time, in response to a variety of endogenous and exogenous factors. As such, it calls for broader analysis and presents a challenge for further work on the subject.*

KEYWORDS: *absorption capacity of financial assistance, EU pre-accession programs, municipalities, multilevel governance*

Introduction

The absorption capacity (AC) of European Union (EU) financial assistance is a pertinent topic, particularly in light of Croatia's imminent membership in the EU. The EU financial assistance provides quantifiable benefits for Croatia today in the form of pre-accession programs and, in the near future, as an EU Member State, in the form of Structural Funds and Cohesion Fund. The AC depends on several key factors that are the focus of this research. Although relevant, the issue of the absorption capacity of EU financial assistance has not been analysed in a comprehensive way, although the matter is a subject of heavy debate mostly within the national political arena. The academic literature on EU financial assistance is more oriented to the issue of the effectiveness of funds and less to the analysis of the AC. Moreover, there is no systematic approach to the concept of the absorption capacity

[1] Address: Lopašićeva 13, 10000 Zagreb, e-mail: vladimira.ivandić@mfin.hr

of EU financial assistance. Therefore, this article presents an attempt to contribute to the literature on AC; for that purpose it will analyse the implementation of pre-accession programs in Croatia with particular focus on the municipalities. This article begins with a review of the academic literature on AC from the two theoretical perspectives. The second part covers the AC of EU financial assistance, while the third part presents the analysis of the AC of pre-accession programs in Croatia. Finally, the fourth part contains the empirical model along with the results of the regression analysis, followed by the conclusion.

Theoretical considerations and literature review

There is an absence of a theoretical framework of absorption capacity problems related to EU financial assistance. This is rather strange as interest in the topic is relatively high; one of the reasons often stated is because of its novelty and "changing nature". Horvat (2004) concluded that the absorption capacity of EU funds is still considered a "work in progress".

The issue of the absorption capacity in this article is considered from two theoretical standpoints. The first originates from the field of development economics and is based upon a consideration of the absorption capacity in the context of the effectiveness of the foreign assistance (aid). The second approach developed from the theory of multilevel governance (MLG) that was introduced to explain the nature of the European Union (EU) cohesion policy and the implementation of the Structural Funds.

Development economics on absorption capacity

One of the first works within development economics that captured the concept of absorption capacity of foreign aid was written by Rosenstein-Rodan (1961). His analysis of capital flows to Less Developed Countries (LDCs) revealed their need to boost their investments and expedite the process of economic development. Capital transfer from the wealthy and developed countries could trigger the sustainable growth in the LDCs and influence the catch-up process only if the LDCs possessed an adequate absorption capacity. The concept of absorption capacity was developed to account for and to measure the amount of foreign financial assistance that Less Developed Countries (LDCs) can productively utilize during a set period of time.

Within academic literature, absorption capacity is seen as one of the constraints that influence the growth in LDCs; however, it also serves as a tool to measure the scale of the development assistance provided to them (Clemens, Radelet, 2003). Following the decision taken by the international development community in 2005 to increase aid volume, the discussion about the 'aid effectiveness' was initiated, subsequently highlighting the concept of 'absorptive capacity'. On one side were advocates of a general expansion of aid, while on the other side were opponents who cautioned against too much aid being delivered beyond the actual absorptive capacity of a country.

The term absorptive capacity is used for an ability to implement additional aid without pronounced inefficiency of public spending and without induced adverse effects, such as 'Dutch disease', or crowding-out of domestic saving (De Renzio, 2005). Bourguignon and Sundberg (2006) state that, to date, there has been very little systematic effort to either define

the key drivers of absorptive capacity, or to measure a country's ability to absorb foreign assistance.

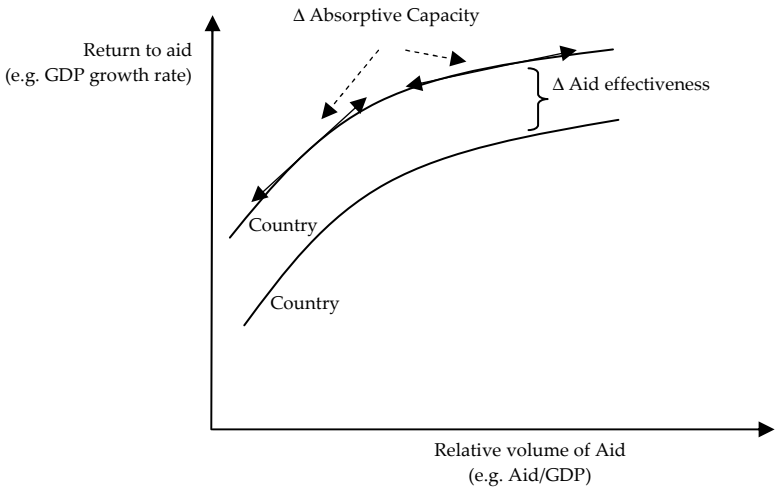
Literature on development economics considers that a country has reached its absorptive capacity limit for foreign aid when the rate of return on further increments of aid falls to some minimum acceptable level (Radelet, 2003). Beneficiary countries could benefit from foreign assistance if there was an institutional and administrative capacity to effectively utilize the provided financial resources. Collier and Dollar (2002) concluded that many LDCs suffer from capacity constraints and, as a result, the potential benefits from additional aid may be constrained by weak capacity.

Several empirical international studies (Hansen and Tarp, 2001; Dalgaard et al., 2004) revealed that, after a certain level, additional aid to GDP has little effect to growth. This 'saturation point' is a function of different proxies for absorptive capacity arising from macroeconomic, institutional, infrastructure, human resources, or socio-cultural constrains (Collier and Dollar, 2004). The World Bank (2004) states that most LDCs suffer from an inadequate capability to absorb additionally-allocated financial assistance. Absorption capacity is considered a constraint to the further allocation of aid and is one of the primary reasons of aid inefficiency; the additional financial aid simply does not generate economic development and growth in LDCs. Several economists argued that, for many LDCs, there were severe limits on how much financial assistance could be utilised productively, or "absorbed", as a consequence of low skill levels, lack of managerial talent, and poor governmental administrative facilities (Adler, 1965).

An extensive literature on policy environment linked AC to 'good policies and institutions' – countries that can absorb larger amounts of aid before diminishing returns set in (Heller and Gupta, 2002; Dollar, Pritchett, 1988). In countries with low capacity, the saturation point arrives much sooner and additional amounts of aid are unlikely to be very productive. Bourguignon and Sundberg (2006) commented that this conclusion is intuitive and appealing, even though it is derived from an international analysis, which is of little help when examining the case of a particular country. Moreover, the literature is not overly clear on the causes of the complex phenomenon of declining returns. Bourguignon and Sundberg (2006) also state that the return to aid has many dimensions.

In Figure 1, return to aid is associated with the rate of growth of GDP. This return will vary depending on several initial conditions – institutions, endowments, policy environment, etc. – working in isolation or together. It is an increasing function of the amount of aid that is made available. The distinction between aid effectiveness and absorption capacity is depicted in the following figure. Aid effectiveness can be characterized as the difference between the top and bottom curves, representing the return to aid in two different countries. Country 2 is able to utilize aid more effectively than Country 1 at any given level of aid (relative to the size of its economy) due to a combination of endowments, institutions and policies.

Figure 1. Aid effectiveness and absorption capacity



Source: Bourguignon, Sundberg, 2006

The limit of absorption capacity is reached when the marginal rate of return falls below some minimal acceptable level. The absorption capacity (marginal return for a given aid / GDP ration as depicted by the slope of the curve) may be higher or lower than in the country with higher aid effectiveness. This underscores the fact that aid effectiveness and absorption capacity are dynamic processes linked to the underlying forces of economic development and change over time. Absorption capacity refers to the marginal rate of return to aid, which declines as the amount of aid increases. Hansen and Tarp (2001) assume that increasing aid beyond some limit may even be detrimental to the recipient economy at some stage.

Bourguignon and Sundberg (2006) state that the literature is not very clear on the causes of the complex phenomenon of declining returns and they conclude that there is little insight in the literature provided from country-specific examples of absorption capacity constrains. In order to clarify concepts they suggest a distinction between the broad factors that influence aid effectiveness over time, and absorptive capacity at a given point in time. They also define several broad categories as overall absorption capacity constrains: quantitative, macroeconomic and institutional. Finally, they also conclude that AC needs to be country specific.

Theory of multilevel governance (MLG) and EU financial assistance

The theory of multilevel governance rests on methodological assumptions that – rather than consider the state as a unitary actor – examine the decision-making of specific other actors, such as municipalities, etc. It assumes that the various actors have multiple, potentially incompatible goals and it finds that the influence of actors varies widely across different levels of government.

In cohesion policy the influence of the European Commission (EC) is shaped by the formal rules governing decision-making by the resources it can bring into play (Marks, 1996). The fact that decisions concerning financial redistribution are made before decisions

concerning broad policy goals, or decisions concerning institutional design, is a distinctive feature of EU Structural Funds (and cohesion policy in general). Marks (1996) commented that in a case of cohesion policy it is "funding looking for a set of institutions" while many policy areas can be described as a set of institutions seeking funding.

The implementation of Structural Funds – determined by procedures among EC, Member State, central, regional, local governments (sub-national governments) and other actors after the radical reform of the Structural Funds in late 1988 – gave the EC an impressive degree of financial and bureaucratic influence (Hooghe, Marks, 2001). Several aspects of the conflict – including the way in which local actors were mobilised, their alliance with the Commission, their effectiveness in shifting the government's position – support the claim that structural policy has provided sub-national government with new political resources and opportunities in an emerging multilevel policy arena.

The creation of regional partnerships to administer the Structural Funds (in 1988) was an attempt by the Commission to empower sub-national actors at the expense of national government domination over the implementation process. Marks (1993) cited the partnership principle as part of this argument that structural policy appeared to be a two-sided process, "involving decentralisation to sub-national levels as well as centralisation of new powers at the supranational level". As such, structural policy was seen to be "the leading edge of multilevel governance in which supranational, national, regional, and local governments are enmeshed in territorially overarching policy networks."

MLG breathed new life into the debate about the EU structural policy process and drew attention to the increased role played by the Commission at the EU level as well as the emerging role of sub-national players at the implementation stage (Bache, 2004). MLG dealt with the main actors as well as different levels and instruments of the cohesion policy. In spite of the fact that it was initially developed as a concept to explain the decision-making process within the European Union, MLG represents a process of the implementation of EU funds. Therefore, as such MLG provides an adequate background for the analysis of the absorption capacity of EU funds. Through analysing the EU structural policy and the role of the EC, Marks (1993) pointed out several crucial principles upon which the Structural Funds operate; these principles present the main framework under which the Structural Funds operate.

Absorption capacity of EU financial assistance

Literature on the absorption capacity of EU funds does not offer a unique definition for the term. Herve and Holzmann (1998) define the absorption capacity as a lack of institutional and administrative capacity. For Šumpikova et. al. (2004) absorption capacity meant the extent to which a country is able to fully utilize all allocated financial resources from the EU funds/programs in an effective and efficient way. Most definitions state that it represents the capacity of country to absorb an allocated EU fund/program, with more emphasis on quantitative aspects. Others, such as Mrak and Tilev (2008) state that the absorption capacity denotes the degree to which a country is able to effectively and efficiently spend the financial resources from the EU so as to make a significant contribution toward economic and social cohesion. For the European Commission, absorption capacity means the capability of the

state (or region, unit) to use allocated funds in an efficient way. Horvat (2003) concludes that the definitions of Structural Funds' absorption capacity are usually based on different evaluation studies and reports prepared for and published by the European Commission. For the purpose of this article, the absorption capacity stands for the degree upon which the country is capable of utilizing financial resources from the EU pre-accession programs.

In order to use all the resources allocated from EU funds, it is necessary to have a state-created institutional system to ensure an absorption capacity capable of managing the given resources (Begg, 1999). Conversely, it is also required to have absorption capacity from the beneficiaries to design and program projects. Two distinct characteristics most frequently referred to as absorption capacity relate to supply and demand (Šumpikova et. al., 2004). The first is usually connected with the programming and managing of EU funds, and it essentially falls within the responsibilities of the national/government level. The demand side of the absorption capacity relates to recipients; in the case of pre-accession programs, the final beneficiary and recipients are bodies at the government level. However, in the case of Structural Funds, recipients are more broadly defined (mostly at the local level, but also from the business community, NGOs etc.).

One could also speak about two distinct characteristics of the absorption capacity for the EU funds Horvat (2005). A review of academic literature indicates the absence of a conceptual framework to comprehensively assess the issue of absorption problems related EU financial assistance. Milio (2007) pointed out that existing literature on EU financial assistance lacks in-depth analysis of the implementation process. She stated that the vast majority of authors have been more concerned with the policy-making process, or with the economic impact of the resources to the economic and social structure of the country. In line with the most accepted definition of absorption capacity – stating that it represents the capability to absorb an allocated amount of EU financial resources – absorption capacity is usually measured by the absorption rates. In the European Union's evaluation practice even the effectiveness of Structural Funds' interventions is measured through absorption rates. The absorption rate measures the ex-post investment output of Structural Funds' spending in relation to ex-ante targets. The absorption rate therefore illustrates the absorption capacity and is defined as 'the level of spending as a percentage of the total amount of Structural Funds available' (Horvat, 2004). Achieving an absorption rate of 100% means that all funds allocated to a country have been fully utilized. On the contrary, if a region is unable to achieve 100% of the targeted values (allocated amounts) it is considered to have an absorption problem.

Herve and Holzmann (1998) provide an output-oriented explanation of the absorption problem; namely, that any deviation from the potentially highest growth path can be conceived as an effect of the absorption problem. However, the absorption problem is usually defined as the case when the recipient country (or region) fails to achieve 100% of its target value programmed a priori, which means that the absorption capacity to deliver and implement the given operational program is inadequate. This approach is input-oriented. In both approaches the gap between the targeted optimal values and the measured real values (in investment of marginal outputs) is reflected in the so-called absorption rate. The European Commission uses absorption rates to assess the progress of financial management and the implementation of funds and programs.

It is worth mentioning that the precise measurement of the effectiveness of pre-accession programs, as well as of the absorption capacity, is often hampered by the unavailability of data. In order to measure the absorption of EU funds spending, the contracting rate could be just one of several other indicators. The European Commission often uses absorption rates during the formal process of evaluation to assess the progress of fund management. The effectiveness of absorbing EU funding on a national level is frequently presented in various ways in the form of rates, such as commitment rates, contracting rate (the share of signed funds), payment rates, etc. Besides, EU financial assistance is difficult to assess, because structural changes take longer to generate and often suffer from the lack of systematic evidence.

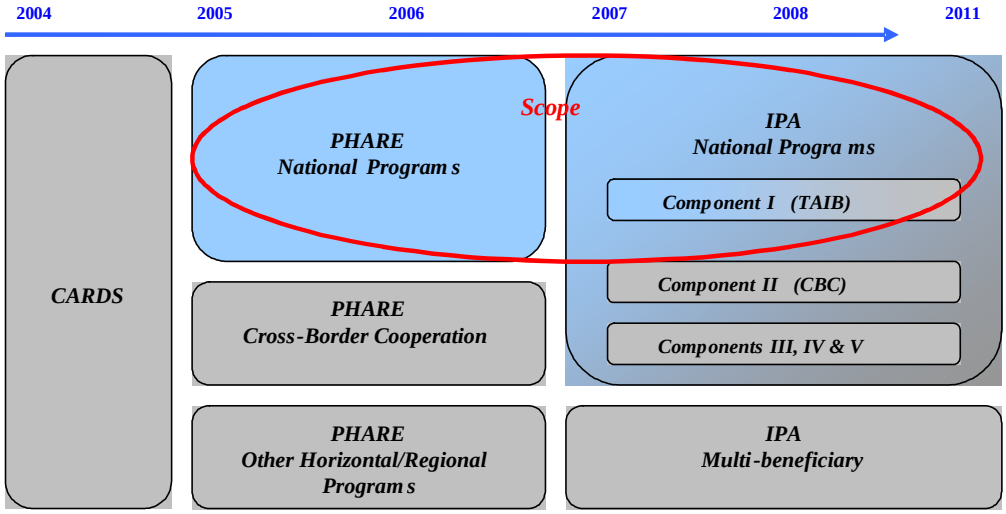
Absorption capacity of the pre-accession programs in Croatia

Research into the absorption capacity of EU financial assistance in Croatia is based on quantitative analysis of the implementation of the pre-accession programs (mainly the PHARE and IPA programs). These pre-accession programs are still currently in use; they present an important source of investments following the areas of co-operation and negotiation with the EU. As a candidate country for membership in the European Union, Croatia is a beneficiary of the European Union's pre-accession programs. When it becomes a fully-ratified EU Member State, Croatia will be eligible for the resources of a cohesion policy, as well as common agricultural and fisheries policies. As such, Croatia will be the beneficiary of Structural Funds, Cohesion Fund, Agricultural Fund and Fisheries Fund.

Overall, the financial assistance provided to Croatia under the pre-accession programs is more than EUR 1.255 billion (Ministry of Finance, 2012). Only the PHARE and IPA programs include several hundred projects, worth in excess of EUR 1.1 billion. Some of the pre-accession programs have already been completed (for instance PHARE 2005 and PHARE 2006, IPA 2007) while some are still currently under implementation (mainly IPA 2008-2010) – part of them are still in the preparatory phase.

The scope of the research on AC of pre-accession assistance primarily focuses on the PHARE and IPA national programs, while other forms of EU pre-accession assistance (such as PHARE Horizontal programs, Regional programs, ISPA and SAPARD/IPARD) are not covered. There are several reasons for this. The first reason is that the PHARE objectives could be best characterized as the areas of intervention that have explicit connections with the accession process. The TAIB strategic objectives are even more closely linked with the EU accession, as they basically coincide with the fulfilment of the Copenhagen criteria. PHARE and especially IPA have institutional set up and financial management alike the one similar to that of the Structural Funds. The second reason is more of a technical nature as it is related to the type of implementation of the program. It was chosen because they are implemented under the so-called Decentralized Implementation System (DIS) in which national authorities are responsible for the system of financial management and the implementation of pre-accession programs under the system of ex-ante control (performed by the EU Delegation).

Figure 1. Scope of analysis of EU pre-accession assistance



Source: Author

Research into the absorption capacity takes place at both the national level and local (regional) levels. Special emphasis is devoted to the absorption capacity of financial assistance of municipalities in Croatia because their roles need to be strengthened through the use of the Structural Funds. Moreover, regional and local government levels will become important actors in the whole process of the implementation of the EU funds. Several recent analyses in the New EU Member States reconfirm that the local governments in the system of usage of Structural Funds are one of the most important instruments in their socio-economic development, while the capacity to absorb the funds is primarily limited due to the low absorption capacity at the local government level (Tatar, 2010).

The data relevant to the study of absorption capacity is limited with regard to both Structural Funds and economic variables (Hagen and Mohl, 2009). It is the case with EU pre-accession programs. For this research, data was collected from a survey conducted from the beginning of 2012 until April 2012. The survey was sent to all municipalities along with relevant questions to assess the absorption capacity of EU financial assistance in Croatia. Some of the questions were devoted to obtaining opinion on the overall functioning of the financial management system of the pre-accession programs. In addition, a few questions were included in the survey to provide feedback on the capability and managerial skills of the staff working on the EU project implementation (covering all phases of the project cycle – from programming to implementation and evaluation). Furthermore, the questionnaire covered the different aspects needed to determine the factors of the absorption capacity of EU financial assistance, in accordance with the main goals of the research. Besides the first question, which related to identification, the questionnaire covered five main sets of questions, namely:

1. Assessment of the participation of the municipalities during the implementation of the pre-accession programs. This topic covered several important issues, starting with their participation in the programming process through to their

experiences during the implementation of projects within the allocated pre-accession programs.

2. Success factors combine with judgement about limitations in the implementation within the whole national system of financial management of pre-accession programs. For the purpose of this analysis, eight areas were covered; specifically, those relating to the availability of information, the decision-making processes, financial management, formal rules and EU procedures, readiness of the other actors within the system, interests of the beneficiaries, cooperation between different non-governmental actors, and the availability of financial support required for the implementation of EU projects.
3. Success factors in line with the activities connected to the implementation of EU projects, which are within the scope of municipal responsibility. This topic also covered specific problems characterized for the implementation of actual projects. These factors were then summarized in seven categories, starting with institutional strengthening and adequate human resources, readiness (mature) project proposals, as well as questions related to sustainability upon project completion. The other set of questions was devoted to analysing the motivation of the staff involved in the process of EU projects, their observations on internal organizational issues in connection with the implementation of EU projects, details on activities covered by the job description, and division of labour within the staff responsible for the EU projects. Success factors also include overview of the necessary conditions for the implementation of EU structural funds that are in place (such as, those that relate to the execution of partnership principle, etc.).
4. Assessment on co-operation with other actors in the implementation of EU projects including relations with the state (national) level, other actors within the municipal level (town representatives, etc.) as well as with public companies and business community.
5. Information on realized (contracted) EU pre-accession projects, as well as the one that is still currently in the preparatory phase. This topic included all relevant data about the nature of the project, modalities, categories, timing, etc. This set of questions was divided into a few subcategories, starting with the type of pre-accession program and programming year, then the type of project (works, technical assistance, grants, twinning, etc.), followed by basic information in relation to size, project duration, components, etc.

Using statistical analysis, the main factors of the absorption capacity of EU pre-accession programs in Croatia were identified. Lastly, correlation between the absorption capacity and the utilization of the pre-accession programs was tested in order to reconfirm the projected positive connection.

The assessment revealed that the absorption capacity of the EU pre-accession programs is adequate. The efficiency of the utilization of pre-accession programs rated higher than average (Table 1.) – the arithmetic mean is 3.5, while the mode is 4.0.

Table 1. EU pre-accession programs' effectiveness and importance

	Arithmetic mean	Standard deviation	Variation Coefficient	Mode	Asymmetry Coefficient
Effectiveness	3.5	1.0	29.6	4.0	-0.5
Participation in the planning process	2.3	0.7	31.3	2.0	0.2
Program importance	4.1	0.8	18.8	4.0	-0.2
Readiness for implementation	3.6	0.7	20.9	4.0	0.1

** For each activity, the rating is from 1 to 5 (where 1 is the lowest score).*
Source: Author

The results of the quantitative analysis conducted at the municipal level reveal the key factors of the absorption capacity of the pre-accession programs in Croatia. The following table (Table 2.) presents the relevant factors of the absorption capacity of the EU pre-accession programs.

Table 2: Factors of the absorption capacity

	Arithmetic mean	Standard deviation	Variation Coefficient	Mode	Asymmetry Coefficient
Information	4.1	0.7	15.8	4.0	-0.1
Management	3.8	0.9	24.4	4.0	-0.8
Organisation	3.9	0.8	21.3	4.0	-0.4
Institutional support	3.9	1.0	26.3	4.0	-0.6
Staff experience	3.7	0.7	19.3	4.0	-0.4
Motivation of staff	4.0	0.9	22.4	4.0	-0.5
Responsibility of staff	4.2	0.7	16.5	4.0	-0.4
Rewards policy	2.7	1.3	47.9	2.0	0.4

** For each activity, the rating is from 1 to 5 (where 1 is the lowest score).*
Source: Author

The results show that the main influence on the absorption of the EU pre-accession programs is the administrative issue (71.4%). In second place, equally important is harmonization with the national development strategy. It is interesting to note that almost a quarter (23.4%) of all municipalities think that political support is also crucial for the effective utilization of the EU pre-accession programs.

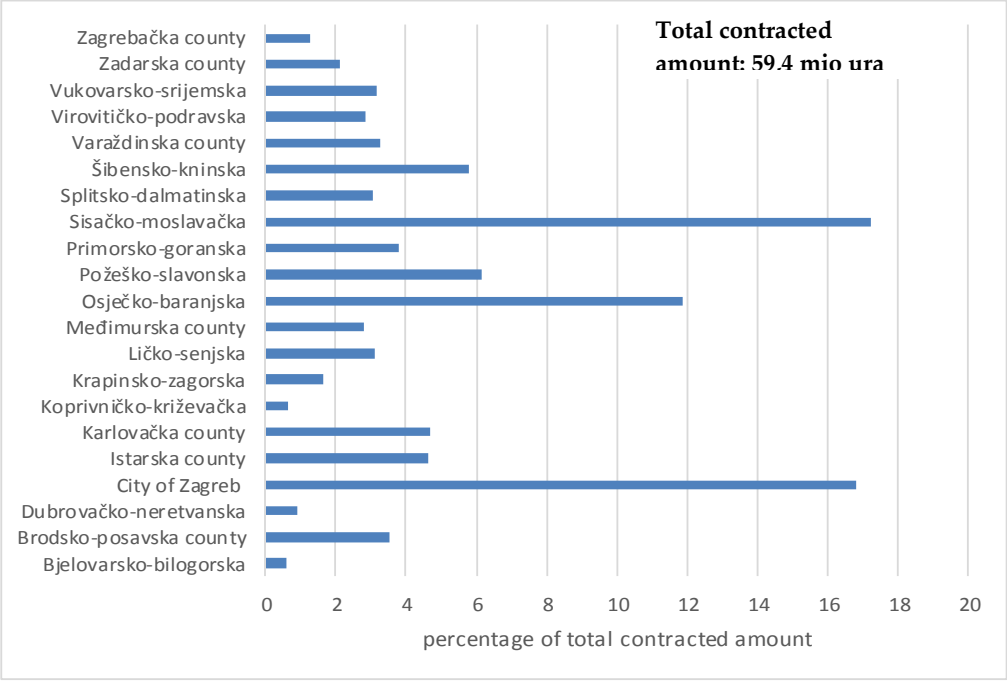
In regard to the more technical issues, the preparation of project documents and the readiness of projects are also important. The majority of municipalities think that this has extreme influence on the absorption capacity. Specifically, more than 61% of municipalities are of the opinion that mature projects are more able to absorb, as they have all the prerequisite project documentations and licences ready for their implementation. As a result, there is no delay and the contracting deadline is usually achieved within the given

timeframe. Also crucial in the case for the efficient usage of EU pre-accession programs are well-defined projects with clear objectives that are easily implementable and straightforward.

Municipalities are considered institutional building and availability of skilled staff as the second most important factors for the absorption of EU funds. Conversely, it is rather surprising that only 19% of municipalities recognize the exercise of the partnership principle to be one of the main elements that influence the absorption of funds. This is in line with the fact that the partnership principle was not often exercised in the case of pre-accession assistance, as it was not formally required. It is further worth mentioning that the partnership principle is of extreme importance for the usage of Structural Funds; therefore, in the near future, much work would need to be devoted to its proper introduction within the system of implementation.

If we compare the results of the analysis and actual data on the contracting of projects, interesting observations could be made in regard to the absorption capacity. From the data on contracting and disbursements of EU projects, it is evident that most developed municipalities contracted more funds from pre-accession programs. They additionally claim that their absorption capacity for the implementation is quite high. The structure of the municipalities in the contracting of EU projects (from pre-accession programs[2]) is presented in the following figure (Figure 2).

Figure 2. Municipalities by contracted amounts
(CARDS 2003-2004, PHARE 2005-2006, IPA I[3], IIb 2007-2009)



Source: Author

[2] Programs are: CARDS 2003-2004, PHARE 2005-2006, IPA 2007-2009.
[3] In the case of two municipalities eligible for cross-border cooperation, projects from IPA II were also included.

It is obvious from the figure that the capability to contract (and absorb) the EU resources differ between the various municipalities. One of the reasons could be because of the strong influence of the factors characterized from the demand side of the absorption capacity. In regard to the supply factors of the absorption capacity, the administrative dimension is positioned as dominant. It is evident that where administrative capacity in municipalities is higher, they are better able to disburse more EU assistance, meaning that they developed an adequate absorption capacity to efficiently utilize allocated EU resources. However, it is also necessary to emphasize that in the case of the Croatian municipalities, the differences between the contracting rates are not entirely the result of the absorption capacity.

In the case of pre-accession programs, a couple of municipalities were in the position to fully utilize other possibilities and programs (for instance, cross-border cooperation) while the rest were not eligible. Alternatively, economic constraints (co-financing elements) were not emphasized as expected because finances were mainly secured by the state budget or other financing sources, including loans from international financial institutions such as the European Bank for Reconstruction and Development, (EBRD).

In order to test the correlation between the absorption capacity and the implementation of the EU pre-accession programs, statistical analysis was conducted. First, the relation between the elements of the absorption capacity and efficiency of the EU pre-accession programs was tested. The correlation was estimated by using statistical analysis (SAS statistical program package) in order to calculate the Pearson coefficient and the Spearman coefficient. However, the Pearson coefficient was not appropriate for testing the correlation between the absorption capacity and the implementation of the pre-accession programs because it is adequate for the estimation of linear correlation. Therefore, the Spearman coefficient was calculated and the results are presented in the following table (Table 3) which confirms that the correlation exists, though it is rather weak.

Table 3. Spearman coefficient of the selected factors of the absorption capacity

Factors of the absorption capacity of EU pre-accession programs	**Spearman coefficient**
Success in the implementation of EU pre-accession programs	0.23538
Co-operation in the decision-making process about development priorities	-0.23447
Importance of the EU programs	-0.03753
Readiness for the implementation of EU programs	0.03677
Availability of information	-0.31582
Management and governance	-0.22297
Organisation	-0.31175
Institutional support	0.15245
Staff experience	0.13946
Motivation of staff	0.00755
Staff responsibilities	0.08666
Reward options	-0.15509

Source: Author

Empirical model and results of the regression analysis

Based on the conclusion from examining the correlation between the utilization of financial resources and the factors/determinants of AC, the model on the implementation of the EU pre-accession programs at the municipal level was empirically estimated. A multivariable regression model was used, in which the independent variables and functional types of model were determined in the first place by the extent of the research. The availability of set indicators of AC presented the second limitation. The model was based on the assumptions derived from the theoretical concepts behind the determinants of AC, and its influence on the use of the resources from the pre-accession programs in Croatia.

$$kpf_i=f(ak_i)\ i\ (\text{number of observations})= 1, \ldots, n \quad (1.1.)$$

in which kpf_i means the usage of pre-accession programs in each of the Croatian municipalities (i), ak_i the absorption capacity of the municipality (i), and f an increasing function ($\frac{\partial f(ak_i)}{\partial ak_i} > 0$).

The linear function form assumed in 1.1. allows the set up of an econometric model that allows testing the hypothesis if there exists a dependence between the use of pre-accession financial resources and the absorption capacity. The linear regression model, including an error term that is multiplied by the deterministic dependent variable:

$$kpf_i = f(ak_i + cont_i) * 10^{\varepsilon_i} \quad i = 1, \ldots, n \quad (1.2.)$$

with

- kpf_i– the usage of pre-accession programs in each of the Croatian municipality (i), assumed as the dependent variable in the model;
- ak_i – the absorption capacity of the municipality (i), assumed as the independent variable in the model;
- $cont_i$ – a set of control variables that ensures that the model does not include a specification error leading to an omitted variable bias (Kmenta, 1997), the control variables concern indicators that define the demand side of the absorption capacity;
- $\varepsilon_i \sim N(0, \sigma^2)$ –a normal distributed random term assumed to have a mean at zero and a variance of σ^2 for every i=1, …,n.

The parameters of the model can be estimated with cross-section data for each municipality (N=21, including Zagreb city). The log linear transformation of the model implies:

$$kpf_i = \alpha_0 ak_i^{\beta} cont_i^{\gamma} 10^{\varepsilon_i} \quad (1.3.)$$

which a logarithmic transformation becomes a linear function:

$$\log kpf_i = \log\alpha_0 + \beta \log ak_i + \gamma \log cont_i + \varepsilon_i \quad (1.4.)$$

The crucial assumption of using a non-linear function form is a result of a preceding analysis that did not show a corresponding linear function between the variables. In the non-linear log model, the estimated parameters can be interpreted as the coefficients of partial elasticity that show the amount of the relative change in the dependent variable as a result of an incremental increase in one of the independent variables (Bahovec i Erjavec, 2009).

Data gathered in the "primary research" and collected from the CFCA (Central Finance and Contracting Agency) allows us the use of the following variables:

- the usage of pre-accession programs in each municipality (*kpf*) – the use of pre-accession programs in each municipality is measured as the amount of contracted projects that each municipality acquired from the EU pre-accession programs ;
- the absorption capacity of municipality (*ak*) – the variables is defined as an aggregate indicator of the absorption capacity, and is presented a weighted arithmetic mean of selected determinants of absorption capacity;
- the size of the municipality (*bdp*) – the size of the gross national product within a municipality is used as a control variable in the model. The data on the gross national product of each municipality is acquired from the data set of on municipalities BDP from State Statistics Office (Publication on BDP no. 12./ "*Priopćenje Bruto domaći proizvod za Republiku Hrvatsku, prostorne jedinice za statistiku 2. razine i županije u 2009., broj 12.) dated April 14, 2012.;* table 1").

Coefficients on the correlation between the variables show a weak relation within the variables and a very low relation within the independent variables (table 4) which is viewed upon favourably as it ensures the absence of multicollinearity in the model.

Table 4. The matrix of correlation coefficients within the variables in the model

	logkpf	*logak*	*logbdp*
logkpf	1,0000		
logak	-0,0863	1,0000	
logbdp	0,3404	-0,1026	1,0000

Source: Author's calculations using Stata 9.1.

Parameters in the model are estimated with the ordinary least squares (OLS) method that estimates the model parameters as to minimize the squared sum of the model's residuals. The necessary assumption for OLS estimated parameters to be consistent and unbiased in any sample is the assumption of homoscedasticity. Autocorrelation cannot cause inconsistent estimators in this model since the use of cross-section data is time-constant.

Table 5. The estimated model of the use of EU pre-accession programs in Croatia, on the municipality level

Method	Ordinary least squares (General method of moments)		
Data	Cross-section data on 20 counties in Croatia and the city of Zagreb (N=21)		
Dependent variable	logkpf The log of the variable of the use of EU pre-accession programs		
Independent variable	Coefficient	T-statistic	p-value
logak (log of the absorption capacity, municipality level)	4,78459	3,63	0
logbdp (log of gross national product, municipality level)	1,073876	4,29	2
Constant	-	-	-
R^2 (coefficient of determination)	0,9937		
$\bar{R}^2$ (the adjusted coefficient of determination)	0,9930		
Breusch-Pagan/Cook-Weisberg test of heteroscedasticity	$\chi^2(1)=0,10$ $Prob\chi^2=0,753$		
Ramsey RESET test	F(3,15)=0,67 Prob>F=0,581		

Source: Author's calculation, Stata 9.1.

The estimated coefficient on the absorption capacity is positive and equal to 4,78 which can be interpreted that when the absorption capacity increases by 1% the use of pre-accession programs will increase by 4,78%.

The following table (6.) shows the estimated parameters of five different models where the variable logk is replaced by one or more variables:

- the evaluation of the experienced of employees (variable *logiskus*),
- the evaluation of the responsibility of employees (variable *logodg)*,
- the evaluation of the efficiency of organization of the municipality administration (variable *logorg)*,
- the evaluation of the management of the municipality administration (variable *logup*).

Table 6. The estimated five different models of the use of EU pre-accession programs in Croatia, on the level of municipalities

Method	Ordinary least squares									
Data	Cross-section data on 20 counties in Croatia and the city of Zagreb (N=21)									
Dependent variable	logkpf The log of the variable of the use of EU pre-accession programs									
Independent variable	Model I		Model II		Model III		Model IV		Model V	
	Coefficient	p-value	coefficient	p-value	coefficient	p-value	coefficient	p-value	Coefficient	p- value
logiskus (the evaluation of the experienced of employees)	2,92	17	1,47	280						
logodg (the evaluation of the responsibility of employees)			2,76	86	3,79	6	5,52	5	5,24	11
logorg (the evaluation of the efficiency of organization of the municipality administration)							-2,12	0,18	-2,72	177
logup (the evaluation of the management of the municipality administration)									0,76	609
logbdp (the size of the municipality bdp)	1,46	0	1,18	0	1,24	0	1,28	0	1,32	0
Constant	-		-		-		-		-	
R^2 (coefficient of determination)	0,9929		0,9933		0,9929		0,9936		0,9937	
$\overline{R}^2$ (the adjusted coefficient of determination)	0,9917		0,9922		9,9921		0,9925		0,9922	

Source: Author's calculation, Stata 9.1.

In the models in which besides the control variable (*logbdp*) only one variable of the each of elements of absorption capacity is used (Model I and Model III) the statistically significant variables are estimated variable on experienced of employees (*logiskus*) and responsibility of employees (*logodg*). It is evident that these two variables are crucial for the assessment on the AC and the implementation of the EU pre-accession programs in Croatia and consequently the further analysis on AC should be concentrated exactly on these elements.

Conclusion

The article is about the analysis of the absorption capacity of EU financial assistance. The aim of this article had been to highlight the matter of absorption capacity of EU financial assistance and examined relevant factors of absorption capacity of pre-accession programs in Croatia.

The issue of the absorption capacity in this article is considered from two theoretical standpoints. The first originates from the field of development economics and is based upon a consideration of the absorption capacity in the context of the effectiveness of the foreign assistance. The second approach developed from the theory of multilevel governance.

Research into the absorption capacity of EU financial assistance in Croatia is based on quantitative analysis of the implementation of the PHARE and IPA pre-accession programs. Special emphasis is devoted to the absorption capacity of financial assistance of municipalities in Croatia because their roles need to be strengthened through the use of the Structural Funds. Moreover, regional and local government levels will become important actors in the whole process of the implementation of the EU funds.

Using statistical analysis, the main factors of the absorption capacity of EU pre-accession programs in Croatia were identified. The results show that the main influence on the absorption of the EU pre-accession programs is the administrative issue. Based on the conclusion from examining the correlation between the utilization of financial resources and the factors/determinants of absorption capacity, the model on the implementation of the EU pre-accession programs at the municipal level was empirically estimated. A multivariable regression model was used, in which the independent variables and functional types of model were determined in the first place by the extent of the research. The model was based on the assumptions derived from the theoretical concepts behind the determinants of absorption capacity, and its influence on the use of the resources from the pre-accession programs in Croatia. The results of the model showed that the estimated coefficient on the absorption capacity is positive and equal to 4,78 which can be interpreted that when the absorption capacity increases by one percent the use of pre-accession programs will increase by 4,78 percent.

The regression analysis also determined that two variables (experienced of employees and responsibility of employees) are crucial for the assessment of the absorption capacity at the municipality's level in Croatia. Therefore, further analysis of the absorption capacity of EU pre-accession programs in Croatia should concentrate on those elements. The future work could be done on assessment of absorption capacity of EU funds during the period of time. The analysis should be expanded to capture other dimensions of absorption capacity as the absorption capacity was reconfirm to be a complex phenomenon that need to be analyzed from country-specific examples of absorption capacity constrains with a distinction between the broad factors that influence effectiveness of EU funds over time, and absorptive capacity at a given point in time

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Apsorbcioni kapacitet pretpristupnih fondova Evropske unije u Hrvatskoj

REZIME – *Korišćenje finansijske pomoći Evropske unije (EU) je jedno od centralnih pitanja za države članice, kao i za zemlje kandidate kao što je Hrvatska. Da bi se u potpunosti iskoristila dodeljena sredstava iz budžeta EU, svakoj zemlji treba odgovarajući apsorpcioni kapacitet (AC). Ovaj članak je o apsorpcionom kapacitetu pretpristupnih programa u Hrvatskoj. Apsorpcioni kapacitet pretpristupne pomoći EU može se videti sa dva teorijska gledišta: prvo potiče od ekonomije razvoja, dok drugi razvio iz teorije više nivoa upravljanja (VNU). Svrha ovog članka je da se analiziraju faktori / determinante apsorpcionog kapaciteta, i sprovođenje predpristupnih programa hrvatskih opština. Da bi testirali odnos AC i implementacije (upotrebe) sredstava EU, uspostavljen je empirijski multivarijabilni model regresije AC. Empirijska procena potvrdila je očekivanu pozitivnu korelaciju između AC i fondova EU. Druga ključna stvar do koje se došlo je da je AC veoma dinamičan koncept u smislu da su mogućnosti korišćenja fondova EU promenljive tokom vremena, kao odgovor na različite endogene i egzogene faktore. Kao takva, ona zahteva širu analizu i predstavlja izazov za dalji rad na tu temu.*

KLJUČNE REČI: *apsorpcioni kapacitet, EU pretpristupni programi, opštine, više nivoa upravljanja*

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