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## DO EUROPEAN FUNDS GENERATE COUNTRIES' SUSTAINABLE DEVELOPMENT?

***The aim of the paper is to prove significant positive correlation between sustainable development of the countries and their absorption of EU funds. By using Pearson correlation method as an econometric tool, the authors tested the hypothesis that the use of European funds contributes to the development of the countries based on sustainability. This paper contributes to the literature by presenting the first empirical proof of negative relationship between the actual level of EU funds used and the Happy Planet Index (HPI) which represents sustainability of a country.***
***Keywords:*** *foreign aid, European funds, absorption rate, policy making, sustainable development.*
***JEL codes: C12, F35, F36, O1.***

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## ЧИ СПРИЯЄ ЄВРОФІНАНСУВАННЯ СТІЙКОМУ РОЗВИТКУ КРАЇН?

***У статті доведено існування суттєвої позитивної кореляції між стійким розвитком країн та їх єврофінансуванням. Для економетричного аналізу розраховано кореляцію Пірсона, за допомогою якої автори намагались довести гіпотезу про те, що єврофінансування країн сприяє їх стійкому розвитку. Вперше емпірично доказано існування негативної залежності між фактичним об'ємом єврофінансування країни та її Індексом щасливої планети, який до певної міри є свідченням її стійкого розвитку.***
***Ключові слова:*** *зовнішня допомога, єврофінансування, ступінь використання засобів, розробка політики, стійких розвиток.*
***Форм. 3. Табл. 4. Рис. 2. Літ. 22.***

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## СПОСОБСТВУЕТ ЛИ ЕВРОФИНАНСИРОВАНИЕ УСТОЙЧИВОМУ РАЗВИТИЮ СТАН?

***В статье доказано существование существенной позитивной корреляции между устойчивым развитием стран и их еврофинансированием. Для эконометрического анализа рассчитана корреляция Пирсона, при помощи которой авторы попытались доказать гипотезу о том, что еврофинансирование стран способствует устойчивому развитию. Впервые эмпирически доказано существование негативной зависимости между фактическим объемом еврофинансирования страны и ее Индексом счастливой планеты, который в какой-то мере свидетельствует об устойчивости ее развития.***
***Ключевые слова:*** *внешняя помощь, еврофинансирование, степень использования средств, разработка политики, устойчивое развитие.*

**Introduction.** The EU has an important role within world economy. This is why the EU has a goal to economically strengthen all its members even before they become full EU members. This is why the EU has developed mechanisms to provide financial assistance via the establishment of EU funding.

The absorption capacity of EU funds is a measure of EU funds use in fulfilling this task to accelerate development of states, and it is hoped to contribute to creating

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common European cohesion. It is believed to be of special importance, focusing on the development of particular sectors. By pushing the development of these economic sectors, it is thought EU funds can contribute to long-term development and future survival of European countries to the benefit of mankind. This paper has the objective to present analysis results of the effects of the funds use from the viewpoint of their contribution to driving sustainable development of EU candidates and members. The basic issues of this paper are:

The research object: the use of EU funds.

Hypothesis: The use of European funds as a form of foreign aid, which contributes to the development of countries based on sustainability.

Research tasks: To set up a new methodology as a measure for the relation between the level of EU funds implementation and sustainable growth and to test the methodology within the present data.

Methodology: Data collecting and analysis, econometric models.

The new approach to EU funded project management, which authors present in this paper, uses the measurement of correlation between selected corresponding index, with the realized financial resource contributed by EU funds. There are many indices created to reflect the image of the world and its changes, like human development index (HDI), human genuine index (GPI), global peace index (GPI), child development index (CDI) etc. Some of them are established by the UN, others by professional organizations, NGOs etc. This paper deals with correlation between realization results of Phare and Structural funds and Happy Planet Index (HPI). HPI is considered as an index which incorporates environmental impact of economic growth and reflects sustainable development.

The paper proceeds as follows. The next section deals with literature review. The methodology is presented in the third section. The forth section explains the way the authors have conducted the research and the empirical results with the analysis. The last sections discusses and concludes with the suggestions for future research.

**Literature review.** A significant number of the studies on the effects of EU funds discuss their effects through a limited number of items which represent the level of funds used, if they are only contracted or already paid, therefore implemented. A number of these will be discussed shortly but first some definitions of terms used are necessary. These are:

- *available budgets.* Represent allocated financial resources for a state according to the officially accepted National strategic framework of each country approved by the European commission (EC) and represents the amount accessible for applicants or potential beneficiaries.

- *contracted resources.* Represent financial resources which are already contracted by a competent authority and a final beneficiary.

- *paid (realized) resources.* Represent resources used for implementing projects or parts of projects. These are amounts which have been disbursed to final beneficiaries by a paying agency. These resources are verified through project management systems.

- *absorption*. Represents amount of actual paid resources divided by available budget for the same period (KPMG, 2010).

Relatively few studies on absorption of funds by non EU members have to date been located. Significantly more literature is available on EU member states which

currently benefit from structural funds. Some authors point out that there is a lack of any good measures or indicators of a country's absorption capacity (Georgescu, 2007).

Only in 1997 did the European commission undertake the first such study which mainly stressed the economic views on the problem and concentrated on the issues related to larger structural funds and cohesion fund transfers for economic infrastructure. A rather cursory examination covering some of general macroeconomic aspects in the absorption problems, brought the authors to the central topic of this paper, namely, the question of how to measure the administrative capacities of a particular candidate to absorb structural funds (Zurga, 2011).

Most papers so far appear to have presented the absorption problems of only a single country.

For example, Judith Kalman, in "Possible structural funds absorption problems" (Kalman, 2010) focused on underdevelopment of monitoring and control mechanism in Hungary. Very rarely the authors used some econometric model like Oana Gherghinescu (Gherghinescu, 2010) who presented data of an ARCH like model in order to analyse the absorption of structural funds in Romania. Through an essay, identifying the factors which influence the absorption rate of structural funds in Romania, Corina Berica intended to make the first step in solving this problem, which requires special attention (Berica, 2010).

The practical experience of EU member states and particularly the experience of one country analysed, Slovakia, in the EU funds management, has shown that the preparatory phase is of enormous importance for creation of efficient and adequate capacities in absorption of EU funds in the country and for the future (Knezevic, 2010).

The results of the study by Merit Tartar show that Estonian local governments regard structural funds as the most important instrument in their socioeconomic development while the capacity to absorb these funds was limited due to low administrative and financial capacities at local government level (Tartar, 2010).

Some studies present difference in the absorption rate between new (EU-8) and old (EU-15) member states (Marinov et al., 2006). As Table 1 shows, effective absorption of structural funds has posed major challenges for new member states. These challenges reflect both the magnitude of these funds and the strict and often complex requirements for their utilization. In qualitative terms, effective absorption requires inter alia democratic articulation of stakeholder needs and priorities – national ownership of structural funds – as well as partnerships among central governments, municipalities, and NGOs as well as private companies. Analysis of the new members' experience can help to derive lessons (good and bad) for pre-accession countries and candidates. Table 1 presents the paid structural funds (as % of the decided funding).

In Table 1 the absorption rates for EU-8 relate to resources allocated for the period 2004–2006. For EU-15 countries they relate to the resources allocated for the whole 2000–2006 programming cycle. Absorption rate within EU-15 is higher and differences are bigger that within EU-8. The latter are less developed and entered the EU later with less project management experience and knowledge.

*Table 1.* **Structural Funds Absorption Rates (as of March 2005)**

| Recipients | Lowest absorption rates | Highest absorption rates |
|---|---|---|
| EU-8 countries | 10% (Czech Republic, Lithuania, Slovenia) | 15% (Hungary) |
| EU-15 countries | 30% (Netherlands) | 60% (Ireland) |

Source: D.G. Regio, 2005.

Some papers discuss the modelling framework which has been widely used for the structural funds analysis. The HERMIN model is the most used. A possible weakness of this model is the relatively high level of sectoral aggregation. For policy makers, particularly those interested in industrial policy, a breakdown of, for example, manufacturing into subsectors would be interesting as certain sectors may benefit more or less from structural funds (Bradley et al., 2003).

The introduction of the plenary feedback session of the Fifth European conference on the evaluation of structural funds "Challenges for evaluation in an enlarged Europe" (Budapest, 2003) stated that the European Commission itself will have to organise the ex-post evaluation of all the programmes funded during 2004-06. Evaluation can be addressed in many various ways in order to make progress: in terms of timing (ex ante, ex post), focus on the level (policy, programme or project), or at the scope (macro, mezzo or micro). One could look at financial, economic or social dimensions, improve the brilliance or resolution of both indicators and methodologies. Here it could be found how absorbtion capacites of specific sectors (environment, employment) can be evaluated (Bollen, 1999).

While interest and demand in EU funding for energy efficiency (EE) and renewable energy resoures (RE) measures is on the rise, the research findings show one major trend across all the countries which are subject to this study – EU funds available for EE and RE projects are being contracted and spent very slowly. Within the 2007–2013 programming period, the number of the contracted projects is still rather low and very little actual spending has been done. This amounts to roughly 16.3% of the absorbed funding. Only the Czech Republic shows better results. The rest of the countries have experienced very slow absorption compared to their total allocations (http://www.inforse.dk/europe/EU_SF_RE_07_13.htm). It should be noted that our results contribute to the analysis of the EU funds absorption capacities from the point of sustainability of countries' development. This means, how the selected projects direct countries toward protection of their environment and the reasonable use of their resources.

**Methodology.** The authors compare the success of the EU funding process with some indices that are implemented to make an integrative measure of citizens' satisfaction and relative efficiency with which nations convert the planet's natural resources into long and happy lives for their citizens, thereby creating sustainable development and supporting European values.

Keeping in mind sustainability as a significant indicator for humans of: the potential for long-term maintenance of well being, which has environmental, economic and social dimensions (http://en.wikipedia.org/wiki/Sustainability) the authors have chosen the Happy Planet Index (HPI) as an indicator of the achieved level of sustainable growth. The HPI combines environmental impact with human well-being to measure the environmental efficiency with which, country by country, people live long and happy lives. It was introduced by the New Economics

Foundation (NEF) in July 2006. The index is designed to challenge well-established indices of countries' development, such as Gross Domestic Product (GDP) and the Human Development Index (HDI), which are seen as not taking sustainability into account. In particular, GDP is seen as inappropriate, as the usual ultimate aim of most people is not to be rich, but to be happy and healthy (Sen, Amartya, 1999). The Happy Planet Index reveals the ecological efficiency with which human well-being is delivered (Marks et al., 2006).

The HPI strips the view of the economy back to its absolute basics: what we put in (resources), and what comes out (human lives of different length and happiness). No country achieves an overall 'high' score on the Index, and no country does well on all 3 indicators that are incorporated into HPI. Namelly, each country's HPI value is a function of its:

- average subjective life satisfaction;
- life expectancy at birth;
- ecological footprint per capita.

The HPI reflects the average years of happy life produced by a given society, nation or a group of nations, per unit of planetary resources consumed, as show in equation:

$$Happy\ Planet\ Index = \frac{Happy\ Life\ Years}{Ecological\ Footprint + \alpha} \times \beta. \quad (1)$$

The ecological footprint is a measure of human demand on the Earth's ecosystems. It represents the amount of biologically productive land and sea area necessary to supply the resources a human population consumes, and to mitigate associated waste. Carbon footprint is a measure of the land area required to support the plant life needed to absorb and sequester CO2 emissions from fossil fuels used by a country, basing on its consumption levels. Carbon footprint, rather than overall ecological footprint, was used for the European HPI because of concerns that overall footprint would not have treated fairly the differences in particular features of European countries, such as relative abundance of forests and levels of consumption of fish rather than other food types (http://www.happyplanetindex.org/learn/).

To test the hypothesis the authors have to find if there is any dependence between two values: implemented financial resources of the European funds and the Happy Planet Index. The dependence refers to any statistical relationship between two random variables or two sets of data. The most common of these measures of dependence between two quantities is Pearson's correlation, obtained by dividing the covariance of two variables by a product of their standard deviations as in equation:

$$\rho X,Y = corr(X,Y) = \frac{\mathrm{cov}(X,Y)}{\sigma x \sigma y} = \frac{E[(X - \mu X)(Y - \mu Y]}{\sigma X \sigma Y}, \quad (2)$$

where $E$ is the expected value operator, cov means covariance, and corr is a widely used alternative notation for Pearson's correlation. The elements of the calculaton made in this paper are:

- series of $n$ data of HPI index for different countries as $X_i$;
- paid or contracted resouces of a fund for different countries as $Y_i$,

written as $X_i$ and $Y_i$ where $i = 1, 2, ..., n$, indicates the number of countries taken into consideration as a sample. The sample correlation coefficient can be used to estimate

the Pearson correlation $r$ between $X$ and $Y$. The equation for sample the correlation coefficient is written in:

$$rxy = \frac{\sum x_i y_i - n\overline{xy}}{(n-1)S_x S_y} = \frac{n\sum x_i y_i - \sum x_i \sum y_i}{\sqrt{n\sum x_i^2 - (\sum x_i)^2}\sqrt{n\sum y_i^2 - (\sum y_i)^2}}, \quad (3)$$

where $x_i$ and $y_i$ are the sample means of $X$ and $Y$, and $s_x$ and $s_y$ are the sample standard deviations of $X$ and $Y$.

**Empirical data and analysis.** The authors use the presented methodology in order to research the Central Eastern European (CEE) countries absorption rates of Phare and structural funds and their correlation with the Happy Planet Index of the related countries. Phare fund is one of the funds that CEE countries used before becoming members of the EU, after entering the EU they bocame users of structural funds.

***1. EU funds.*** ISPA, SAPARD and PHARE were the instruments of financial aid for candidates and potential candidates from CEE during their process of integration into the EU and before implementation of the IPA program.

- *PHARE (Poland and Hungary: Assistance for Restructuring their Economies).* Started in 1989 as an aid program to Poland and Hungary, later spread to 10 countries. Since 2000 it is available to Western Balkan countries. The revamped Phare programme, with a budget of over EUR 10 bln. for 2000–2006 (about 1.5 bln. per year), has two main priorities, namely institutional and capacity-building, and investment financing. From 1993 Copenhagen Council's invitation to Central and Eastern European countries to apply for membership, Phare support was reoriented to this aim, including a significant expansion of support for infrastructure investments (The enlargement process and the three pre-accession instruments: Phare, Ispa, Saphard, 2002). In this paper we propose to analyze only PHARE fund from this group and structural funds available to countries which already entered the EU.

- *The Structural Funds and the Cohesion Fund are financial tools set up to implement.* The Cohesion policy, also referred to as the Regional policy of the European Union. They aim to reduce regional disparities in terms of income, wealth and opportunities. Europe's poorer and peripheral regions received most of the support, but all European regions are eligible for funding under the policy's various funds and programmes (http://en.wikipedia.org/wiki/Structural_Funds_and_Cohesion_Funds).

***2. Correlation between realized aid and HPI – Phare fund.*** Table 2 shows the allocated, contracted and realized resources of the Phare program during 2000–2006.

The authors used the methodology of Pearson coefficient test to investigate the correlation between the realized financial aid under Phare program and the HPI index. Some results of our calculations are presented in Table 3. The realized aid per capita of a country, a user of Phare, during 2000–2006, is one element of the calulation taken ($X_i$) and the second element is: its HPI index ($Y_i$) for the year 2006. Some values obtained by calculating correlations can be seen in Table 3. In all the calculations $X_s$ is the mean value of $X_i$, and $Y_s$ is the mean value of $Y_i$, $r$ is the value of Pearson correlation coefficient.

As it can be seen from Table 3, the correlation coefficient between the realized aid per capita under Phare 2000–2006 and the HPI index in 2006 is negative, -0,538. This is a significant dependence. It means that the countries which have realized

more projects via EU funds, have worse HPI index, their natural resources becoming even more exhausted.

*Table 2.* **Allocated, contracted and realized financial resources from Phare, for the period 2000–2006**

| Countries | Allocated resources, mln. euros | Contracted resources, % | Realized resources, % |
|---|---|---|---|
| Slovenia | 360,33 | 90,49 | 87,40 |
| Cyprus | 338,01 | 23,00 | 16,49 |
| Czech Rep. | 917,24 | 90,92 | 89,12 |
| Malta | 57,11 | 78,23 | 61,01 |
| Hungary | 1480,06 | 93,26 | 90,81 |
| Poland | 3995,99 | 91,52 | 88,90 |
| Estonia | 346,84 | 89,00 | 87,16 |
| Slovakia | 717,59 | 91,39 | 85,45 |
| Lithuania | 810,27 | 100,32 | 90,48 |
| Croatia | 144,6 | 0,00 | 0,00 |
| Bulgaria | 2328,15 | 73,98 | 60,39 |
| Romania | 3623,5 | 70,03 | 58,07 |
| Turkey | 1861,95 | 55,66 | 35,68 |

Source: EC report, 2006.

*Table 3.* **Correlations between realized aid per capita under Phare 2000–2006 and HPI 2006**

| Phare | Realized aid per capita, % (Xi) | HPI 2006 (Yi) | Q = Xi – Xsr | R = Yi – Ysr | Q x Q | R x R | Q x R |
|---|---|---|---|---|---|---|---|
| Romania | 97,41511 | 37,72 | -41,4276 | 1,564444 | 1716,25 | 2,447486 | -64,8113 |
| Bulgaria | 182,5935 | 31,59 | 43,75072 | -4,56556 | 1914,125 | 20,8443 | -199,746 |
| Slovakia | 113,552 | 35,81 | -25,2908 | -0,34556 | 639,624 | 0,119409 | 8,739373 |
| Estonia | 232,5429 | 22,68 | 93,70012 | -13,4756 | 8779,712 | 181,5906 | -1262,66 |
| Poland | 93,23977 | 42,8 | -45,603 | 6,644444 | 2079,633 | 44,14864 | -303,007 |
| Czech Rep. | 19,94298 | 38,3 | -118,9 | 2,144444 | 14137,16 | 4,598642 | -254,974 |
| Latvia | 161,598 | 36,7 | 22,75524 | 0,544444 | 517,8011 | 0,29642 | 12,38897 |
| Lithuania | 215,6271 | 40,9 | 76,78438 | 4,744444 | 5895,842 | 22,50975 | 364,2992 |
| Hungary | 133,0735 | 38,9 | -5,76925 | 2,744444 | 33,28423 | 7,531975 | -15,8334 |
| Total | 1249,585 | 325,4 | | | 35713,43 | 284,0672 | -1715,61 |
| Xsr. Ysr | 138,8428 | 36,15556 | | | | | |
| r | -0,538 | | | | | | |

Source: Authors'.

Actually, infrastructure built through support of the EU has apparently not brought the expected results if measured in terms of sustainable development. Namely, European projects don't bring recommended results which are recognized as their goal. Figure 1 shows the countries of which resource realization increases and the other graph is of their HPI index.

***3. Correlation between realized aid and HPI – Structural funds.*** The authors of the paper applied the same methodology using Pearson's coefficient to find correlation between realized financial aid from Structural funds which are use by the countries which are already EU members, and their HPI index. This analysis refers to more developed states.

As can be seen from Table 4 there is a significant correlation $r = -0{,}663$ ($\pm 0{,}4 < r < \pm 0{,}7$) between realized financial aid per capita from structural funds during 2006–2009 and the related HPI indices of the countries (in 2009).

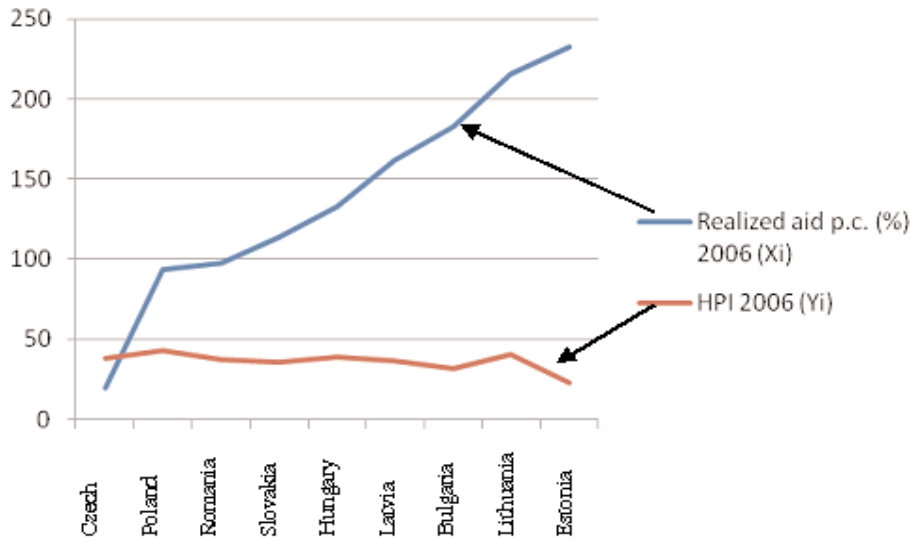


*Figure 1.* **Correlation between realized aid per capita under Phare 2000–2006 and HPI 2006**
Source: Authors'

*Table 4.* **Correlations between structural funds realized per capita (2006–2009) and HPI 2009**

| Structural funds | Paid aid per capita (Xi) | HPI 2009 (Yi) | Q = Xi – Xsr | R = Yi – Ysr | Q x Q | R x R | Q x R |
|---|---|---|---|---|---|---|---|
| Romania | 27 | 43,9 | -234,556 | 4,633333 | 55016,31 | 21,46778 | -1086,77 |
| Poland | 198 | 42,8 | -63,5556 | 3,533333 | 4039,309 | 12,48444 | -224,563 |
| Bulgaria | 59 | 42 | -202,556 | 2,733333 | 41028,75 | 7,471111 | -553,652 |
| Czech | 252 | 38,3 | -9,55556 | -0,96667 | 91,30864 | 0,934444 | 9,237037 |
| Slovakia | 131 | 43,5 | -130,556 | 4,233333 | 17044,75 | 17,92111 | -552,685 |
| Latvia | 426 | 36,7 | 164,4444 | -2,56667 | 27041,98 | 6,587778 | -422,074 |
| Hungary | 342 | 38,9 | 86,44444 | -0,36667 | 7472,642 | 0,134444 | -31,6963 |
| Lithuania | 470 | 40,9 | 208,4444 | 1,633333 | 43449,09 | 2,667778 | 340,4593 |
| Estonia | 443 | 26,4 | 181,4444 | -12,8667 | 32922,09 | 165,5511 | -2334,59 |
| Total | 2354 | 353,4 | | | 228106,2 | 235,22 | -4856,33 |
| Xsr, Ysr | 261,5556 | 39,26667 | | | | | |
| r | -0,663 | | | | | | |

Source: Authors'.

Figure 2 provides a graph of this dependence similar to graph in Figure 1. Figure 2 presents the countries which have seen the resource realization increase and the other graph is of their HPI indices.

The situation appears to be even worse when using data about structural funds. Table 4 presents the correlation coefficient between realized aid per capita, from structural funds for CEE countries during 2006–2009, and the HPI index for 2009. It is a negative significant correlation, -0,663. Structural funds are used by the most developed countries, which exploit nature the most and as the analysis shows, this is still the case.

The projects performed from the EU funds resources have apparently not brought results in the area of decrease in natural resources utilization. This could

mean that these projects are small part of all the investments, or that European projects don't bring recommended results as stated in their goals.

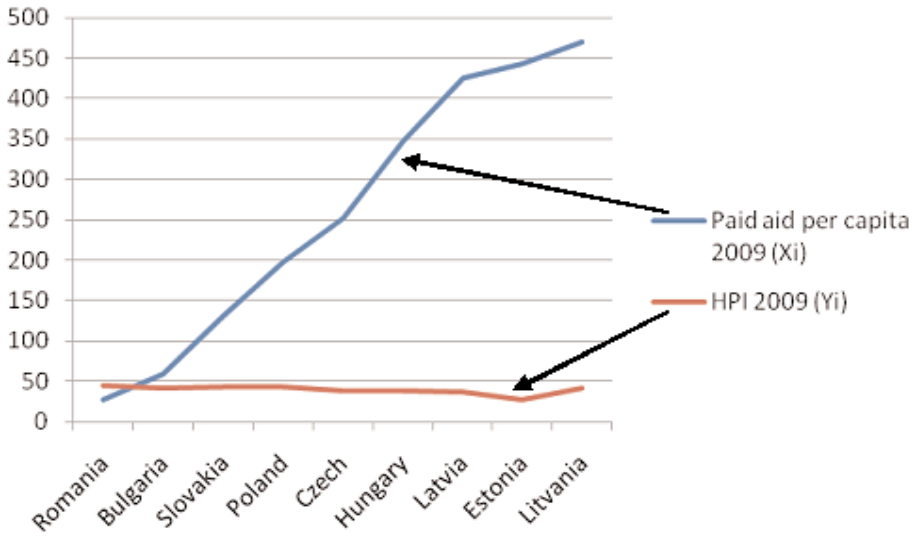


*Figure 2.* **Correlation between structural funds realized aid per capita (2006–2009) and HPI 2009**
Source: Authors'

**Discussion.** The authors have investigated the influence of the realized EU funded projects on sustainable development. They present the results of the realized resources per capita, of various EU funds, and the correlation with Happy Planet Index, which is used as a measure of sustainable development, based on energy efficiency and renewable energy resorces. HPI index is a mark of economic growth based on the care for natural resources. The authors' analysis of the results shows the following:

- The analysis of the results for the projects funded by Phare programs and structural funds present a significant negative correlation between the level of their realization in the countries and their HPI indices. This would indicate that the countries that could be expected to have a better utilization of funds have even worse results in nature protection leading to sustainable development. These results could serve as a warning for the EU authorities who must have a general picture of the projects achivements, and may help to ensure the best choice of projects that really contribute to the EU strategic goals.

**Conclusion.** The hypothesis is not proved. The authors' results show no positive correlation between EU funds' usage and sustainable development of the countries which would show that funds accelerate sustainable growth. The use of European funds as a form of foreign aid has a high negative contribution to sustainable development of the countries, members of the EU, which are using structural funds. EU funded projects don't appear to contribute to sustainable development as required, and should be carefully analyzed. This paper contributes to the literature by presenting the first empirical proof of a negative relationship between the actual level of EU

funds used, and the Happy Planet Index (HPI) which represents sustainability of a country. HPI index incorporates economic analysis with considerations of both human well-being and environmental impact (sustainability). The authors in the paper suggest HPI as a useful index for measuring the successful use of funding from the aspect of sustainable development for future. In this paper the implemented HPI corresponds to some effects of sustainable development which reflect carbon footprint (consumption of CO2), but not to all which could be taken in consideration. New indices which could better reflect sustainability, as an aspect of EU funds investments, could be created. The authors' further research will show a future relation between EU funded projects use and sustainable growth and if, and when, the "race would be won" and the projects would make significant positive reflect on the countries' sustainable growth. The contribution of EU funded projects is still apparently not sufficient to make a significant difference on the level of sustainability of a country. Other projects which don't have this goal seem to prevail. The most developed countries are still having the most deleterious impact on nature. This makes importance of EU funds very big. Their task should be to turn over trends and this would be possible when they reach "critical mass" of implemented sustainable projects. The EU would therefore be well advised to:

- intensify education about sustainable development;
- arise awareness about relation between consumption and ecology;
- strengthen programs which support sustainable development;
- develop better mechanisms for assessment of EU funded projects and their performance;
- support administration capacities of the countries, potential consumers of the funds (Zurga, 2011);
- set up measures, monitoring and control of the sustainability effects of EU funded projects.

The authors' recommendation would be to established a centralized EUROPROJECT center (Kranjac et al., 2010) which would provide education, information and would be monitoring and controlling the EU projects with focus on European and national strategic projects and goals. The EU institutions should support development of new measures for absorption rate.

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