



*Paper reviews*

**STATUS OF ENVIRONMENTAL PROTECTION AS A SOURCE OF FINANCE  
FOR REGIONAL ECONOMIC DEVELOPMENT: MEASUREMENT OF  
ENVIRONMENTAL AND REGIONAL POLICY WITH THE FISHER FUNCTION**

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**Abstract.** The present paper analyses spatial distribution of EU financial support for territories, where environmental protection is of high importance, and tests the measuring method based on the t-statistic of sign frequency in order to apply the *R. Fisher* function's arcsin transformation. The measuring of EU fund distribution is based on the analysis of sign frequency in sample groups with sign frequency in all the municipalities of Latvia. There are 530 municipalities in Latvia, and in 100 of them environmental protection is of high importance. The author has concluded that Latvian municipalities with high environmental protection levels have significantly higher possibilities to obtain EU funds for environmental improvement. A compact group of municipalities with high environmental protection levels have higher and significantly higher possibilities to obtain EU funding for environmental improvement and local business development support. Participation in environmental protection projects did not worsen the economic development scenario.

**Keywords:** regional policy, spatial distributions, t-statistics of relative frequency, environmental protection, EU structural funds.

## 1. Introduction

Entry into the European Union created beneficial conditions for a faster growth of the Latvian economy. Latvia is already receiving and until 2013 will receive significant EU capital for economic development. One of the aims Latvia has set for itself after entering the EU is to achieve a higher rate of approaching the average economic development levels of the EU. At the same time, significant displays of territorial economic inequalities are observable within the country. The consequence of increasing regional differences is the migration of economically active residents away from economically less-developed regions and territories, which further increases regional imbalance.

In these circumstances, it is a pressing matter to find a way to evaluate the regional development level and to estimate the influence of regional policy on territorial development. In order for regional policy to be effective, it is important to know how different socioeconomic indicators interact on a territorial plane.

Unfortunately, research done in other countries is not directly applicable to Latvian territorial analysis. To use regional policy mechanisms in Latvia, it is necessary to have a good knowledge of Latvian regularities. However, at the same time the Latvian experience can be used as an example in European and world contexts, when carrying out investigations of territories with notable

regional disproportions between different parts of the country.

The objective of regional policy in Latvia is to attempt to achieve a similar level of development in Latvia and its regions to that of the European Union countries.

The objective of this paper is to analyse how the status of environmental protection has impacted regional development, especially how significant the possibility is to receive EU fund support for territories where environmental protection is of high importance. The present paper analyses spatial distribution of EU financial support for territories, where environmental protection is of high importance, and tests the measuring method based on the t-statistic of sign frequency in order to apply *R. Fisher* function's arcsin transformation.

In Latvia, the principles of structural fund distribution and influence of regional policy on resource distribution to regional and structural projects became a topical issue after the disturbance of 20 March 2006 at the main office of Latvian Investment and Development Agency (Figs. 1 and 2). The disturbance was a response to the announcement that money would be allocated according to the order in which projects are submitted; hence, project applicants queued up a week in advance of the projects submission date. At that time, the Ministry of Economics formulated that EU fund allocation was dominated by the principle "first come, first served". Now the policy has been changed.



**Fig. 1.** Latvia, Riga, 20 March 2006. A disturbance arose at the doors of the main office of Latvian Investment and Development Agency. The reason was an announcement that money shall be allocated according to the order in which projects are submitted. Queues were regulated by no-one, hence, three alternative lines were formed; friction between these lines caused the blockade of all the institutions and enterprises located in the same building with the main office of Latvian Investment and Development Agency. Photo –Aigars Egīte, Neatkarīgā



**Fig. 2.** On 20 March 2006 the municipal police is bringing order to the queue lined up to submit applications for EU structural fund reception at the entrance of Latvian Investment and Development Agency. Photo – Aigars Egīte, Neatkarīgā

The paper provides an answer to the following question: did projects from territories with high environmental protection ratings manage to enter the first lines for EU financial support?

## 2. Data

In this investigation the CSB data (Demogrāfija ... 2006) have been used to obtain data on the number of residents in Latvian municipalities and the area of municipalities. The CSB data (Būvniecība Latvija... 2006) have been used to obtain data on the total floor space of commissioned residential buildings in Latvian municipalities. Data on municipal tax income (cash flow) were obtained from the public database of the State Treasury of Latvia (<http://www.kase.gov.lv/?sadala=224>). Information on the implementation of EU support was acquired from publicly available information on enterprises which have concluded a contract for receiving funds. The author has collected data from four EU financial activities.

Data on 79 accepted projects in the national program Development of Water Management Infrastructure in Populated Areas with Human Equivalent of 2000 have been acquired from the Ministry of Environment (Vides aizsardzības... 2005). This program has received the European Regional Development Fund (ERDF) support.

Data on 110 accepted projects in the national program "Support to investment in business development in specially supported territories" have been received from the Latvian State Regional Development Agency (SRDA). This program has been approved by the European Commission as No. LV/08/2003, and is being implemented within ERDF grant schemes "Support to investment in business development in specially supported territories".

Data on 222 already paid-out projects in programs "Support to modernization of business infrastructure", "Support to consultancy services and the participation of commercial companies in international exhibitions and trade missions", "Support to development of new products and technologies", "Support for training, re-training and raising of qualification of the employed" have been received from the Latvian Investment and Development Agency. These programs have been financed by the ERDF and European Social Fund.

Data on 262 accepted projects in the program "Forestry development" have been received from the Latvian Rural Support Service. This program has been financed by the European Agricultural Guidance and Guarantee Fund. The amount of support and number of projects were drawn up by Latvian administrative units.

## 3. Measuring methods

When inspecting indicators of the received financing, a characteristic trend is observable – financing is allocated only to a part of all the territories, but a certain number of territories do not receive it. Usually there are two maximums to such parametric distribution. One maximum is formed by the number of territories where the corresponding indicator is zero (territories which do not re-

ceive financing), but the other one is formed by the most often observable financing indicator. A distribution with two maximums does not correspond to any of the classical distributions of statistical theory. In the case of such a distribution, the average indicator, standard deviation and dispersion size of a sample are significantly influenced by the frequency of the analysed indication within the sample. Practically there are two ways of analysing such an indicator. The first one is to group and increase the size of examined territories, for example, moving from civil parishes to country districts. The other one is to analyse the relative frequency of the indication in different samples.

Hence, a relevant method (both in evaluating the relative frequency of qualitative indications and in analysing data clusters for which parametric distribution does not correspond to normal distribution) is the evaluation of the relative frequency of an indication. In such cases, the presence of an indication was shown by a quantitative indicator 1 (one), the lack of a qualitative indication – with 0 (zero), and the relative frequency can be used as a quantitative indicator that characterizes the whole cluster or sample. The relative frequency of an indication usually complies with normal distribution. However, using the indicator in the above way, its mathematical properties must be considered. The relative frequency has a limited numeral range. It cannot be less than 0 or more than 1. If the relative frequency in the general cluster is 0.01, then, for half of all the samples, the relative frequency will be positioned within a very narrow interval between 0 and 0.001 (Kraštinš, Ciemiņa 2003).

The measurement of EU funds distribution has been based on an analysis of sign frequency in sample groups with sign frequency in all the municipalities of Latvia. Sign frequency of EU fund distribution is calculated as a ratio between municipalities with EU support and the entire number of municipalities in the sample group. To calculate the t-statistic, sign frequency is transformed into normally distributed parameters using the *R. Fisher's* function (Fisher, Yates 1963), according to the following formula (Kraštinš, Ciemiņa 2003):

$$\varphi = \frac{2\pi}{180} \arcsin(\sqrt{p}), \quad (1)$$

where  $p$  – sign frequency,  $\varphi$  – *Fisher's* transformation of sign frequency.

The acceptance or rejection of the zero hypothesis is based on empirical t calculations. If  $\varphi$  is known in all Latvian municipalities and the sample group, the t-empirical can be calculated as follows (Kraštinš, Ciemiņa 2003):

$$t_b = \frac{|\varphi_1 - \varphi_2|}{\sqrt{\frac{n_1 + n_2}{n_1 \times n_2}}}, \quad (2)$$

where  $\varphi_1$  – *Fisher's* arcsin transformation of sign frequency for all Latvian municipalities,  $\varphi_2$  *Fisher's* arcsin transformation of sign frequency for sample group,  $n$  – size of samples.

$\varphi$  – function of relative frequency in all Latvian municipalities – was accepted as an indicator of the general cluster. Knowing the  $\varphi$  function within the sample (group), t-empirical was calculated. The t-empirical characterizes to what extent the relative frequency of the respective group (sample) differs from the average value in all Latvian municipalities. If the t-empirical is less than 2, it means that the zero hypothesis, which states that the indicators of the respective group do not significantly (probability of 95 %) differ from the indicators of the general cluster, cannot be rejected. If EU structural funding were distributed evenly in each group, the t-empirical would be small in each group as well. The t-empirical of a large value (above 2) means that the zero hypothesis, which states that the indicators of the respective group do not significantly differ from indicators of the general cluster, must be rejected. Hence, an alternative hypothesis must be presumed, namely, that this distribution is not coincidental and that it might with a certain probability be a result of targeted action (policy). T-critical values have been extensively tabulated, and they can be calculated also by most widely used mathematical computer programs (Excel, SPSS etc.). The t-critical for a relevance level of 0.05 is 1.96, but for a relevance level of 0.005–2.8, respectively. T-empirical indicates how important the differences are between two samples or between the specific group and the general cluster. The author of this investigation follows the assumption that in case the zero hypothesis is rejected, and the alternative hypothesis is approved, this approval of an alternative statistic hypothesis indicates that there has been an expression of regional policy. Regional policy can be manifested in allocating resources more intensely as well as in allocating them minimally to a certain group. If t-empirical is large, and the relative frequency exceeds the average (the zero hypothesis is rejected), it means that this group is receiving funding intensively. If t-empirical is large, while the relative frequency is below the average (the zero hypothesis is rejected), regional policy manifests itself in no particular support to this group. Small values of the t-empirical indicate that the zero hypothesis is not rejected.

The zero hypothesis is that sign frequency in sample groups is not significantly different if compared to the sign frequency all over Latvia with a probability of 0.95.

The results have been compared to other indicators by the grouping method.

## 4. Results and discussion

### 4.1. Regional development measuring of areas with high environmental protection levels compared to other areas

Before evaluating the distribution of EU funding, the present level of protected territories must be evaluated. For this reason the investigation makes use of three regional development indicators: changes in population, the total floor space in newly-commissioned dwelling-houses, and municipal tax income per capita. Territories where intense construction takes place are in a sense an attractive direc-

tion for investment flows and population migration, therefore, by using the grouping method, municipal tax income per capita is set against such parameters as changes in population and floor space in newly-commissioned dwelling-houses. Municipal tax income is a sum of two tax incomes (population income tax and the real estate tax). Municipal tax income characterizes both the income of residents (population income tax component) and territorial development (real estate tax component).

There are a total of 530 municipalities in Latvia. According to a classification (Melluma 1996), in Latvia there are 100 municipalities in which environmental protection is of high importance (Fig. 3). This group includes approximately 8.7 % of the resident population of Latvia (Table 1) and 25.6 % of the territory (Table 2). It is the basis for one sample group. The second sample group is based on municipalities (a total of 36 municipalities) which are located (with at least 50 % of their area) in the North Vidzeme Biosphere Reserve (NVBR). The NVBR is located in the north-western part of Latvia (including parts of Limbaži, Valka, and Valmiera administrative districts). The NVBR is Latvia's largest compact environmentally protected unit. Municipalities of the NVBR sample cover approximately 7.4 % of the territory and 2.6 % of the resident population of Latvia.

**Table 1.** Number of residents in studied groups (% of population in Latvia), 2006

Groups	Number of residents – % of population in Latvia, 2006
All municipalities	100.00
Republican cities	49.03
Regional centres, excluding republican cities	11.91
Municipalities of Riga region, excluding Riga and Jūrmala	6.84
Towns	6.64
All rural parishes, excluding civil parishes of Riga region	25.58
All specially supported territories (SST)	24.56
SST rural parishes	13.65
SST regional centres	5.95
NVBR municipalities	2.60
Areas with HEP levels	8.74

The remaining Latvian municipalities were grouped into the following quantitatively different groups: republican cities, regional centres (excluding republican cities), municipalities of Riga region (excluding Riga and Jūrmala), towns, all rural parishes (excluding civil parishes of Riga region), all specially supported territories (SST), SST rural parishes, and SST regional centres.

The first group includes republican cities (7 municipalities). Seven republican cities accommodate 49.03 % of Latvian residents. This group of municipalities is char-

acterized by changes in the number of resident population that correspond to the average level in the state (Table 3) and large municipal tax incomes per capita in 2004 – LVL 200.86 (Table 4). However, if to evaluate the total floor space of newly-built dwelling-houses in Latvia ( $m^2$ ), in the group of republican cities it forms only 25.55 % of the total state value (Table 5).

**Table 2.** Number of residents in studied groups (% of population in Latvia), 2006

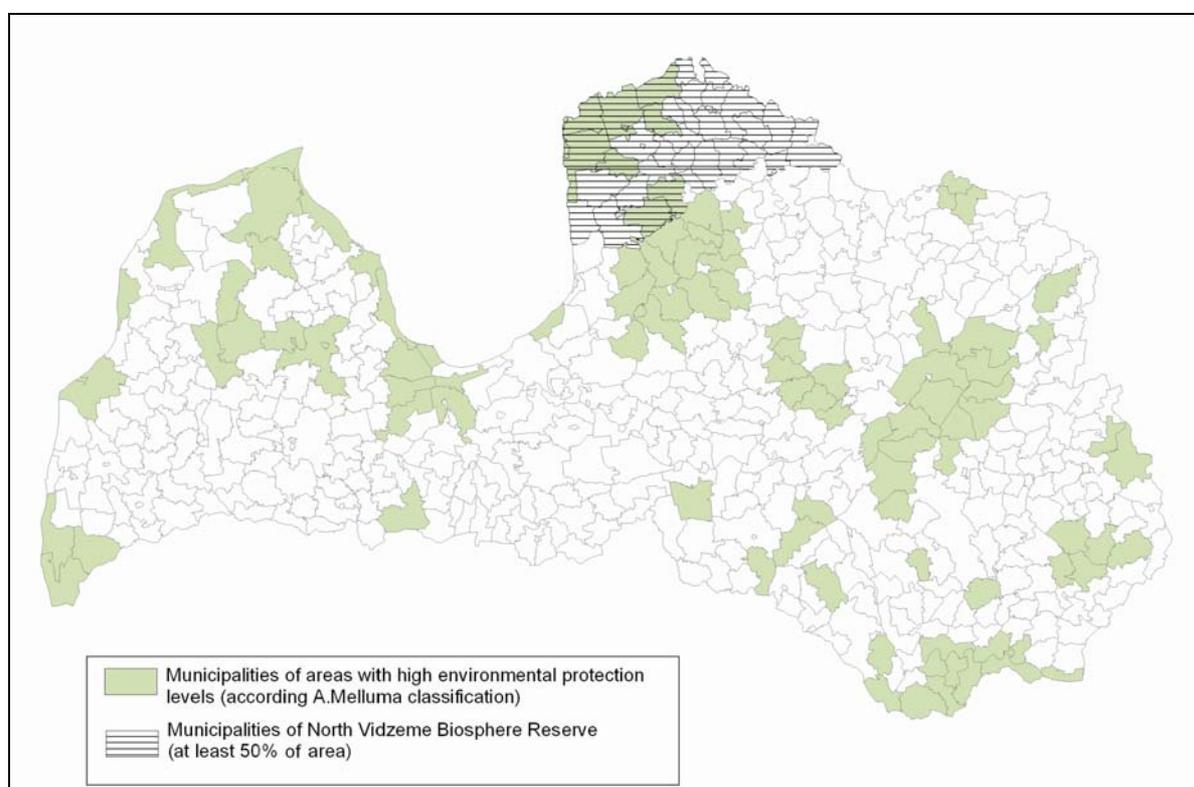
Groups	Territorial area – % of total area of Latvia
All municipalities	100.00
Republican cities	1.04
Regional centres, excluding republican cities	0.99
Municipalities of Riga region, excluding Riga and Jūrmala	4.85
Towns	8.19
All rural parishes, excluding civil parishes of Riga region	84.93
All specially supported territories (SST)	63.00
SST rural parishes	0.54
SST regional centres	55.96
NVBR municipalities	15.92
Areas with HEP levels	7.35

The second group incorporated cities – regional centres (excluding republican cities) and included 20 municipalities. A characteristic of this group is a smaller reduction in population, but a significantly smaller municipal tax income per capita (LVL 150.55) than in the group of republican cities.

The fastest development, however, characterizes the third group, which includes 20 municipalities of Riga region (apart from Riga and Jūrmala). Within a year, the population in this group increased by 23.77 per mile. In a territory that accommodates only 6.84 % of the Latvian population, 44.95 % of the area of newly-constructed dwelling-houses was built in 2005. Only municipal tax income per capita for this group is smaller than in republican cities – LVL 191.92.

The fourth group – towns including all towns with rural territories, town districts that are not republican cities or regional centres and that are not cities of Riga region (43 altogether). This group is characterized by a population reduction that exceeds twice the average rate in the state – minus 8.94 per mile – and by municipal tax incomes of only LVL 118.44 per capita.

The weakest economic development takes place in Latvian rural parishes (excluding civil parishes of Riga region) which constitute the fifth group (437 civil parishes). Population size in this group has decreased by 11.9 per mile per year. Municipal tax income per capita is LVL 90.46. This group contains 25.58 % of Latvian residents, however, in 2005 only 15.28 of the total area of new houses was built in this territory.



**Fig. 3.** Placement of municipalities of the North Vidzeme Biosphere Reserve (at least 50 % of area) and municipalities of areas with high environmental protection levels (according to a classification by A. Melluma) in Latvia

**Table 3.** Changes in population per mile in studied groups (2006 against 2005)

Groups	Changes in population per mile – 2006 vs 2005
All municipalities	-5.14
Republican cities	-5.17
Regional centres, excluding republican cities	-4.38
Municipalities of Riga region, excluding Riga and Jūrmala	23.77
Towns	-8.94
All rural parishes, excluding civil parishes of Riga region	-11.90
All specially supported territories (SST)	-12.77
SST rural parishes	-15.58
SST regional centres	-6.81
NVBR municipalities	-12.50
Areas with HEP levels	-7.85

**Table 4.** Average tax income per capita in LVL, 2004

Groups	Average tax income per capita, LVL, 2004
All municipalities	160.35
Republican cities	200.86
Regional centres, excluding republican cities	150.55
Municipalities of Riga region, excluding Riga and Jūrmala	191.92
Towns	118.44
All rural parishes, excluding civil parishes of Riga region	90.46
All specially supported territories (SST)	96.00
SST rural parishes	77.81
SST regional centres	129.91
NVBR municipalities	113.19
Areas with HEP levels	108.89

The sixth group includes specially supported territories (331 municipalities). A specially supported territory (SST) is a territory where negative tendencies of social and/or economic development persist for an extended time period and to which the legal status of a specially supported territory has been conferred in Latvia. The group "All SST" encompasses 24.56 % of Latvian residents, and only 9.34 % of dwelling area was built in its territories in 2005. The population of this group has decreased by 12.77 per mile per year, and municipal tax income per capita was LVL 96, i.e. considerably lower than the Latvian average. Two smaller SST groups were defined: rural parishes with the status of SST (284 civil

parishes) and regional centres with the status of SST (12 municipalities).

The seventh group – rural parishes with the status of SST are, in terms of economic development, quite backward. Rural parishes of SST accommodate 13.65 of Latvian residents, but in 2005 only 3.99 % of the total Latvian dwelling area was put into use in these regions. The number of residents in rural parishes decreased by 15.58 per mile a year, and municipal tax income per capita was only LVL 77.81.

In the eighth group – regional centres with the status of SST (12 municipalities) – the reduction in population numbers only slightly lagged behind the Latvian average. Municipal tax income per capita was LVL 129.91 and thus better than average indicators in towns.

**Table 5.** Area of newly-built dwelling-houses in 2005, % of total value in Latvia

Groups	Area of newly-built dwelling-houses, 2005 – % of total value in Latvia
All municipalities	100.00
Republican cities	25.55
Regional centres, excluding republican cities	8.87
Municipalities of Riga region, excluding Riga and Jūrmala	44.95
Towns	5.35
All rural parishes, excluding civil parishes of Riga region	15.28
All specially supported territories (SST)	9.34
SST rural parishes	3.99
SST regional centres	3.00
NVBR municipalities	1.81
Areas with HEP levels	11.58

The population is decreasing most rapidly in rural parishes of specially supported territories of Latvia. Of all the studied groups, the number of residents is increasing only for municipalities of Riga region.

The total area of dwelling-houses put into operation in Latvia has a very uneven territorial distribution – 44.95 % of newly-built dwelling areas are put into use in municipalities of Riga region that only accommodates 6.84% of Latvian residents. Proportionally the least significant construction of dwelling-houses is taking place in the rural parishes of specially supported Latvian territories. Municipal tax income per capita effectively characterizes the level of territorial development and financial abilities of the municipalities. A pronounced territorial lack of uniformity is observable in terms of this tax income in Latvia. The highest level of municipal and residential income is to be seen in republican cities and municipalities of Riga region. Rural parishes and SST-status

rural parishes to a great extent have fallen behind the average level.

Municipalities in which environmental protection is of high importance are not the least developed territories, if to evaluate the observable indicators. As Table 3 shows, decrease in population in these territories a little exceeds the state average, but by less than in least-developed territories. Municipal tax income per capita (Table 4) is greater than for the average rural parish or specially supported territories, except the specially supported territories that are regional centres. In 2005, only 11.58 % of the total dwelling area of new houses was built in this territory (Table 5), which is significantly higher than the proportion of the number of residents in these territories – 8.74 %. This indicates that in these territories building construction is more common than on average in Latvia. In other words, territories, that for a long time have enjoyed environmental protection of high importance, have already reached a higher level of regional development than an average Latvian municipality. If EU funding was to be distributed proportionally to the level of development, then municipalities in which environmental protection is of high importance should receive less funding than an average municipality.

A completely different situation appears when evaluating NVBR municipalities. The number of residents in this group is decreasing (Table 3), similarly to the poorest Latvian territories. In 2005, this territory witnessed the construction of only 1.18 % of the total area of newly-built dwelling-houses (Table 5), which is significantly lower than the percentage of population inhabiting these territories – 2.60 % (Table 1). Only municipal tax income per capita in NVBR municipalities (Table 4) is higher than in specially supported territories, yet still considerably lower than the Latvian average. It could be interpreted by the relatively large proportion of cities in the group of NVBR municipalities.

Altogether NVBR incorporates municipalities with a development level below the Latvian average, and NVBR municipalities are an example of a situation when municipalities have chosen the environmental protection direction as one of development scenarios.

#### 4.2. Analysis of EU fund distribution

EU financing for entrepreneurship support was firstly grouped according to the location where the enterprise receiving EU support was registered.

Financing for projects in terms of the program “Development of Water Management Infrastructure in Populated Areas with Human Equivalent of 2000” can be received only by one community, hence, the spatial distribution of this program is even. The other three EU programs can assist multiple projects from the same community or district. In evaluation of the territorial distribution of funds administered by SRDA it appears that a pronounced leader is Jēkabpils with 8 supported projects which constitute 8.4 % of the total support amount allocated to Latvia (Table 6). The greatest assistance both in terms of the amount of received financing and the number of supported projects was enjoyed by enterprises regis-

tered in regional centres (Jēkabpils, Kuldīga, Gulbene) as well as in multiple civil parishes – Eglaine, Ranka, etc.

**Table 6.** Distribution of contracts concluded for co-financing within the grant scheme administered by SRDA “Support to investment in business development in specially supported territories” according to enterprise registration address (situation of 20 Sept 2006)

Municipality	Number of projects	EU grant financing (thousands, LVL)	% of total
Jēkabpils	8	465	8.37
Eglaine civil parish	5	250	4.50
Kuldīga	5	290	5.22
Gulbene	4	210	3.79
Ranka civil parish	4	239	4.30
Krāslava district	3	74	1.33
Līvāni	3	158	2.85
Madona	3	144	2.59
Padure civil parish	3	123	2.22
Talsi	3	112	2.01
Valka	3	114	2.06

Structural fund distribution administered by LIDA produces a completely different situation (Table 7). Leaders in terms of project numbers, money received as well as the distribution percentage of money are the republican cities of Riga, Liepāja, Daugavpils, Jelgava and Ventspils. In these five cities 151 project has been supported (222 altogether in Latvia). Enterprises registered in the municipalities of Riga, Liepāja, Daugavpils, Jelgava and Ventspils also received 57.4 % of all the funds administered by LIDA. Relatively large amounts of money (3–7 % of the total) have also been allocated to enterprises registered in Valmiera, Ogre district, Salaspils district, Brocēni district and Dobeles. Among municipalities where at least 3 projects have been supported, there are no civil parishes, only cities or city districts.

A different situation emerges in the distribution of funds for the “Forestry development” program. These funds are basically received by municipalities with small population levels, and the size of projects is relatively small. To 11 projects of Skaņkalne civil parish, a total of LVL 5.7 thousand have been allocated (Table 8).

At the next stage of investigation, data on EU entrepreneurship support was grouped according to the 8 groups defined previously. Distribution of funds to the studied groups administered by SRDA is shown in Table 9.

As seen in Table 9, republican cities and enterprises registered in Riga region do not receive any SRDA support. The relative frequency of money recipients in the group “All SST territories” is statistically significantly higher than the relative frequency of the indication in all Latvian municipalities (the t-empirical is 2.89).

**Table 7.** Distribution of structural funds administered by LIDA to municipalities according to enterprise registration address (situation of 8 Aug. 2006)

Municipality	Number of projects	Money paid out by LIDA (thousands, LVL)	Money paid out by LIDA (% of total)
Rīga	125	8,325	33.59
Liepāja	10	2,233	9.01
Daugavpils	8	831	3.35
Jelgava	4	1,207	4.87
Ventspils	4	1,622	6.54
Cēsis	4	42	0.17
Valmiera	4	1,148	4.63
Rēzekne	3	497	2.00
Alūksne	3	90	0.36
Salaspils district	3	1,156	4.67
Sigulda district	3	304	1.23
Valka	3	279	1.13
Brocēni district	3	1,532	6.18

**Table 8.** Distribution of recipients of the Latvian Rural Support Service Program “Forestry development” in municipalities according to enterprise registration address (situation of 28 Feb. 2007)

Municipality	Number of projects	Money paid out (thousands, LVL)	Money paid out (% of total)
Skaņkalne civil parish	11	5.70	0.71
Launkalne civil parish	8	4.53	0.56
Mazsalaca with rural territories	8	5.46	0.68
Ramata civil parish	8	5.20	0.64
Bilskā civil parish	7	4.49	0.56
Valka civil parish	7	5.86	0.73
Rugāji civil parish	6	8.98	1.11
Litene civil parish	5	2.98	0.37
Rencēni civil parish	5	4.21	0.52
Vaidava civil parish	5	3.66	0.45
Liepa civil parish	4	3.78	0.47
Alsunga civil parish	4	12.77	1.58
Zvārde civil parish	4	3.97	0.49

**Table 9.** Distribution of the money amount to structural fund recipients in the SRDA-administered program “Support to investment in business development in specially supported territories” by municipality groups, their relative frequency and the t-empirical

Groups	Relative frequency of money recipients	t-empirical (against all municipalities)
All municipalities	0.123	
Republican cities	0.000	1.88
Regional centres, excluding republican cities	0.600	4.64
Municipalities of Riga region, excluding Riga and Jūrmala	0.000	3.36
Towns	0.209	1.48
All rural parishes, excluding civil parishes in Riga region	0.034	5.31
All specially supported territories (SST)	0.196	2.89
SST-rural parishes	0.155	1.27
SST-regional centres	1.000	8.31

However, in the group “SST-rural parishes” the relative frequency of the indication is not significantly different from the relative frequency of the indication in all Latvian municipalities (the t-empirical is 1.27).

This shows that money is distributed very unevenly among SST municipalities. The main recipients of support are SST-regional centres. SST-regional centres receive 32.53 % of EU project funding administered by SRDA; moreover, the probability, that a randomly chosen SST-regional centre will have at least 1 supported project, is 100 %. In contrast, probability for a random SST-rural parish to receive support for investment is only 15.5 %.

The distribution of money amount to structural fund recipients from structural funds administered by LIDA demonstrates an essentially different structure of fund allocation, as shown in Table 10.

Relative frequency that characterizes the group of all municipalities is statistically significantly similar only to the relative frequency of structural fund recipients of the town group (the t-empirical equals 1.34). After the distribution of funds administered by LIDA (Table 10), such groups as republican cities, regional centres (apart from republican cities), Riga region municipalities (excluding Riga and Jūrmala) and SST regional centres have a significantly higher (statistically significant) frequency of funding allocation. However, the following groups – “all rural parishes excluding civil parishes of Riga region”, “all specifically supported territories and “SST rural parishes” have a statistically lower chance to receive funding administered by LIDA. SST rural parishes are in the worst position for LIDA-administered structural fund reception. The probability that in a random SST civil parish an enterprise will receive support administered by LIDA is only 2.5 % (the t-empirical equals 4.11).

**Table 10.** Distribution of the money amount to structural fund recipients from structural funds administered by LIDA by municipality groups, their relative frequency and the t-empirical

Groups	Relative frequency of money recipients	t-empirical (against all municipalities)
All municipalities	0.092	
Republican cities	1.000	6.63
Regional centres (excluding republican cities)	0.550	4.62
Municipalities of Riga region (excluding Riga and Jūrmala)	0.391	3.44
Towns	0.163	1.34
All rural parishes (excluding civil parishes of Riga region)	0.034	3.79
All specially supported territories (SST)	0.051	2.29
SST-rural parishes	0.025	4.11
SST-regional centres	0.333	2.10

**Table 11.** Distribution of the money amount to structural fund recipients in the Latvian Rural Support Service Program “Forestry development” by municipality groups, relative frequency and the t-empirical

Groups	Relative frequency of money recipients	t-empirical (against all municipalities)
All municipalities	0.258	
Republican cities	0.000	2.804
Regional centres (excluding republican cities)	0.050	2.703
Municipalities of Riga region (excluding Riga and Jūrmala)	0.043	3.036
Towns (excluding towns in Riga region)	0.209	0.734
Civil parishes (excluding civil parishes in Riga region)	0.288	1.036
Specially supported territories	0.284	0.819
SST-civil parishes	0.303	1.342
SST-regional centres	0.000	3.654

The distribution of money amount to structural fund recipients in the Latvian Rural Support Service Program “Forestry development” by municipality groups, when analysing the relative frequency (Table 11), indicate that such groups as republican cities, regional centres (excluding republican cities) and municipalities of Riga region (excluding cities of Riga and Jūrmala) receive significantly lower financing or receive none at all. It can be concluded that it is a result of a certain policy for these territories not

to receive this financing. However, in the rest of municipality groups the frequency of structural fund reception does not significantly differ from the average.

#### 4.3. Chances for municipalities with high environmental protection levels to receive EU structural funds and statistical evaluation of these chances

There is no significant difference when comparing the structural fund distribution results to a parameter like the EU structural fund financing support ratio in % all over Latvia (Tables 12, 13). The NVBR municipalities did not have a good starting position for regional development.

The NVBR sample municipalities have 23.18 % of the whole financial support spent in the Water Management Program. That is three times higher than the proportion of the NVBR municipalities’ area in relation to the territory of Latvia, and exceeds the proportion of resident population ten times. It can be concluded that the NVBR sample municipalities have significantly higher (probability over 0.95) possibilities to obtain EU funds for environmental and living quality improvement. Participation in the reserve project did not worsen economic development scenario for the NVBR municipalities, according to the analysed indicators of regional development. There are good perspectives of environmental protection scenario for regional development. Latvia has a unique opportunity to promote sustainable economic and social development of the North Vidzeme Biosphere Reserve.

The NVBR sample municipalities have higher possibilities to obtain all the analysed EU structural funds resources (Table 13). The NVBR sample municipalities have significantly higher (probability over 0.95) possibilities to obtain EU structural fund resources for two programs – Water Management (the t-empirical is 5.67) and Forestry Development (t-empirical is 2.93).

**Table 12.** Results of different EU structural fund distribution for municipalities of entire Latvia

Activity\indicator	Sign frequency of entire Latvia
Water management	0.16
Managed by SRDA	0.12
Managed by LIDA	0.09
Forestry development	0.26

**Table 13.** Results of different EU structural fund distribution for municipalities of the North Vidzeme Biosphere Reserve

Activity\indicator	Sign frequency in NVBR	t-empirical	Support finance (%) ratio to total
Water management	0.61	5.67	23.18
Managed by SRDA	0.19	1.15	8.54
Managed by LIDA	0.11	0.36	0.79
Forestry development	0.50	2.93	6.28

The sample of municipalities in areas where environmental protection is of high importance has higher and significantly higher (probability over 0.95) possibilities to obtain only EU structural funds within the Water Management Program (Table 14). A possibility to obtain other analysed EU structural funds is lower but not significantly.

**Table 14.** Results of different EU structural fund distribution for municipalities of areas with high environmental protection levels (HEP)

Activity\ indicator	Sign frequency in areas with HEP	t-empirical	Support finance (%) ratio to total
Water management	0,28	2,72	44,05
Managed by SRDA	0,10	0,66	13,32
Managed by LIDA	0,06	1,13	2,66
Forestry development	0,27	0,24	24,89

Sample municipalities have 44.05 % of the whole financial support spent in the Water Management Program. That is twice as high as the proportion of the area of high-level environmental protection municipalities in comparison to the area of Latvia, or five times higher than the proportion of the resident population.

Investigation of EU fund distribution is an important task in the investigation of regional development. Investigations are typically based on distribution of EU structural fund financial resources (Vītola 2006; Musial 2004). Some authors have focused on the number of projects (Klevas *et al.* 2007; Jakusonoka 2005) or the number of applications (Buģina, Krūmiņš 2005; Pilvere, Rukmanis 2005) as indicators in their investigations.

It has to be concluded that, from the point of view of levelling off Latvian regional differences, funding distribution by LIDA encourages extra flow of funds to territories with a higher level of development, and such a distribution of funds might not be effective in terms of regional equalization policy and might not facilitate the reduction of regional differences in the future. However, such a distribution of funds corresponds to the prior aim of LIDA to reduce the gap between average levels of EU and Latvia. Money is directed to territories that show the highest growth rates.

Even though the money distribution policies of programs differ, the amount of finance is greater in programs administrated by LIDA and for the program Development of Water Management Infrastructure in Populated Areas with Human Equivalent of 2000. Within the considered period, SRDA has concluded co-financing contracts for LVL 5.5 million, while LIDA has already paid out LVL 24.8 million of EU support funding. Within the program Development of Water Management Infrastructure in Populated Areas with Human Equivalent of 2000 more than LVL 25 million has been paid out, but the Latvian Rural Support Service program "Forestry development"

has so far allocated only LVL 800 thousand. In Latvia an inconsistency is observable when a part of EU funding is directed to reducing the regional disproportion, but another part of EU money stimulates increase in this disproportion.

## 5. Conclusions

1. Latvian municipalities with high environmental protection levels have significantly greater possibilities to obtain EU funds for environmental improvement.

2. A compact group of municipalities with high environmental protection levels like the North Vidzeme Biosphere Reserve area has significantly higher possibilities to obtain EU funds for environmental improvement and local business development support.

3. Participation in environmental protection projects did not worsen the economic development scenario for Latvian municipalities, according to the analysed indicator.

4. There are good perspectives of an environmental protection scenario for regional development. Latvia has a unique opportunity to promote sustainable economic and social development in areas with high environmental protection levels.

5. The sign frequency measurement is a new approach to studies of regional development, linking dates territorial distribution of EU Structural funds. It can be helpful in regional policy making.

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## APLINKOS APSAUGOS PADĒTIS KAIP FINANSINIS IŠTEKLIUS REGIONINEI EKONOMINEI PLĒTRAJ: MATAVIMAI, SUSIĒJ SU APLINKOS IR REGIONINE POLITIKA NAUDOJANT FISHER FUNKCIJĀ

**J. Paiders**

Santrauka

Analizojama Eiropas Savienības finansinās paramos teritorijoms, kuriose aplinkos apsaugai teikama daug dēmesio, erdvinis pasiskirstymas ir tikrinamas mataavimo metodus, kurio pagrindas yra reikšmių santykinio dažnio t-statistika, siekiant pritaikyti R. Fisher funkcijos arcsin transformaciją. ES lėšų pasiskirstymo matavimai remiasi reikšmių santykinio dažnio tiriamose grupėse su reikšmių santykinio dažniu visose Latvijos savivaldybėse analize.

Latvijoje iš viso yra 530 savivaldybių, o iš jų 100 savivaldybių aplinkos apsaugai teikama daug dēmesio.

Autorius padarė išvadą, kad Latvijos savivaldybės, kuriose yra aukštas aplinkos apsaugos lygis, turi reikšmingai didesnių galimybių gauti ES fondų paramą aplinkai gerinti. Šiose savivaldybėse kompaktinės grupės turi didesnių ir reikšmingesnių galimybių gauti ES lėšų paramą aplinkai gerinti ir vietiniam verslui plėtoti. Dalyvavimas aplinkos apsaugos projektuose nepablogino ekonominės plėtros scenarijaus.

**Reikšminiai žodžiai:** regioninė politika, erdvinis pasiskirstymas, reikšmių santykinio dažnio t-statistika, aplinkos apsauga, ES struktūriniai fondai.

## ПРИРОДООХРАННЫЙ СТАТУС КАК ФИНАНСОВЫЙ ИСТОЧНИК РЕГИОНАЛЬНОГО РАЗВИТИЯ: ОЦЕНКА ПРИРОДООХРАННОЙ И РЕГИОНАЛЬНОЙ ПОЛИТИКИ С ПРИМЕНЕНИЕМ ФУНКЦИИ ФИШЕРА

**Ю. Пайдерс**

Резюме

Проводится анализ пространственного распределения структурных фондов Евросоюза (ЕС) для территорий с высокой значимостью природоохранного статуса и проверяется метод, основанный на t-статистике относительной частоты и применении арксинусной трансформации функции Рональда Фишера.

Оценка распределения фондов ЕС основывается на анализе относительной частоты в выборке по сравнению с относительной частотой в Латвии.

Из 530 самоуправлений Латвии в 100 из них природоохранные участки занимают значительную часть территории. Автор делает вывод о том, что самоуправления с высокой значимостью природоохранного статуса имеют статистически значимо большие возможности в получении фондов ЕС для природоохранных целей.

Компактные группы самоуправлений с высокой значимостью природоохранного статуса, к примеру, территория Северо-Видземского биосферного заповедника, имеют статистически значимо большие возможности в получении фондов ЕС для природоохранных целей и развития местного бизнеса.

Участие самоуправлений в разработке природоохранных проектов весьма перспективно для экономического развития.

**Ключевые слова:** региональная политика, пространственное распределение, t-статистика относительной частоты значений, защита окружающей среды, структурные фонды ЕС.

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