THE IMPACT OF PUBLIC CONSORTIUM IN ENVIRONMENTAL SPENDING FROM MUNICIPALITIES IN SOUTHERN BRAZIL

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1. Introduction

Environmental degradation is an imminent danger to the entire planet, therefore it is necessary to find solutions to reduce or end this threat (GOLDBLATT, 1996). The State is the entity responsible for enforcing the environment. Moreover, there is a need to use environmental policy to try to control environmental degradation (TRIDAPALLI; BORINELLI; CAMPOS; CASTRO, 2011).

It is up to society to verify if the State is being effective in protecting the environment. According to Konisky and Woods (2012), the State can control with indicators, like environmental expenditures, pollution reduction costs or regulatory enforcement actions. Therefore, the analysis of the environmental expenditures in the public sector has become an important tool to analyze the State work effectiveness.

Understanding the fluctuations that occur in environmental spending is important, because the environmental area is different from other public areas such as health and education, and it has not a guaranteed minimum percentage in the public budget.

Souza (2006) explains that the concern for the environment in Brazil only had a striking fact from the 1980s, with the adoption of environmental policies in the Federal Constitution of 1988, mainly due to pressure from international bodies, like United Nations. One of the policies was inserted sharing the responsibility of public bodies on the environment, which until then was only the States and the Union and, after the Brazilian Constitution, is also a responsibility from the municipalities.

This decentralization has brought advantages and disadvantages to society (CALDERAN, 2013). The main advantage is that the municipality has the opportunity to try

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to solve local adversity, serving people and solving problems located within its territory. On the other hand, the main disadvantage is that with the increase of responsibility, there was an increase in public expenditure. In most cases, this increase was not accompanied by revenue (LIMA, 2003).

Trying to balance the lack of resources, public managers can adopt new strategies to meet efficiently in public policy. The partnership strategy between municipalities facing the same problems became a solution. This partnership between municipalities, when performed in a formal way, is called public consortium, whose goal is to solve problems and to take actions that meet all the consortium members (LIMA, 2003).

However, it is necessary to monitor the performance of public officials, including how they care about the environment (PEARCE; PALMER, 2001). According to Konisky and Woods (2012) there is no specific way to do this, for these authors one of the ways is to track expenditure on environmental spending. Public expenditure incurred in the environmental area are included in the public budget as environmental management expenses.

One way to identify and understand the dynamics of public environmental spending occurs through the identification of determinants variables related to expenditure. Studies sought to identify what are the determinant variables related to environmental expenditure (HÁJEK; KUBOVA, 2015; PEARCE; PALMER, 2001; KRAJEWSKI, 2016; PEREIRA; REZENDE; GOOD, 2016; GUPTA; BARTENDER, 2015).

Bacot and Dawes (1997) classified the variables into three broad categories: socio-economic; structural / administrative, and; politics. In structural or administrative category, the authors related a number of variables, one of which is the intergovernmental relations, which can be evidenced by the performance of the consortium in the environmental area.

Broietti et al. (2017) conducted a survey of the influence of environmental consortium in Paraná. However, in other States or regions this survey was not carried out. Stanton and Whitehead (1994), as well as Konisky and Woods (2012), also said that relations with other municipalities or States can contribute to environmental expenditure.

So the question arises: what is the influence of environmental public consortium in environmental expenditures of municipalities in southern Brazil? This research aims to determine the influence of the participation of environmental public consortium located in the south of Brazil in environmental expenditures of the municipalities, between 2012 and 2016.

Based on the provisions to answer the research question, the following hypotheses were formulated:

H_0: municipal environmental public expenditures are not influenced by adherence to environmental public consortium.

H_1: municipal environmental public spending are influenced by adherence to environmental public consortium.

To do this analysis, we used the quantitative methodology with a panel data regression model (FÁVERO; BELFIORE, 2017). In order to measure the environmental efficiency of the State, one of the possible indicators to monitor is public spending on the

environment, through the accounting function number 18, Environmental Management. The municipal environmental expenditures are not homogeneous (DE CARLO, 2006), hence the need for studies to identify its determinants.

In this context, the practical contribution is the possibility of proving that the municipalities that participate in public consortium have better environmental indicators. Thus, such a result could encourage other municipalities to perform this action. The theoretical justification of this work is to contribute to studies on the environmental costs of municipalities, which are still few (DE CARLO, 2006; TRIDAPALLI et al., 2011; BUENO, 2013).

The work is divided into five sections: the first, with the introduction, includes the questioning, the purpose and justification of the work; the second, for the theoretical, with issues related to public consortium and environmental public spending; the explanation of the method is in the third section; on Wednesday, contains the presentation and discussion of the results; and the fifth, presents the end of the study considerations.

2. Theoretical Background

2.1. Environmental public spending

Tridapalli et al. (2011) argue that the environmental public expenditures include those inherent in State constitutional functions related to environmental preservation and recovery and ensuring environmental rights. In Brazil, public spending on funding and investments are made for the administration, operation and support of the bodies responsible for environmental control, air pollution control and sound, policies and programs of reforestation, monitoring of degraded areas, works of prevention dry, surveys and trash removal services in protected areas and environmental reserves (forests, lakes, rivers).

According to Carneiro (2008), environmental public expenditure should contain spending on improvement of the environment that may contain basic maintenance, preservation of forests and environmental education. According to the authors, to analyze the spending allocated for environmental function and its sub is due use that are presented by the Brazilian National Treasury Secretariat.

The federal units play an important and irreplaceable role in the environmental regulatory process as a representative of the public interest and guarantor of environmental rights. In addition, to ensure the environmental well-being, public managers are used in environmental public policies that have a concern about the protection, conservation and use of natural resources and the environment. These policies, expressed in legislation and corresponding institutional organization, define the State intervention instruments in the management of resources and environment quality (TRIDAPALLI et al., 2011).

In Brazil, the analysis of public spending on the environment has been facilitated by changes in the Fiscal Responsibility Law in early 2000. The increased standardization, transparency and systematization of the Statements of public expenditure of the Union, States and municipalities have opened new and broad possibilities of accompaniment

and evaluation of policies and institutions in the environmental field (BORINELLI et al., 2011).

Public spending is divided into two categories: function and sub-function. The function is considered the highest level of aggregation of various expenditure areas that include the public sector, since the sub-function divides the function to add certain expenses subset of the public sector (MBM, 1999).

The ordinance 42/1999 of the Federal Environmental Management and Budget Department is ranked number 18 function aimed at environmental management, and is divided into the following sub-functions:

– preservation and conservation: includes the cost of implementation, maintenance planning and environmental areas;

– environmental control: are spending to prevent and control pollution of water, air and soil;

– recovery of degraded areas is spent on areas constantly flooded or subject to erosion;

– water resources: covers the costs related to use of water resources;

– weather: includes actions that seek to implement, coordinate and maintain the organs studying climate change and weather conditions.

– other sub-functions of environmental management: despite this sub-function is not in the decree 42/1999 is used for the costs of environmental management that are not covered in any other sub-function.

The irregularity in the definition of the total environmental public spending is another worrying factor for those who care about the environment. As public area is the largest investor funds for the environment, the application of resources in this area is dependent on several determinants. Changes can happen, and cuts can occur unexpectedly to meet other demands of the public agenda (YOUNG, 2006).

An example of this situation was found in the study of Dutra, Oliveira and Prado (2006) which analyzed public expenditure of the Ministry of the Environment from 2000 to 2005 showed that this ministry lost funds for other ministries such as Social Security and Education. Lemos, Young and Geluda (2005) argue that environmental costs are not priorities within the three spheres of government. Tridapalli et al. (2011) explain that it is interesting to conduct research with environmental expenses using the variable total expenditure since not always the environmental spending follows the oscillations in expenses.

Study public environmental spending is important because, through the information generated by research, you can follow the public performance in relation to the environment. One way to do this is to try to understand how resources are allocated, by identifying determinants.

It is important that they verify the determinants of environmental spending, since the environmental area has no requirement for minimum investment percentage in relation to total spending, as with education and health. International researchers,

particularly Americans (BACOT; DAWES, 1997; DALEY; GARAND, 2005), classified the determinants: economic partner; structural / administrative, and politics.

Among the many studies that have shown the possible determinants of environmental expenditure, the emphasize studies Lombard and Lester (1990); Whitehead and Stanton (1994); Neves (2012); Konisky and Woods (2012); Broietti et al. (2017). The authors highlighted the variable "intergovernmental relations" as a possible variable that interferes with the environmental expenditure. These relationships are those in which the municipality is related to other municipalities, States or union to carry out the actions for the environment, and lead to an increase in public spending. These joint actions between public actors, when carried out in a formal way, can be elucidated by the public consortium. Thus, the determinant of intergovernmental relations served as a reference and support for the objective proposed in the face of relations between municipalities.

Other variables, such as population used in the study Bacot and Dawes (1997), Newmark and Witko (2007) and the total area of the municipality in the study of Newmark and Witko (2007), were also used to explain the environmental spending.

2.2. Public consortium

Since the Constitution of 1988 was the decentralization of the Union, States and municipalities. Thus, the municipalities started to legislate on their territory and to implement policies that guarantee the rights and duties of citizens. The law also established the responsibility to municipalities in relation to the environmental field.

The municipality has an obligation to solve problems within your geographical area, ie localized issues. The increased responsibilities brought as a consequence the increase in spending, but there was no proportionate increase in public revenues to municipalities (LIMA, 2003). In an attempt to they liven up this problem, municipalities had to invest in new strategies to perform, effectively, the current public policies (CALDERAN, 2013). Therefore, partnerships between municipalities that had the same problems or demands in common became a solution.

These partnerships between municipalities happen most often when the municipalities have common problems between neighboring cities beyond territorial border (LIMA, 2003). When the partnership is carried out in a formal way, it is called public consortium and, when the partnership occurs exclusively with municipalities, is called inter-municipal public consortium. Cruz (2002) defines intermunicipal consortium as the agreement between municipalities for the implementation of the demands of society through the use of resources generated by the municipalities that compose it.

Only in 1995, the public consortium was approved as a constitutional menu and has been recognized as a public service provider (RIBEIRO, 2007). Public consortium have become part of the public administration and constitute an organizational arrangement of public administration.

The inter-organizational arrangements seek to contribute to the consortium members to perform tasks that would not be possible to carry out alone. Lima (2003) explains that the aim of the consortium is to solve problems that meet all partners and at the same

time reduce the use of resources. The Law 11,107/ 2005 established the constitutional limits of public consortium.

Carvalho (2007) observed the Intermunicipal Consortium Basin Jiquiriçá-BA, in order to verify that the consortium acts as a tool to reduce environmental impacts. The author found that the consortium could only achieve the goals because the municipalities acted in a committed way and showed confidence among themselves to carry out the actions.

The Municipal Consortium Eastern Fluminense was studied by Prado (2011), which studied cities face the environmental impacts caused by the Petrochemical Complex of Rio de Janeiro and do not have enough resources to take actions. The author found that the consortium enabled more resources and strength to combat environmental impacts. Azevedo (2012) conducted a study in the Consortium Project Viva the Broa, located in the State of São Paulo, which aimed to protect and conserve the environment of the region. The author showed that the consortium as a management tool helped municipalities to protect and develop tourism in the region.

Research method

3.1. Characterization of the research and data sources

This study has the specificity to identify the activities of the consortium on the environment, using the municipal environmental spending. The data collected are secondary, available and free access. For the research, various data were collected from various sources.

Environmental spending values and total expenditure of municipalities were collected in the Brazilian National Treasury Secretariat (STN). The identification of the municipalities in the southern State of Brazil participating in the public consortium and municipality size they were collected on the site of the Brazilian Institute of Geography and Statistics (IBGE), in MUNIC - Research municipal basic information.

3.2 Sample

Collins and Hussey (2005) explain that the unit of analysis is the study investigator border and can be an individual, a group of individuals, a city, a State or a country. The unit of analysis of this study are the municipalities of Southern Brazil (Paraná, Santa Catarina and Rio Grande do Sul), with 1190 municipalities. Some municipalities have environmental problems beyond its territorial boundaries, and this becomes the problem of neighboring municipalities. As a solution, the municipalities have created municipal consortium. In Brazil, there are sixty-eight consortium environment (exclusive or not), of which five are in the State of Paraná, three in the State of Santa Catarina and twelve in the State of Rio Grande do Sul.

These twenty consortium cover a total of 308 municipalities: 64 municipalities in the State of Paraná, 41 in the State of Santa Catarina and 203 in the State of Rio Grande do Sul.

3.3 Selection of the cities: treating the sample

The sample comprises the municipalities of the southern States of Brazil. Data were collected for the period 2012 to 2016. The timeline is justified due to the disclosure of available information for some variables of which there was no previous information to 2012.

To constitute the sample, we selected data from 1,190 municipalities of the three southern States of Brazil. After calculating the dependent variable, municipalities with missing data were excluded. The sample ended at 395, 389, 369, 395 and 372 municipalities for the years 2012, 2013, 2014, 2015 and 2016, respectively, in the localities of the State; to the State of Santa Catarina to the sample years were respectively: 293, 292, 251, 292 and 280; to Rio Grande do Sul the sample was: 493, 493, 452, 491 and 493. This totaled 5,754 observations.

In this sample municipalities have not been categorized by size, income, population, or any other variable that might secretes them, this procedure has also been used by other authors as Lombard and Lester (1990); Newmark and Witko (2007); Ercolano and Romano (2017); D'Grape (2017).

3.4 Econometric procedures

Because it is an empirical question, to see if joining the consortium impacted the environmental costs, the constant conceptual variables were used in Table 1 that had data for its operation, culminating in the following econometric model:

$$
\begin{aligned}
Environmental\ Expenditure \\
= \beta_0 + \beta_1 D.Consortium_{it} + \beta_2 Total\ Expenses_{it} + \beta_3 Total\ Receipts_{it} \\
+ \Sigma\beta_j Control_j + \mu_{it}
\end{aligned}
$$

Where:

$Environmental\ Expenditure = Environmental\ Expenditure = $ expenses incurred in the municipality in environmental management expenditure function for the municipality i;

$D.Consortium_{it} = D.Consortium_{it} = dummy$ assuming value of 1 (one) for municipalities with environmental public consortium and 0 (zero) otherwise;

$Total\ Expenses_{it} = Total\ Expenses_{it} = $ sum of expenditure implemented for the municipality i;

$Total\ Receipts_{it} = Total\ Receipts_{it} = $ sum of revenue executed for the municipality i;

$Control'_i\ (Density_{it}) = Control'_i\ (Density_{it}) = $ relationship between the population and the surface of the territory for the municipality i;

$Control''_{it}\ (Extension_{it}) = Control''_{it}\ (Extension_{it}) = $ spatial size of the district i measured per square kilometer (km square);

$\beta_0 = \beta_0 = $ constant;

$\beta_1; \beta_2; \beta_3; \beta_j = \beta_1; \beta_2; \beta_3; \beta_j =$ angular coefficients calculated in the model estimation;

$\mu_1 = \mu_1 =$ Robust error of the regression technique by White (1980).

The coefficients were estimated by White technique (1980) for restraining Heterocedasticity problem.

4. Analysis of results

4.1 Univariate analysis

Table 1 shows the descriptive statistics of the variables.

Table 1 - Descriptive statistics of the variables used in econometric models

Environmental expenditure	2012	2013	2014	2015	2016
Average	923.673	959.789	1107.706	1362.289	1384.714
Desv.pad	4282.283	4760.537	5781.652	7073.337	5973.885
Minimum	0.001	0.001	0.001	0.001	0.001
Maximum	67640.214	80042.604	118,593.934	158,713.449	105,800.509
Total expenses	**2012**	**2013**	**2014**	**2015**	**2016**
Average	63218.444	65608.865	75941.123	81461.122	88401.258
Desv.pad	247,730.072	273,759.254	305,262.728	310,707.260	332,049.877
Minimum	7040.754	7105.298	7779.552	8654.705	9301.481
Maximum	5,115,609.914	5,804,296.014	6,422,553.199	6,272,670.397	6,528,700.018
Total receipts	**2012**	**2013**	**2014**	**2015**	**2016**
Average	67270.306	72646.744	83773.332	88482.564	97528.104
Desv.pad	275,309.407	278,934.870	316,449.054	331,507.657	359,258.509
Minimum	6724.425	3413.280	617.854	10353.741	6388.383
Maximum	5,911,551.022	5838159	6,346,677.306	6,765,667.613	7,403,483.459
Density	**2012**	**2013**	**2014**	**2015**	**2016**
Average	69.88	98.98	100.03	99.95	100.82
Desv.pad	314.09	323.51	326.67	326.41	329.15
Minimum	1.57	1.62	1.61	1.61	1.60
Maximum	4084.17	4250.10	4285.66	4285.66	4320.00
Extension	**2012**	**2013**	**2014**	**2015**	**2016**
Average	536.16	536.16	536.16	536.16	536.16
Desv.pad	757.87	757.87	757.87	757.87	757.87
Minimum	27.68	27.68	27.68	27.68	27.68
Maximum	7803.95	7803.95	7803.95	7803.95	7803.95
Population	**2012**	**2013**	**2014**	**2015**	**2016**
Average	28939.93	30047.44	30327.53	30291.45	30506.25
Des.pad	92618.62	96296.86	97207.70	97058.58	97746.27
Minimum	1232	1278	1286	1286	1293
Maximum	1776761	1848946	1864416	1864416	1879355

Note: Environmental spending = expenses incurred in the municipality in environmental management expenditure function for the municipality Total expenses = sum of expenditure implemented for the municipality; Total receipts = sum of revenue executed for the municipality; Density = relationship between the population and the surface of the territory for the municipality i; spatial size of the district i measured per square kilometer (km square); Population = residential population of the municipality.
Source: Research data.

In Table 1, you can see that environmental expenses recorded a small increase in the average, however the maximum value had decreased in the last year analyzed. The other variables showed an increase in average over the years and this increase is repeated a maximum value even in the total revenue, which shows that the environmental spending did not follow the changes in revenue. In view of this requirement, it appears that the average environmental costs and total expenses for all analyzed cities are statistically different over the years. As expected, the density and the extension had similar mean values during the study period.

In unreported statistics, there was a lack of normality of variables. Based on the analysis of the extreme values listed in Table 2, it appears that the presence of outliers contributed to the lack of univariate normal. However, by the will of the researchers, it was decided to keep the municipalities with outliers, given its relevance to the search. Thus, the results should be interpreted in the sample analyzed.

Table 2 presents the correlation of variables.

Table 2 - Pearson correlation matrix

	Environmental spending	D.Consortium	Total expenses	Density	Extension	Total receipts
Environmental spending	1.0000					
Consortium	0.048665 *	1.0000				
TotalExpenses	0.833191 ***	0.038202 *	1.0000			
Density	0.548607 ***	0.097634 **	0.649493 *	1.0000		
Extension	0.063469 **	0.039452 *	0.081337 *	-0.09368	1.0000	
Total receipts	0.830911 ***	0.039423 *	0.994423 *	0.64965 *	0.082548 *	1,00,000

Note: *, ** and *** significant at 10%, 5% and 1%, respectively. Environmental spending = expenses incurred in the municipality in environmental management expenditure function for the municipality Total expenses = sum of expenditure implemented for the municipality; Total receipts = sum of revenue executed for the municipality; Density = relationship between the population and the surface of the territory for the municipality i; spatial size of the district i measured per square kilometer (km square); Population = residential population of the municipality.
Source: Research data.

Based on the Pearson correlation identifies a statistically positive relationship between the model independent variables and the dependent variable. All correlations were positive presented except density correlation with the extension whose correlation was negative, which was expected, because when the lower most municipal area density.

Strong correlations were identified between environmental spending and the total expenditure of variables (0.83) and total revenue (0.83), ie, when higher the total expenditure, the greater the environmental spent the same applies to income overall, the more revenue the municipality receives the greater the environmental expenditure.

To confirm the causal relationship, econometric models were estimated with the stacked data Pooled OLS technique. Furthermore, in order to verify multicolinearity the estimations are presented the values for the FIV test (Inflation of variance).

4.2 Multivariate analysis

Table 3 shows the estimation results of the model are presented to the main sample, with the dependent variable weighted environmental costs:

Table 3 - Estimated environmental costs for all Paraná municipalities

$$Environmental\ Expenditure_i = \beta_0 + \beta_1 D.Consortium_i + \beta_2 Total\ Expenses_i + \beta_2 Total\ receipts_i + \Sigma\beta_j Control_j + \mu_i$$

	Coefficient	Error	t	P-value
D.Consortium + Total Expenses	19.64	102800	1.92	0.054 **
+ Total Receipts	0.011	0.0015	7.83	5,807
+	0.003	0.0014	2,631	0.008 ***
Density +	148.369	196.673	0.754	0.450
Extension +	-30.315	64.514	-0.469	0.638
Constant	-110,043.67	-1.64	-1.64	0.100
Adjusted R²	69.47%			
Comments	4392			

Note: *, ** and *** significant at 10%, 5% and 1%, respectively. The superscripts (+) represent the signals expected from the ratio of the independent variable and the dependent variable. Environmental spending = expenses incurred in the municipality in environmental management expenditure function for the municipality Total expenses = sum of expenditure implemented for the municipality; Total receipts = sum of revenue executed for the municipality; Density = relationship between the population and the surface of the territory for the municipality i; spatial size of the district i measured per square kilometer (km square); Population = residential population of the municipality.
Source: Research data.

It is observed in Table 3 that the adhesion to the municipal consortium is decisive for the environmental costs (D.Consortium: coefficient = 19.64, p-value = 0.054). This relationship indicates that consortium municipalities tend to have higher values of environmental expenditures.

The weighted total expenditure (Total Expenses: coefficient = 0.011 p-value = 5.807) were not statistically positive relationship with environmental spending. Thus, municipalities with higher values for the weighted total expenditure not necessarily have higher environmental expenses.

Total revenues (Total receipts: coefficient = 0.003 p-value = 0.008) showed a statistically positive relationship with environmental spending. Thus, municipalities with higher values for total revenues necessarily have higher environmental expenses.

The first control variable tested, density, and showed no statistically positive relationship with environmental costs (= 148.369 coefficient p-value = 0.45). Thus, the higher the ratio of housing population and land area, not necessarily the environmental expenditure of municipalities presents greater.

Overall, the results demonstrated that the environmental costs are positively impacted by the adherence to environmental public consortium and an increase in en-

vironmental revenues of municipalities. It highlights the relevance of the consortium's membership, given the estimated value of its coefficient. Moreover, the model (i) the insertion of additional variable is not sensitive; o (ii) it is robust to the presence of heterocedasticity; and (iii) meets the assumptions of multicollinearity (VIF test statistics less than 5).

4.3 Discussion of the results

This research, as presented in Table 1 shows that the average environmental expenditures continued swings. In 2016, spending by municipalities exceeded the value of one billion two hundred million, which represents an increase of 32% over the amount spent in 2012.

Follow the evolution of the absolute values and identify that there was an increase in environmental spending does not mean that there was a major concern of public officials to the environment. After all, the increase in total expenditure of the municipality does not mean that environmental expenditure has increased because both have asymmetric behavior, because according to Dutra, Oliveira and Prado (2006) and Lemos, Young and Geluda (2005) environmental expenses not are priorities in public administration. There was an evolution of the percentage of environmental expenditures of the southern municipalities in relation to total spending and it was found that there was an increase in the percentage of environmental expense for municipalities where, in 2012, the index was 1.46% in 2016, the last reporting period, the percentage was 1.57%. This means that the environment in the southern municipalities, It has gained ground and representation in the decisions of public officials. Such a development had already been observed by Bueno (2013) in another period only in the State of Paraná.

This paper aims to identify the presence of environmental public consortium is a determinant for environmental spending. Based on Table 3, the coefficients for the variable consortium was 19.64 and the p-value was 0.054, it is understood that the public consortium of the environment in the southern States of Brazil is considered a determinant for environmental spending.

These results were similar to that found in the study by Broietti et al. (2017) when it was found that the public consortium impacts on environmental expenditure of the municipality. The results also reinforce what Lester and Lombard (1990) stated: intergovernmental relations are a determinant of environmental expenditure.

In order to get more evidence on the influence of consortium in environmental spending, there was an analysis of the mean percentage of environmental spending in relation to individual total expenditure of all partners of the municipalities analyzed States. It was found that some municipalities showed results well above the State average. Table 4 shows the expenses and the ranking of cities with the best averages.

Table 4 - Ranking of municipalities with higher expenses

Position	County	Consortium	Expenses (%)
1st	Terra Roxa - PR	CORIPA	4,86%
2nd	São Marcos - RS	CISGA	4,67%
3rd	Agudo - RS	CIRC	4,44%
4th	Campo Bom - RS	Pró-Sinos	4,32%
5th	Novo Hamburgo - RS	Pró-Sinos	4,08%
6th	Irati - PR	COPATI	3,94%
7th	Estância Velha - RS	Pró-Sinos	3,86%
8th	Vargem - SC	CISAM	3,72%
9th	Glorinha - RS	Pró-Sinos	3,65%
10th	Diamante do Norte - PR	COMAFEM	3,50%

Source: Research Data

In these municipalities above have not found any serious timely environmental problem (disasters) in the period analyzed in this way, there is the municipality of Terra Rossa, located in the State of Paraná, had the highest average environmental expense for between consortium municipalities, 4.86%. This city belongs to Coripa consortium. All top ten municipalities classified consortium were far more average than the general average of the analyzed municipalities (1.57%).

The consortium that presented the greatest number of municipalities in the list of best cities was the Consortium Pro-bells, the consortium is made up of 28 municipalities located in the basin of the Rio dos Sinos, was founded in 2007 after an environmental tragedy in the city of Old resort, the consortium's headquarters is in the city of Esteio, this consortium performs actions in the environmental and sanitation.

Another variable considered crucial for environmental spending identified in this study using univariate and multivariate analysis, in addition to variable environmental having consortium in the municipality was the variable total revenue. In this study, it was found that the higher the income of the municipality, the greater the environmental spending, this variable had previously been identified by Lester and Lombard (1990) as a determinant for environmental spending.

With regard to spending by sub-functions that make up the 18 Environmental Management function of the southern municipalities it was found that between the years 2012 and 2016, 52% of expenditure was allocated to Sub Preservation and Conservation, and the Sub Environmental Control has allocated 20% of environmental expenditure. In the analyzed period the function with the highest growth was the Preservation and Conservation with 11% increase since the sub-function "Other sub" that is not in the Ordinance 42/1999, but is used by municipalities when the expense is not included in any other subfunction described, this subfunction environmental management decreased 18% during the study period.

Final considerations

The objective of this research was to analyze the impact of the involvement of environmental public consortium regarding the performance of the environmental costs of syndicated municipalities in the southern State of Brazil, between 2012 and 2016. The environmental public expenditure is an important indicator to track how public managers are concern for the environment. According to Lester and Lombard (1990), the higher the environmental spent on total expenditure of the government entity, the greater the concern of this with the environment.

Understand what are the reasons why public bodies to invest in the environment becomes important. By knowing and measuring these variables it is possible to take actions so that these percentages increase, or even be treated more efficiently. Likewise, it is possible to identify those municipalities that have more significant values, and based on the results, one can determine the point.

International studies have raised a number of determinants that can influence spending. Lombard and Lester (1990), Stanton and Whitehead (1994), Konisky and Woods (2012) identified interorganizational relations that can influence spending. An example of these relationships can be identified by the consortium. Thus, this research has contributed to identifying how public consortium environment in municipalities in southern Brazil influenced the environmental costs of syndicated municipalities between 2012 and 2016.

In the States of southern Brazil have been identified twenty environmental consortium composed of 308 municipalities. The analyzes showed that the public consortium as an independent variable can be a determining factor in changing environmental spending. The empirical data showed that it was consortium showed a decisive contributing to improved performance of the municipalities in the environmental spent on the total expenditure. Total revenue also proved to be important for the variation of the environmental expenditure of municipalities.

It was observed that some municipalities consortium presented results of the percentage of environmental expenditures in relation to total expenditure far above the general average. This was the case of the Terra Rossa municipality, which came close to the percentage of 5% of environmental investment expenditure in the total expenditure.

As a research limitation, the study was conducted in only one region of Brazil. In this case, this result cannot be generalized to other regions. Also, the study was limited to analysis of collected quantitative data, providing notes by this method to other more specific studies using the qualitative method. Future studies may use the same model of this research to analyze the performance of environmental public consortiums in Brazil, as in Brazil for 68 consortium.

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THE IMPACT OF PUBLIC CONSORTIUM IN ENVIRONMENTAL SPENDING FROM MUNICIPALITIES IN SOUTHERN BRAZIL

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THE IMPACT OF PUBLIC CONSORTIUM IN ENVIRONMENTAL SPENDING FROM MUNICIPALITIES IN SOUTHERN BRAZIL

Abstract: Environmental preservation is a State responsibility, and the State use public resources. Control and understand how and what impact the environmental spending is important to check the performance and concerns of public managers with the environment. This study aims to determine the influence of the participation of environmental public consortium located in the south of Brazil in environmental expenditures of the municipalities between 2012 and 2016. The research method is based on a multivariate model with pooled data, applying Pooled Ordinary Least Squares. The results show that in this region there twenty consortium, made up of 308 municipalities. It was found that the consortium have positive and statistically significant influence on environmental spending.

Key words: public consortium; environmental expenditure; Southern Brazil.

O IMPACTO DOS CONSÓRCIOS PÚBLICOS NO GASTO AMBIENTAL NOS MUNICÍPIOS DO SUL DO BRASIL

Resumo: A preservação ambiental é de responsabilidade do Estado, este utiliza-se de recursos públicos para fazê-lo. Controlar e entender como e o que impacta o gasto ambiental é importante para verificar o desempenho e a preocupação dos gestores públicos com meio ambiente. Esse estudo procurou verificar a influência da participação dos consórcios públicos ambientais localizado no sul do Brasil nos gastos ambientais dos municípios, entre 2012 e 2016. O método de pesquisa baseia-se em um modelo multivariado com dados empilhados, pela técnica Pooled OLS. Os resultados apontam que há nessa região vinte consórcios, constituídos por 308 municípios. Verificou-se que os consórcios apresentam influência

positiva e estatisticamente significante nos gastos ambientais. Assim, o estudo contribui para constatar que as relações interorganizacionais influenciam nos gastos ambientais.

EL IMPACTO DE LOS CONSORCIOS PÚBLICOS EN EL GASTO AMBIENTAL EN LOS MUNICIPIOS DEL SUR DE BRASIL

Resumen: La preservación ambiental es responsabilidad del Estado, y éste se utiliza de recursos públicos para hacerlo. Controlar y entender cómo y qué impacta el gasto ambiental es importante para verificar el desempeño y la preocupación de los gestores públicos con el medio ambiente. Este estudio buscó verificar la influencia de la participación de los consorcios públicos ambientales ubicados en el sur de Brasil en los gastos ambientales de los municipios entre 2012 y 2016. El método de investigación se basa en un modelo multivariado con datos apilados por la técnica agrupada OLS. Los resultados apuntan que hay en esa región veinte consorcios, constituidos por 308 municipios. Se verificó que los consorcios presentan una influencia positiva y estadísticamente significativa en los gastos ambientales. Así, el estudio contribuye a constatar que las relaciones interorganizacionales influyen en los gastos ambientales.