What if Royalties run out and how Oil-Producing Municipalities are preparing for it – The case of Brazilian Oil Route

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Abstract

We investigated the impact of Oil-related Revenues on the local economy of producing municipalities in the Oil-producing Region of the State of Rio de Janeiro. We analysed the effects of Oil Revenues on quantitative variables such as GDP and jobs creation. We also investigated the effects of Oil Income on the Index of Development of Basic Education. With these observations, we demonstrate how the extinction of Oil Revenues would affect the local economy and living standards. We also analyse objectively initiatives that have been implemented to reduce the dependence of the Municipal Budget in relation to Oil revenues. We investigated the correlation between the variables Budget Dependence and Public Investments. We demonstrated that in most cases the poor quality of these investments prove the lack of efficiency and effectiveness in the use of the public budget. Finally, we demonstrate empirically that most municipalities in Oil-Producing Region of the Brazilian Oil Route are not prepared, or preparing for an extinguishment of Oil Revenues and have a high dependence on Oil Income.

Keywords: Oil Revenues, Local Economy, Public Budget, Oil Route.

1 Introduction

Fundamental changes in the context of economic regulation occurred in August 1997, when it was sanctioned by President of the Federative Republic of Brazil, Fernando Henrique Cardoso, the Ordinary Law No. 9,478, also called the Petroleum Act. Among other changes, the Petroleum Act established the end of state monopoly over all activities related to the extraction, production, refining and transportation of petroleum and its derivatives in Brazil, activities that had so far remained exclusively in possession of the State-owned Company Petrobras, as ratified by Law 2004 of 1953. However, it was not only to the opening of the oil market that the Petroleum Act was restricted, having converged to establishing guidelines for the sharing of royalties arising from all oil activities, which were regulated later by Presidential Decree No. 2705 in August of 1998. This decree presented the following definition for royalties:

Art 11. The royalties referred to in item II of art. 45 of Law No. 9478, 1997, constitutes the financial compensation by the dealers of exploration and production of oil or natural gas, and will be paid monthly, related to each field, from the month in which the date of commencement of production happens, prohibited any deductions.

Therefore, it is relevant noting that the legal treatment given to royalties, within Brazilian constitutional limits, is financial compensation. The same expression can be found in Article 20, section IX of the Federal Constitution of Brazil:

§ 1 – It is guaranteed under the law, to the States, to the Federal District and to the Municipalities, as well as to the organs of Direct Administration of the Union, participation in the result of the exploration of oil or natural gas, water resources for generating energy and other mineral resources on their territory, continental shelf, territorial sea or exclusive economic zone or financial compensation for this exploration".

According to Costa, of the number of legal grounds available, among them the aforementioned, one can observe that the "financial compensation constitutionally provided contains an indemnity nature. Although the ownership of mineral resources, including those from the subsoil, belong to the Union (art. 20, IX), the Highest Law presupposes an injury to the person in whose territory the exploration is given." In this concept of compensation, not only royalties are placed, but also the Special Participations, paid quarterly to the oil-producing municipalities.

Despite its legal nature, Oil-related revenues still lack legal device able to specifically define the areas in which they must be applied. According to Senator Cristovam Buarque, since 1997, with the sanction of Petroleum Act, there was no legal determination regarding where resources should be applied. The applications of royalties and other Oil-related revenues were then subjected to "the flavour of the discretionary use of managers." This lack of legal provisions coupled with the lack of technical public administrators lead to a scenario of contradictions between the amount of revenues destined to state entities, especially municipalities, and the level of development and quality of life of its citizens.

Emerges, therefore, the low managerial competence of public officials, who, facing the prospects of growth in current revenue due to oil activity, usually build robust spending structures at the cost of public administration, not taking into account the imminent risks to the society in future periods, and promoting a vicious dependency of the public budget in relation to the Oil Revenues. The result of this process is a perceived irresponsibility in the understanding of the origin of Oil Revenues, whose very existence is limited to both the renewal capacity of the natural resource itself, since oil is a non-renewable natural resource, and to the national political debate, mainly that around the Ibsen Pinheiro Amendment, which proposes changing the sharing of royalties and Special Participations, drastically reducing the amount of Oil Revenues allocated to producing municipalities.

Given these observations, the concern with the end of Oil Revenues becomes completely legitimate, since the question at issue is not "if it will happen" but "when it will happen". And in such a situation, it is still important to investigate "how it will happen".

The search for answers to these related questions, all of them linked to the concept f Economic Sustainability, is the motivating factor of this work, that investigates the correlation between Oil Revenues and variables related to economic development, jobs creation, education and GDP, to indicate the present and future situation in case of presence or absence of Oil Revenues. We also carried out an analysis of the dependence of the Public Budget in relation to Oil Revenues, followed by an investigation of the correlation between the variables "Budget Dependence" and "Investments Liquidated". Basing on this approach, we sought to investigate whether the budget management has been effective and efficient in the use of public resources so that the State Agency is better prepared for a possible sharp depreciation or even extinction of Oil Revenues.

To achieve the goals proposed, this paper presents this Introduction in the Chapter 1, the Literature Review in Chapter 2, the Characterization of the Unit of Analysis in Chapter 3, the Empirical Strategy in Chapter 4, the Analysis of the Results in Chapter 5 and Final Considerations in Chapter 6, followed by References.

2 Literature Review

The definitions of the rules regulating the payment of royalties from oil production in Brazil have their origin in October of 1953 with the Law no. 2004 that created Petrobras. According to Schechtman (2000), at this time it was established that 4% of the onshore production earnings from Oil exploration would be allocated to the states, while 1% would be for the municipalities in whose territory the production of oil and natural gas is carried out.

The author also presents the ramifications of this law, indicating the Law No. 7453 of December 27th, 1985, which also considered subject to royalties, at the same percentage of 5%, oil and natural gas extracted from the continental shelf, of which 1.5% are directed to the States bordering on with the producing wells,

1.5% to the municipalities also bordering on with the producing wells and their geo-economic areas, 1% to the Ministry of the Navy, in order to meet the requirements of inspection and protection of economic activities in the producing marine areas, and 1% consist of a Special Fund distributed among all the States and Municipalities of the Federation.

Subsequently, the Law no. 7.990, of December 28th, 1989, changed the distribution, to include as beneficiaries of the royalties the municipalities where the facilities for loading or unloading of oil or natural gas were located. This law was regulated by Decree 01 of 1991.

Finally the Petroleum Act, besides increasing to 10% the basic rate of royalties, kept the criteria for distribution to states, municipalities and ministries to 5% and introduced a new form of distribution for the surplus portion of the royalties. It is thus, according to the authors reports, that the Petroleum Act nearly doubled the Oil Revenue by increasing the basic rate of royalty, in addition to establishing the Ministry of Science and Technology as the recipient of 25% of the royalties in excess of 5%, making clear the policy of promoting science and technology through Oil-related profits.

Conceptually, as commented before, royalties are a financial compensation paid by the utilities that produce oil or natural gas. Its calculation is done monthly and is at the responsibility of the National Agency of Petroleum ANP, in accordance with Law No. 9.478/97, depending on market prices for oil, *in natura* or condensate gas, product specifications and location of the field.

The Special Participations, however, are a special kind of financial compensation payable by Companies of exploration and production of oil and natural gas in cases of a high-volume production or high profitability. They are applied on the gross production, deducted royalties, exploration investments, operating costs, depreciation and taxes under the laws in force. These have counting and distribution placed every three months, and in the case of states and municipalities in which the production occurs, are distributed, respectively, in a proportion of 40% and 10% (Pinto, 2002).

Hence, for the effects of this work, when we use the term "Oil Revenues", or more accurately, "Oil-Related revenues", we express a variable that comprehends both and exclusively Royalties and Special Participations.

On the question, the Court of the State Auditors – State of Rio de Janeiro claims in its reports that such revenue is extremely important because the significant and steady growth of the amount granted by the National Treasury has been promoting the improvement of financial situation of the State and of a significant portion of its Municipalities. In addition to the positive tax impact arising from royalties and special participation, the state also has benefited from massive investments from the oil industry, resulting from the increase in production and in reserves identification. It is noteworthy that the future rights related to government participation in the exploration of oil and natural gas were the main factor for the success of debt renegotiation with the Union, and also for the capitalization of the Unified Social Security Fund of the State of Rio Janeiro - RIOPREVIDÊNCIA.

Checking the trajectory of evolution of the royalty revenues in oil-producing municipalities, the Tribunal's statements of accounting are ratified. However, the outcomes of these applications, in qualitative terms, are incompatible, since elements of a proper effective budget execution are not observed. The level of investment is low and, consequently, the cost structure is extremely high. Added to this are the strong dependence of the Budget of these municipalities on Oil Revenues and the lack of investment in social and economic infrastructure.

Based on data from the Court of the State Auditors, the main oil-producing municipalities of the Rio de Janeiro State presented the following rates of investment in 2011, during the period from January to October: Campos dos Goytacazes 18.68%, 5.14% Macae, Rio das Ostras 11.77% and São João da Barra 1.32%. Considering the period from January to August: Cabo Frio and Quissamã 6.05% and 2.85%.

The picture of the degree of dependence on Oil-Revenues is primarily worrying. Campos dos Goytacazes displays a level of dependence at 85.60%, Macae 60,75%, Cabo Frio 78.97%, Quissamã 92,89%; Rio das Ostras 74.64% and São João da Barra 89.73%. Data also from 2011.

Ribeiro and Nogueira (2011) oriented toward a different view, unfortunately, still far from the practices identified in the public sector management. According to the authors, in the context of the local economy, as an autonomous institutional political space, the expectation of productive and social actors is that the government may have a power of intervention capable of inhibiting the failures of the market, creating favourable conditions internally, from the management of public budget. Thus, actions such as attracting companies and the consequent increase in employment and income are key elements and expected by the local society.

On the other hand, historically these spaces coexist with economic systems composed of small and medium business, which present difficulties in obtaining financial resources and fragility in the context of innovation and business management. In addition, there is a marked informal activity that is inhibitory of employment and the social protections it brings along.

Because this framework does not allow the structure of its own revenues to be more robust, these spaces have a strong dependence on the institutional transfer for the composition of the municipal revenue streams. The same management problems observed in small businesses, are also observed in the public sphere.

Regarding the first situation, stands the unpreparedness of management of the consisting business owners, since it is in the very nature of entrepreneurship by necessity, the condition of low education. These entrepreneurs usually acquire a working knowledge on a specific business field and start a company at a time of unemployment or from the formation of savings that will permit the beginning of the project. In this case, it is clear that even the company with a good product or good service, has no guarantee of success in market competition. Hence the high rate of death of new companies in this type of socioeconomic environment.

Concerning the second situation, stands the low managerial skills of public managers, who, facing the prospects of growth in current revenue, often build robust spending on structures cost of public administration, not taking into account the imminent risks for society in future periods. The low investment pattern observed in these spaces materialize this condition, since a substantial part of the budget is used in practices of patronage and other strategies needed to maintain political power. We have observed a strong division between the political practices and techniques in the public sector, which reflects the deepening of poverty, even in recipients of growing volumes of budget revenues. A paradox that needs to be better understood.

3 Unit of Analysis

The concept of "Oil Route" still lacks reference in the literature. It commonly appears in commercials, such as the Venture Campos Supreme Hospitality, and the propaganda of the Trip Airlines, on the occasion of the inauguration of the section covering the municipalities of Campos dos Goytacazes and Macaé. At a first moment, one can say that it is related to a common sense of citizens of the State of Rio de Janeiro and Brazil in respect of a geo-economic region not well defined, but which includes municipalities with high levels of oil production and, therefore, consequently recipients of large inflows of Oil Revenues. This work stands among the first academic attempts, if not the first, to define this territory, which constitute our unit of analysis. For this purpose, we used the following criteria:

- That the municipality is member of the State of Rio de Janeiro;
- That the municipality participate in the Organization of Petroleum Exporting Municipalities;
- That Oil-Related Revenues Represent a large amount of Total Current Revenues;
- That there is sufficient consensus in the literature regarding the municipalities' importance.

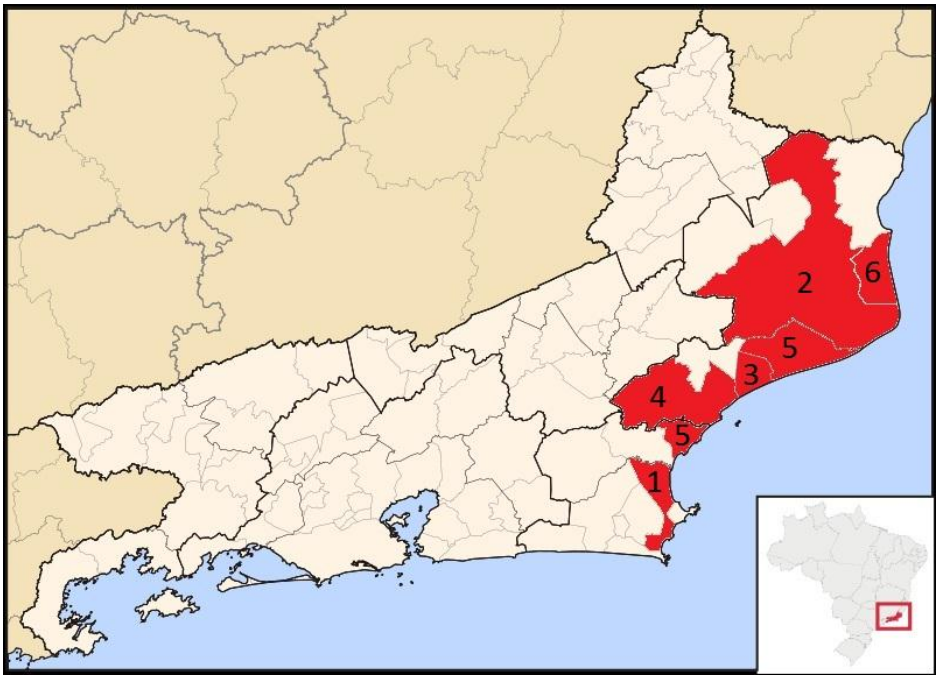
Previous attempts to define this Region in literature were made by Miranda (2010), selecting Cabo Frio, Campos dos Goytacazes, Macaé, Quissamã and Rio das Ostras as the main cities, recipients of large

amount of Oil-Revenues. The author claims that these are the municipalities considered rich in Oil and Gas, all of them being part of the Campos Basin.

In this work, according to the parameters imposed, the municipalities selected were represented in the following table, which informs a set of basic data regarding their economic situation:

Municipalities	Population	GDP	Total Revenues	Oil Revenues (Royalties + Special Participations)
Cabo Frio	186.227	R$ 4.596.004.000,00	R$ 372.411.302,10	R$ 133.778.273,24
Campos dos Goytacazes	463.731	R$ 19.501.276.000,00	R$ 1.394.402.189,20	R$ 938.458.487,36
Carapebus	13.359	R$ 300.380.000,00	R$ 52.230.270,10	R$ 22.745.005,61
Macaé	206.728	R$ 7.057.282.000,00	R$ 1.086.210.900,00	R$ 365.247.504,11
Quissamã	20.242	R$ 1.810.872,000,00	R$ 168.521.228,60	R$ 90.926.791,95
Rio das Ostras	105.676	R$ 4.480.099.000,00	R$ 388.925.700,00	R$ 252.223.801,18
São João da Barra	32.747	R$ 2.039.370.000,00	R$ 214.412.167,00	R$ 168.329.125,44

Source: IBGE and TCE-RJ (2009).



1 – Cabo Frio
2 – Campos dos Goytacazes
3 – Carapebus
4 – Quissamã
5 – Rio das Ostras
6 – São João da Barra

Figure 1: Oil Route. Source: Produced by the authors.

4 Empirical Strategy

The main objective of this paper is to analyse the use of oil revenues by public managers in the municipalities that comprise our research unit. This analysis is performed in two stages.

In the first stage we sought to ascertain the impact of oil revenues on the local economy, for which we used for the following model:

$$Y_t = \alpha + \beta R_t + \varepsilon_t$$

Where R represents Oil-Related Revenues at year *t*, Y represents some observable results, such as GDP, Value Added, Jobs Creation, Slow-way Deposits and the Index of Development of Basic Education. Epsilon represents the effects of unobservable variables on Y.

This approach has similarities with the ones adopted by Michaels and Caselli (2009), but it differs from the aspect that our analysis focuses on the specific situation of each municipality, being thus the reason we avoided the Panel Data Analysis.

In the second stage, we unhurried the weight of Oil-Related Revenues on the total current Revenues measuring a new variable called "Budget Dependence". Then we made an analysis of correlation between "Budget Dependence" and "Public Investments". We believe this is consistent with the affirmation that if the Revenues are being used efficiently and effectively, "Budget Dependence" must decay through time. For this analysis we used the following model:

$$D_{t+1} = \theta + \delta I_t + u_t$$

Where I represents the amount of investment of the municipality in year *t* and D represents the variable "Budget Dependence" at year *t* plus one. This strategy was adopted from the premise that investment in year *t* requires a certain lag, a time to result in any outcome that could have a budgetary impact.

From these results, a conclusion was made on the specific situation of each municipality.

All the analysis was made mainly over the period that goes from 2000 to 2010, using for our purpose the information regarding each year. All data was collected from National Petroleum Agency, Brazilian Institute for Geography and Statistics, Ministry of Education, Tribunal of State Auditors of the State of Rio de Janeiro, the Association of Oil-Producing Municipalities and the Ministry of Work.

5 Results

5.1 Synthesis of the statistical analysis

5.1.1 For the municipality of Cabo Frio

Variable	r	R^2
GDP	0,98	0,96
Value Added	0,98	0,96
Private Jobs Creation	-0,04	0,001
Slow way deposit	0,68	0,46
Basic Education Quality Index (First Years of Elementary School)	-0,29	0,08
Basic Education Quality Index (Latter Years of Elementary School)	0,11	0,01

Variables	r	R^2
Budget Dependence X Public Investment	0,65	0,42

5.1.2 For the municipality of Campos dos Goytacazes

Variable	r	R^2
GDP	0,98	0,96
Value Added	0,96	0,92

Private Jobs Creation	-0,12	0,01
Slow way deposit	0,68	0,46
Basic Education Quality Index (First Years of Elementary School)	0,20	0,04
Basic Education Quality Index (Latter Years of Elementary School)	0,70	0,49

Variables	r	R^2
Budget Dependence X Public Investment	0,59	0,34

5.1.3 For the municipality of Carapebus

Variable	r	R^2
GDP	0,93	0,86
Value Added	0,93	0,86
Private Jobs Creation	-0,18	0,03
Slow way deposit	0,68	0,46
Basic Education Quality Index (First Years of Elementary School)	0,87	0,75
Basic Education Quality Index (Latter Years of Elementary School)	0,63	0,39

Variables	r	R^2
Budget Dependence X Public Investment	-0,04	0,001

5.1.4 For the municipality of Macaé

Variable	r	R^2
GDP	0,91	0,82
Value Added	0,90	0,81
Private Jobs Creation	0,29	0,08
Slow way deposit	0,65	0,42
Basic Education Quality Index (First Years of Elementary School)	0,97	0,94
Basic Education Quality Index (Latter Years of Elementary School)	0,03	0,001

Variables	r	R^2
Budget Dependence X Public Investment	-0,22	0,04

5.1.5 For the municipality of Quissamã

Variable	r	R^2
GDP	0,97	0,94
Value Added	0,97	0,94
Private Jobs Creation	-0,11	0,01
Slow way deposit	0,59	0,34
Basic Education Quality Index (First Years of Elementary School)	0,76	0,57

Basic Education Quality Index (Latter Years of Elementary School)	0,35	0,12

Variables	r	R^2
Budget Dependence X Public Investment	-0,21	0,04

5.1.6 For the municipality of Rio das Ostras

Variable	r	R^2
GDP	0,95	O,90
Value Added	0,95	0,90
Private Jobs Creation	0,58	0,33
Slow way deposit	0,68	0,46
Basic Education Quality Index (First Years of Elementary School)	0,89	0,79
Basic Education Quality Index (Latter Years of Elementary School)	0,99	0,98

Variables	R	R^2
Budget Dependence X Public Investment	0,61	0,37

5.1.7 For the municipality of São João da Barra

Variable	R	R^2
GDP	0,97	0,94
Value Added	0,97	0,94
Private Jobs Creation	0,69	0,47
Slow way deposit	0,29	0,08
Basic Education Quality Index (First Years of Elementary School)	-0,29	0,08
Basic Education Quality Index (Latter Years of Elementary School)	0,11	0,01

Variables	R	R^2
Budget Dependence X Public Investment	0,63	0,39

5.2 Results of analysis by niche of concentration

5.2.1 The economic dependency

The hypothesis ($\rho = 0$) that there is no correlation between GDP, which is one of the main economic measures, and Oil-related Revenues was rejected for all the municipalities analysed. In fact, the Pearson correlation coefficient was shown above 0.90 for all municipalities, which indicates a strong correlation between the variables of Oil Revenue and GDP. A similar situation was found with respect to Value Added and Slow-Way Deposit, confirming the economic dependence of the Oil Route on Oil Revenue.

However, when the variables analysed were Oil Revenues and Private Jobs Creation, it was observed the opposite situation that leads to a paradox in Economics. The hypothesis (Ho: $\rho = 0$) of no correlation between the variables cited above was accepted, except for the municipality of São João da Barra,

confirming the lack of managerial capacity of the state to allocate resources in order to stimulate the economy.

The paradox situation observed is the existence of a strong correlation between main Economy measures, GDP and Value Added, and Oil Revenues, and at the same time, the lack of correlation between Oil Revenues and Private Jobs Creation. Simply, Royalties were influencing GDP growth and the economy in general, but not the generation of jobs, as assumes the Brazilian economic model, in which the state action in economy is considered and expected.

We believe that the reason for this paradox is explained by two factors. First, the variable "Jobs Creation" does not count government jobs. Second, there are other factors besides the level of employment that explain the influence of oil revenues on GDP, such as government spending. Caselli and Michaels (2009) sustain that in Brazilian Oil-Producing municipalities, it can be observed a large growth in the size of homes owned by public servants through the time, indicating that many times Oil-Revenues could have been used in practices of raising the government structure and patronage.

5.2.2 Regarding to basic education

The hypothesis (ρ= 0) that there is no correlation between the accumulation of Oil Revenues over the years and the Index of Development of Basic Education for the two phases of elementary school was accepted except for the municipality of Rio das Ostras. In fact, for the municipality of Rio das Ostras, the degree of correlation between the accumulated of Oil Revenues and the Index of Development of Basic Education was considered very strong for both phases of the elementary school, indicating a successful government policy on basic education.

For the municipalities of Campos Goytacazes, Cabo Frio, Carapebus and Quissamã, the correlation was accepted for only one of the two phases of elementary school, not meeting the objectives of this work, which aims to observe an influence of Oil Revenue on basic education that is more cyclical, not just occasional.

For the municipality of São João da Barra, the correlation between accumulation of Oil Revenues and the Index of Development of Basic Education was not observed for any of the two stages of elementary school.

5.2.3 The budgetary dependence and public investment

The null hypothesis of no existence of negative correlation (-ρ= 0) between the amount of liquidated investments and Budget Dependence was accepted for all municipalities.

According to the results, in none of the municipalities the government investments have contributed to a decrease in budget dependence on Oil Revenues. It can be stated that the Investments have not been effective, neither efficient.

6 Final Considerations

The substantial increase in Oil Revenues in the Public Budget of Oil-producing municipalities, according to Law no. 9.478/97 (Petroleum Act), which defines financial compensation paid by dealers to the municipalities in whose areas oil and natural gas are produced, has been a major factor of discussion in Brazil. Strong questions about the possible redistribution of Oil Income at one side face speeches of defence, in function of business risk, on the other side, feeding doubts about the importance and actual outcomes of Oil Revenues.

Analysing from the focus areas of this work, one can say that in a situation of immediate extinction of the revenues from oil, there would be a strong impact on economic dynamics, affecting the composition of GDP and Value Added. However, this impact would be small on Private Jobs Creation. From assumptions raised earlier, it can be stated that a greater impact would occur on the Public Employment and the level of government consumption.

Regarding living standards, this study sought to stick the level of education quality, which according to Blanchard(2011), is considered a good measure of the latent capacity of development of a region or country, as exposed in the case of the Asian Tigers. According to the statistical analysis, only the quality of education in the municipality of Rio das Ostras is influenced by the high volumes of Oil Revenues. Thus, in the case of a termination of this source of public funds, only education in the municipality of Rio das Ostras would be impacted.

As for investments implemented by municipalities, it was observed they are not fulfilling their key role in forcing the decrease of Budget Dependence. Since the Budget Dependence over Oil revenues in the cities studied is over 50%, we strongly support that in the case of the extinction of Oil Revenues, there would be a situation of "state bankruptcy" in all joint municipalities that comprise the Oil Route.

Conclusively, the end of the Oil Revenue would lead to a strong economic impact, but with little influence on Privates Jobs Creation, except in São João da Barra. However, as the municipality has strong influence of exogenous variables with the investments of the Industrial Complex of Açu and the correlation is considered moderate, it is possible that this influence would not be so marked. Effects on consumption of the Government would be imminent.

Finally, regarding the investments of the state and its influence over the reduction of dependence on Oil Revenues, we can infer that the municipalities of Cabo Frio, Campos dos Goytacazes, Carapebus, Macaé, Quissamã, Rio das Ostras and São João da Barra are not preparing for a possible situation of extinguishment of oil revenues. In short, we believe that the lack of training of public managers is leading municipalities in the Oil Route to a vicious cycle of Budget Dependence, which could guide the region to an economic failure in a possible looming future.

References

ANP. (2011). *Royalties e Participações Especiais pagas aos municípios brasileiros*. Obtido em agosto de 2011, de Agência Nacional do Petróleo: http://www.anp.gov.br.

BLANCHARD, OLIVER. (2011) *Macroeconomia*. 5ª edição. São Paulo: Pearson Prentice Hall.

CASELLI, F. & MICHAELS, G. (2009). *Does Oil improve living standards? Evidence from Brazil.* NBER Working Paper no. 1555.

COLLECTION OF AUTHORS. (2003). *Estudos Avançados: O que fazer para gerar Empregos.* Valor Econômico Journal.

FERRAZ, C and MONTEIRO, J. (2009). *Does Oil make leaders Unaccountable? Evidence from Brazil's offshore oil boom*. Department of Economics, Pontíficia Universidade Católica do Rio de Janeiro - (PUC-Rio).

IBGE. (2011). *Contas Nacionais por Unidade Territorial*. SIDRA. Obtido em novembro de 2011, de Instituto Brasileiro de Geografia e Estatística: http://www.sidra.ibge.gov.br/bda/territorio/uftabunit.asp?t=19&n=6&z=t&o=4

MINISTÉRIO DA EDUCAÇÃO. (2011). *Ideb*. Obtido em novembro de 2011, de Ministério da Educação – Portal IDEB: http://www.portalideb.inep.gov.br

MIRANDA, ELIS DE ARAÚJO. (2010) *Cidades do Petróleo: royalties, cultura e planejamento.* Universidade Federal Fluminense.

PINTO, V. (2002) *Comentários sobre o papel dos royalties e participações no Estado do Rio de Janeiro.* Monografia apresentada à Fundação Escola de Serviço Público - FESP para conclusão do Curso de Especialização em Administração Pública -CEAP VIII, lato sensu, em 10 de abril de 2002.

RAMOS, C. A. (2003) *Políticas de Geração de Emprego e Renda – Justificativas Teóricas, Contexto Histórico e Experiência Brasileira.* Universidade de Brasília.

RIBEIRO, A. C. e TAVARES, R. (2011) *Avaliação da Correlação entre Emprego e Receitas Orçamentárias de Royalties nos Municípios Produtores de Petróleo da Região Norte Fluminense*. INGEPRO – Inovação, Gestão e Produção Janeiro de 2011, vol. 03, no. 01.

RIBEIRO, V. S. and DIAS, J. (2009). *Índice de Atividade Econômica: modelso de filtro de kalman e Box-jenkins comparados.* Universidade Estadual de Maringá.

SCHECHTMAN, R., (2000) et. al. Rio *Oil & Gas Conference* held in Rio de Janeiro, Brazil, 16-19 October, 2000.

TRIBUNAL DE CONTAS DO ESTADO DO RIO DE JANEIRO, *Os royalties de petróleo e a economia do Estado do Rio de Janeiro.* Relatório de setembro de 2000.