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REVELATIONS OF DEPENDENCE OF INTERGOVERNMENTAL TRANSFERS BY THE MUNICIPALITIES IN THE STATE OF BAHIA: AN ANALYSIS WITH PANEL DATA

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ABSTRACT

The disorganized growth driven by the emancipation of new municipalities generated a growing fragility in municipal finances, which, under the aegis of the 1988 Federal Constitution and Fiscal Federalism, have granted greater autonomy to several federative entities. However, from the fundraising point of view, many municipalities are still dependent on municipal transfers, exposing a distorted picture with a strong tendency to indebtedness and the presence of a public deficit. The present paper aims to evaluate the level of dependence of the municipalities in the State of Bahia regarding intergovernmental transfers in the composition of their current revenue. This is done by fastening on the assumptions of estimation models via Panel Data for the years 2010 through 2015. The outcomes have showed a high degree of dependence on government transfers, besides a low capacity to collect its own revenues, corroborating other former studies.

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INTRODUCTION

The Brazilian Constitution of 1988 (BRASIL, 1988), in its first article, recognizes Brazil as a Federative Republic, with three governmental levels, i.e., the Union, the States, and the Municipalities. As a result of this constitutionally established federative principle, the division of powers among its entities naturally passes through the tax field, through strict discipline on the spheres of action of the Union, the States, the Federal District, and the Municipalities. Therefore, the Magna Carta provides the types of taxes and the powers of each entity to institute and collect each of them.

The political-administrative autonomy of the municipalities was of fundamental importance, regulating the role of the municipal governments, both in tax collection and allocation, decisive for the local administration. According to data from the Brazilian Institute of Geography and Statistics (IBGE), it is possible to comprehend that, starting in the 1990s, the creation of new municipalities, as well as their disorganized growth, has been producing movements of increasing fragility in public finances, especially from the point of view of fundraising, by which the municipalities are dependent on government transfers, bestowing a picture of misrepresentation with a strong tendency to indebtedness.

In this scenario, intergovernmental transfers emerge as important mechanisms for correcting the existing imbalances in the capacity of smaller federative entities to generate their own resources, and therefore represent one of the ways of financing the public sector in countries organized as federations, which present inequalities in their regions. In Brazil, the main intergovernmental transfer received by the municipalities is the Municipal Participation Fund, whose distribution criterion is the quantitative population of each municipality, with coefficients varying from 0.6 to 4. Thus, the objective of this study is to recognize the level of dependence of the municipalities in the State of Bahia concerning intergovernmental transfers in the composition of their current revenues, more specifically in relation to direct transfers from the Union, as well as their own municipal collection capacity. The information herein employed comes from the Secretariat of the National Treasury, with a database used in the research covering the years 2010 to 2015, which made it possible to compose the set of fundamental variables to estimate the behavior of finances in the municipalities in the State of Bahia.

To that end, a methodology based on the assumptions of econometric models via Panel Dataset has been utilized. Accordingly, a set of available data has been applied, separated into indicators that capture the Degree of Financial Dependence of the Municipalities, as well as the Own Revenue Capacity for the universe of 417 Municipalities that forms the State of Bahia. DFD estimation produces highly efficient results, mainly because it permits the combination of aspects of cross-section and time series estimation. It is pointed out that, in the strategy of the respective estimation method, the individual characteristics of each municipality are observed over time, as well as the behavior of the variables that make up the model that capture the various effects and their results over time. In this context, the numbers found point to evidence of a high dependence on government transfers, besides the low capacity to collect its own revenues. Therefore, the indicators, when analyzed within the framework of municipal finances, demonstrated a diagnosis of fragility in the financial behavior of the Municipalities in the State of Bahia, which validates efforts to adopt measures aimed at fiscal efficiency by municipal entities. The contour to the State of Bahia has the purpose of understanding the fiscal reality at the state level, given its vast and diverse territory.

MATERIALS AND METHODS

A group of researchers has shown relevant results in understanding the current and historical picture of finances in the municipalities of this country. Studies substantiate that research, with emphasis on what happens in the State of Bahia (SILVA FILHO; SILVA, 2013; MIRANDA, 2015; PAZ, 2017; MORAES, 2018; NASCIMENTO, 2018). In addition to this introductory section, this study comprises an empirical-normative reference section, in which works dealing with fiscal federalism are discussed, emphasizing the fiscal dependence, another result of the concentration of tax collection at the central level. The methodological procedures section discusses the research data, as well as the indicators considered in the study and the Panel Data regression model. In turn, the fourth section deals with the results and analysis, in which the main evidence from the study is displayed. Finally, the last section presents the final considerations of the study. The legislation encouraging Public Finance in Brazil was introduced by Federal Law No. 4320, dated March 17, 1964 (BRASIL, 1964), establishing the provisions of Financial Law in the formulation and control of budgets and balance sheets of the Union, the States, the Federal District, and the Municipalities, and was later adapted by the Federal Constitution of 1988. It is necessary to state that, subsequently, this concept was expanded and strengthened with the advent of the Federal Complementary Law No. 101, of May 04, 2000 (BRASIL, 2000), which establishes the rules for the control and responsibility in fiscal management, among other provisions. The 1988 Federal Constitution pursued to generate mechanisms competent to spend competencies and powers amongst the Union, the States, the Municipalities, and the Federal District, each with its own

political, administrative, and tax autonomy (LOVATO, 2006). According to the constitutional text, fiscal federalism is a financial arrangement that establishes the rules for the division of revenues, expenses, and burdens among the federated entities. Hence, the federative commitment is based on providing public services and infrastructure at similar levels for the residents of the Federated Units. Brazil's federalist regime proposes the transfer of responsibility from the Union to the States and Municipalities, since the latter ones have better aware about the demands of the local population than the Union (REZENDE, 1995). With these procedures, it is expected that the distribution of responsibilities enables an even greater condition for the execution of efficient public administration, presenting itself as a fundamental mechanism to alleviate regional inequalities, in the relentless pursuit of promoting socioeconomic steadiness. Complying with this context, tax distribution becomes effective through transfers that are mechanisms aiming to meet a large part of the people's demands, such as reducing disparities in income and development (MENDES 2004). However, the strong dependence on these transfers also results from a greater concentration of revenue collection given the central government level.

Granting autonomy to the Municipalities presumes that these federated entities can develop the capacity for self-management, especially about economic competence, generating from their own collection an amount of revenue to provide the population with essential services and the maintenance of the civil service. Brazilian cities can either be classified by land areas or population. According to this last parameter, which is also significant in determining resource transfers, cities with a population of less than 10,000 inhabitants are considered small (BARCELAR, 2012). Consequently, these small municipalities have difficulties in collecting their own municipal revenue compatible with the maintenance of their structure, both in terms of simple maintenance and in the provision of public services that are required and necessary for their population. These outcomes, in most cases, in demands for more resources to complement the inflow of State and Federal funds, especially those sponsored by the Municipal Participation Fund. It is surely evident that the proper federative design for sources of public revenue privileges the Union, although the disorderly creation of new municipalities, without observing technical criteria of fiscal order, contributes to the strong fiscal dependence of the Municipalities. In summary, the main sources of revenue for the Municipality are of its own, along with State and Federal nature, plus eventual voluntary transfers and costing amendments.

Own revenues are collected at the municipal level through the following taxes: Service Tax (ISS); Land and Urban Tax (IPTU); Inter-Vivos Property Transfer Tax (ITBI); as well as Contribution to Improvement Tax. In turn, State-level revenues or State transfers are those that make up the municipal revenues owed by the State, based on the collection of tax on goods circulation operations and provision of interstate and intermunicipal transport and communication services (ICMS), together with the Tax on the Ownership of Motor Vehicles (IPVA), within each Municipality. Finally, transfer revenues of Federal origin --- which can function as forms of contribution, compensation, incentive or aid for exports, exploration of mineral resources or social, economic, or ecological damages, and also as a way to correct disparities in income and municipal development --- are as follows: Municipal Participation Fund (MPF) resulting from the Tax on Industrialized Products (IPI) and Income Tax (IR), Promotion of Exports (FEX), Contribution for Intervention in the Economic Domain (CIDE); Tax on Rural Territorial Property (ITR); Financial Compensation for Exploration of Mineral Resources (CFEM), and royalties. Considering the purpose of this study, the FPM stands out as a fund for the collection and distribution of resources obtained from taxes and transferred proportionally to the Municipalities. Its current collection base consists of 22.5% of the net collection (gross collection deducted from refunds and tax incentives) of the IR and IPI, plus a 1% bonus per December each year (BRASIL, 2008). To calculate the distribution coefficient that guides the amount transferred to each municipality, some criteria are considered, such as *per capita* income and the region to which the municipality belongs.

Distribution coefficients increase in accordance with population size. However, municipalities with equal populations and located in different states may receive different transfers depending on their geographic position. In the set of information which is the starting point for calculating the FPM transfers, IBGE is responsible for collecting the population and *per capita* income information for each municipality. In sequence, it is up to the Federal Audit Court (TCU), based on the information made available by IBGE, to calculate the participation coefficient of each Municipality (CNM, 2012; STN, 2012). The FPM is distributed according to the classification of the Municipalities and of the amount of the FPM, 10% belongs to the capitals of the States, 86.4% belongs to the Municipalities of the interior of the States, while the remainder (3.6%) constitutes the Reserve Fund ordained for distribution among the Municipalities of the interior with more than 142,633 inhabitants. Thus, it is the transfer that represents the main source of revenue for 81% of Brazilian municipalities (BREMAEKER, 2011).

Several studies presented relevant results to understand the current and historical portrait of the finances of the country's Municipalities. Among them, we emphasize Filho and Silva (2013) who used regression model to verify the public finance image of the Municipalities of the State of Espírito Santo. The results indicate that, even in the context of small improvements in the collection indicators, most of the analyzed Municipalities are dependent on federal resources. Miranda (2015), using models based on the methodological assumptions in PD, with a base for the years 2000 to 2012, also concluded that the three conditioning factors (political-party, redistributive and technical) considered in the study interfere, to a greater or lesser extent, in the transfers of resources by the State government to municipalities in the state of Minas Gerais. According to the statistical regression used, the results do not reject the hypothesis that the three conditioning factors are still influent. Paz (2017) invoked DP technique for economic analysis of public spending in Brazilian municipalities for the period between 2005 and 2015, to obtain evidence of the 'flypaper effect' in Brazilian municipalities. The econometric tests allowed to corroborate that the economic and fiscal reality of Brazilian municipalities does not align with the precepts of the 'flypaper effect'. In summary, the 'flypaper effect' in the literature on public finance is a phenomenon that occurs when local government inefficiency occurs in the collection of local taxes, which can imply dependence and an increase in intergovernmental transfers to municipalities.

Moraes (2018), through an empirical practice, estimated a regression model with municipality and year fixed effects, having as dependent variable the fiscal performance of the municipalities of Minas Gerais, in the interval between 2007 and 2016. The results showed that local singularities constant over time explain more than half of the variation in fiscal performance. Voluntary transfers from the federal or state government favor the fiscal performance of municipalities, especially via investments. As for municipal GDP, no detectable association with fiscal performance was identified in all specifications assessed. Finally, Nascimento (2018), using regression models with data from 2002 to 2016 for five municipalities in the state of Paraíba, pursued to answer the influence of tied and untied fiscal transfers on municipal expenditures and revenues. The results suggest that untied fiscal transfers cause the 'flypaper effect' on local expenditures, while the tied ones are neutral, and it can also be stated that transfers can increase the fiscal risks of Municipalities. Therefore, normative aspects and empirical results indicate the importance of intergovernmental transfers to municipalities, characterizing strong fiscal dependence, which may be the result of municipal revenue accommodation, but also of a design of division of the *tax cake* with strong privilege for the Federal Entity, especially. The next section deals with the procedures adopted in the research. The study resulted in the collection of data referring to the 417 municipalities of Bahia, from 2010 and 2015. The variables that make up the indicators were obtained through the annual reports of the budget balances and the economic and population indexes of the analyzed municipalities. As a result of the difficulty of accessibility to the elements related to the Summarized Reports of Budget Execution (SRBE) and because these

years are not available at the Accounting Court of Municipalities of the State of Bahia (TCM), other sources of information have been accessed. Data have been gathered from the IBGE portals, the Accounting and Fiscal Information System of the Brazilian Public Sector (SICONFI), the Transparency Portal of the State of Bahia, the Municipal Official Gazettes and the FIRJAN index portal. It is pointed out that SINCONFI is STN responsible for the collection, treatment and dissemination of accounting, budgetary, financial, fiscal, economic, credit operations and public finance statistics information of the entities in the Federation (STN, 2017), thus demonstrating the importance of the database generated by this system. Consequently, Table 02 presents the description of the study variables. It is worth noting that the STN (BRASIL, 2018) points out that the Manual of Accounting Applied to the Public Sector (MCASP) "(...) aims to collaborate with the process of budget preparation and execution, in addition to contributing to rescue the object of accounting as a science, which is the assets". This way, accounting can meet the demand for information required by its users, allowing the analysis of financial statements appropriate to international standards, under the budget and equity approaches, based on a National Chart of Accounts. That said, the next item deals with presenting the indicators considered in the study. To measure the level of financial dependence of Bahia municipalities on transfers from the Union, the indicators called Ability to Collect its own tax revenues (CAP) and Degree of Dependence (GD) were used, respectively. The CAP aims to assess the municipal capacity to acquire resources through their own efforts, or rather, through the collection of taxes of their competence, as specified by the CNM (2012). This indicator has been used in similar works such as Silva Filho and Silva (2013), Riane (2002). CAP is described as follows:

$$CAP = \left(\frac{RT}{RC} \right) * 100 \quad (1)$$

With RT for Own Tax Revenue collected by the municipality and CR for Current Revenue. Being that the higher the value of CAP the higher is the own collection capacity; the opposite also being true.

The other indicator used; Degree of Dependence (GD) is described below:

$$GD = \left(\frac{TI}{RC} \right) * 100 \quad (2)$$

This indicator reveals the share of intergovernmental transfers in the amount of current revenues, with IT for Intergovernmental Transfers and CR for Current Revenue. It is of the type: the lower the value of the indicator, the lower the degree of dependence. Therefore, it reveals that the municipalities that present low values for GD represent a better degree of autonomy and financial capacity. Panel data was used to identify the empirical relationship between variables to understand their effects. The choice for this estimation method was because it is possible through this methodology to harmonize time series with cross-sectional data, which can generate greater efficiency of the parameters resulting from the model. The cross-section of the research was six years since it considered the years 2010 and 2015. The organization of panel or longitudinal data allows the presentation of observations in two dimensions which, in general, are time and space. In addition, it covers information that enables a better assessment of the performance of changes in variables, making it feasible to consider the effect of unobserved variables (LOUREIRO; COSTA, 2009). Among the classic panel models, there are fixed effects and random effects models. In the fixed effect, it is intended to control the effects of omitted variables, which vary between individuals, thus remaining constant over time, while in the random effect, despite having the same assumptions of the fixed model, does not remain constant over time.

Thus, in the fixed effect panel estimation method, we have the following condition:

$$Y_{it} = \alpha_i + \beta X_{it} + \varepsilon_{it} \quad (3)$$

In the fixed effect panel estimation method, we have the following condition: $Cov(\alpha_i, X_{it}) \neq 0$. Therefore, strategy is to eliminate the unobserved effect α_i , using the following assumptions: $E(u_{it}|X_{it}, \alpha_i) = 0$, known as the strict exogeneity condition. In the random effect panel model analysis, on the other hand, the unobserved component α_i is placed together with the random term ϵ_{it} , $v_{it} = \alpha_i + \epsilon_{it}$. This being so, we have a compound term. Respecting the following conditions: 1) $E(\epsilon_{it}|X_{it}, \alpha_i) = 0$; 2) $E(\alpha_i | X_{it}) = 0$; 3) $Var(\alpha_i | X_{it}) = \sigma_c^2$. Accordingly the first term relates to strict exogeneity; the second term is associated with orthogonality between α_i and X_{it} and the average of α_i ; and the third condition refers to the inaccuracy variance being constant over time, exhibiting homoscedastic behavior.

In choosing the most appropriate estimation model, it is necessary to use the Hausman test procedure, which compares the random effects estimator with the fixed effects estimator. It is an asymptotic distribution statistic X^2 (chi-square), which has outcomes as interpretation: the null hypothesis that the random effects estimator is the best, or underlyingly, that these estimators do not differ significantly. Let \hat{b}_{re} be the random effects estimator and \hat{b}_{fe} the fixed effects estimator (SILVA et al., 2012).

Algebraically:

$$H = (\hat{b}_{re} - \hat{b}_{fe})' [Var(\hat{b}_{re}) - Var(\hat{b}_{fe})]^{-1} (\hat{b}_{re} - \hat{b}_{fe}) \sim \chi^2 \quad (4)$$

Thus, if the p-value is > 0.05 , the random effects model is the most appropriate, however if the p-value is < 0.05 , significant, the fixed effects model is more recommended for estimation with efficient results. Thus, the next section deals with the results and analysis of the study, containing the descriptive statistics of the sample and the analysis of the variables, from the estimation of the panel data model with its effects and behavior.

RESULTS AND DISCUSSION

In this chapter, the descriptive statistics of the samples are presented, whose objective is to know a little more about the behavior of the data used to estimate the model in panel data. Likewise, analyses of the variables from the estimation of the panel data model with their effects and behavior are presented.

The data presented in Table 01 demonstrate the high degree of dependence on intergovernmental transparency, observing a historical analysis of the behavior of the GD variable between the years studied. This degree is a little more than seven times higher than the own tax collection capacity (CAP), denoting a behavior of low capacity to produce own revenues. The data for the year 2015 of the CAP variable showed a slight improvement when compared to the 2010 results. However, there is a significant difference between the GD and CAP variables in the analyzed period. This difference attests to the low capacity of the municipalities in the State of Bahia to collect taxes and the high need for government transfers. Relevant in the analysis to justify that the municipalities of the state of Bahia are in the Northeast of the country, in the area characterized by low dynamism of economic activity. Based on more comprehensive and multidimensional criteria, such as housing, sanitation, education, work, income and demographics, Lacerda (2009) estimated the multidimensional poverty indicator (MPI) and found that there are great disparities between areas in the territory of Bahia. It is also noteworthy that the most dependent municipalities have the following characteristics: small population; low tax collection; economy based on family agriculture; the largest employer is the municipality; and a substantial portion of income from social security benefits (retirements, pensions, and others). In this scenario, one can foresee a considerable risk of personalistic and patronage practices, and exchange of favors, to stay on in power and secure privileges. The result leads to a shortage of political interest in collecting taxes from the population, which affects self-collection.

On the other hand, some scholars argue that resource transfers can be seen as a disincentive to local tax collection efforts, generating fiscal self-indulgence. However, for the municipalities in the Brazilian Northeast, this does not apply, since a large number of municipalities are geographically located in the interior of the country, not being reached by the industrialization processes. To choose the most recommended model, the Hausman test was performed, as shown in Table 02. This model considers that the characteristics invariant over time are unique for everyone. In the case of this study, this shows that each municipality has its own characteristics and that this does not depend on other municipalities. Then, the estimation captures the heterogeneity of municipalities in what is constant, viz. the difference from municipality to municipality that does not vary over time, such as some environmental factors that tend to be invariant. As observed in Table 02, the result of the test statistic was less than 1%, finding that working with panel with fixed effects is more favorable for this study.

Table 1. Description of the variables used in the research model

Variables	Characteristics	Source
Tax Revenue	Revenue from the collection of taxes, fees, and improvement contributions. Private revenue of the entities vested with the power to tax: Union, States, Federal District and Municipalities	MCASP (2017)
Current Revenue	Constituted by tax revenues, contributions, assets, agriculture and cattle raising, industrial, services and others, and those from financial resources received from other public or private law entities, when destined to meet expenses classified as Current Expenses	MCASP (2017)
FPM- Municipal Participation Fund	It is a fund for the collection and distribution of resources obtained from taxes and passed on proportionally to the municipalities	CNM (2012)
OTC - Other Constitutional Transfers	These are resources received from other public or private entities, regardless of direct consideration for goods and services, provided that the object is the application in current expenses	MCASP (2017)
GD - Degree of Dependence	Its purpose is to reveal the participation of intergovernmental transfers in the amount of current revenues	Silva Filho and Silva (2013)
CAP - Collection Capacity	Its purpose is to evaluate the municipal capacity to acquire resources through its own efforts, through the collection of taxes of its competence	Silva Filho and Silva (2013)

Source: Elaborated by the author

Table 01. Collection Capacity and Dependency Ratio of Municipalities in BA (2010 and 2015)

Indicator	2010	2015
CAP	4.7762%	4.822%
GD	31.336%	30.544%

Table 02. Hausman's test for the years 2010 and 2015

Variable	Fixed effects	Random effects	Differences	Standard Error of the difference
lnRT	0,1172718	0,1865829	-0,0693111	0,0118623
lnFPM	0,1951561	0,3035304	-0,1083743	0,0461945
lnOTC	0,6407077	0,5211185	0,1195892	0,0423060
chi2(4)= 41,80		Prob>chi2 0,000		

Source: Elaborated by the author (2018)

Table 03. Estimation results of the Fixed and Random Effect models.

$$\ln(RC)_{it} = \beta_0 + \beta_1 \ln(RT)_{it} + \beta_2 \ln(FPM)_{it} + \beta_3 \ln(OTC)_{it} + \eta$$

Variable	Fixed effect	Random effect
RT	0,1172718***(0,0335645)	0,1865829***(0,0202378)
FPM	0,1951561***(0,1951561)	0,3035304***(0,0747166)
OTC	0,6407077***(0,0649401)	0,5211185***(0,0587469)
Intercept	2,10204***(2,10204)	1,334235***(0,3430427)
N	828	828
R ²	0,56	0,56

Source: Elaborated by the author (2018)

After verifying the best model to work with, we proceed with the application of the empirical model, presented in Table 03, which shows the results of the regression model estimated by SD. The estimations aim to find answers for the effect of the logarithm of the variables RT, FPM and OTC on the dependent variable CR. Assessing the hypothesis of low capacity of the municipalities of the state of Bahia in tax collection and high need for government transfers. In the analysis of the results the variables: Tax Revenue (RT), Municipal Participation Fund (FPM) and Other Constitutional Transfers showed significant statistics with impact power to explain the variations in the dependent variable Current Revenue (CR). In the individual analysis and with greater detail for the effects of each variable we observe that the power of explanation of RT in the variation of CR is extremely low, for a variation of one percentage point in the CR of Bahia's municipalities, only 0.11 was caused by RT. However, a variation of one percentage point in the CR, the FPM variable causes the effect of an explanation of 0.19, and when we analyzed the effect of the OTC variable on the CR, the model captured an impact of 0.64. The results found after the estimation of the model converge with the analyses observed in the descriptive statistics, demonstrating the great power of explanation of the FPM and the OTC causing a strong impact on the CR of the municipalities of the state of Bahia. In the model fit, r^2 showed explanation power of 0.56. It means that 56% of the dependent variable can be explained by the regressors.

CONCLUSION

Considering the objective of the study, it was evidenced in this work the profile of the 417 municipalities of Bahia regarding the ability to collect their own taxes and the level of dependence on resources from higher-level governments, with preponderance for the Union. For this, we used the budget data evidenced in the reports and annual balance sheets available in the vehicles of publicity and transparency, for the years 2010 and 2015, which enabled the construction of the necessary indicators. The results obtained through descriptive statistics and the panel data regression model are convergent and point out that the municipalities in Bahia have low tax collection capacity, being highly dependent on government transfers, presenting relevant percentage for FPM and Other Government Transfers (OTG). With this, it is important to observe the existence of other variables that complement this phenomenon, such as the low dynamism of the economic activity of Bahia's municipalities, located in the interior of the Brazilian Northeast, as attested by Lacerda (2009) - there are great disparities between areas in the territory of Bahia. It can also be verified that in inland municipalities, the economy is based on family farming and the largest employer is the city government. In this last respect, the game of political interest is common, which can affect the tax collection of the municipalities.

It is possible to verify the existence of a close relationship between the dependence presented by municipalities and the Brazilian model for the distribution of competencies. As stated by Tavares (2010), the criterion for distribution of powers in the Federative Republic of Brazil is the predominance of interest. This denotes an implicit subordination/dependence for resources coming from entities of greater power. It is expected that this study serves as basis for future research related to this topic, to allow the adoption of measures, projects and improvement policies. It is also expected a consistent municipal tax policy, to meet the demand for public goods and infrastructure, development policies for the municipalities in the interior of Bahia are necessary for the generation of employment and income, bringing returns to the collection of local taxes and, consequently, reducing the dependence on intergovernmental resources. It is evident that this does not obliterate a need for a tax reform aimed to comply with local demands compatible with the resources centralized in the Union.

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