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An analysis of delay in implementing ecological fiscal transfers in Brazil

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ABSTRACT

This paper sheds light on the cases of delay, in some cases interruptions and cancellations of criteria, that followed the adoption of ecological fiscal transfers (EFT) by Brazilian states. Using the transaction costs-politics framework to analyze the policy-making process, the central argument is that state legislatives are likely to weight benefits and costs at the formulation stage. At the implementation stage, legislatives delegate the role of refining EFT procedures to state agencies and, as such, increase the costs they incur. The empirical design is based on a set of case-studies, collecting data using questionnaires devised to describe the time-lags and the interruptions and cancellations of environmental criteria. The findings provide evidence of the presence of gridlocks in the formulation stage and delegation problems in the political-bureaucratic relationship at the implementation stage. Also, the absence of a gradual increase to implement the percentage dedicated to ecological criteria in each state is likely to explain the delays in the implementation of EFT schemes. In the end, we recommend flexibility in the design of scheme and the involvement of political actors in the policy process of adopting EFT.

1. Introduction

Ecological Fiscal Transfers (EFT) is a policy tool devised to redistribute revenues from the state to local governments according to ecological indicators (Ring and Barton, 2015). It was first established in the early 1990s in the Brazilian state of Paraná to allocate ICMS (*Imposto Sobre Circulação de Mercadorias e Serviços*)[1] (Loureiro, 2002). Other states followed Paraná and also adopted ecological indicators to redistribute ICMS, mainly to extend protected areas (PA) and to compensate local governments for the positive externalities derived from biodiversity conservation (Grieg-Gran, 2001; Ring, 2008; Droste et al., 2017d; Paulo and Camões, 2019b). Over time, other ecological criteria were introduced in these schemes, such as water conservation policies (Paulo and Camões, 2020), solid waste management (Silva et al., 2012), reforestation, and fire control.

EFT impacts on municipal budgets (Ring, 2008). This explains the avoidance of conflicts among politicians during the process of adopting this policy tool (Paulo and Camões, 2019b). Empirical studies stress the effectiveness of EFT in incentivizing local governments to create protected areas (Droste et al., 2017d) and how it affects spatial interactions among government units (Sauquet et al., 2014). Similar policy tools were either proposed or implemented in such countries as Germany (Droste et al., 2017a), France (Borie

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[1] This is a type of Value Added Tax (VAT) collected by state governments and constitutes the net sales of goods, communication services or transportation under the ICMS rules incurred by each municipality.

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et al., 2014), Poland (Schröter-Schlaack et al., 2014), and Switzerland (Köllner et al., 2002). Portugal adopted EFT through the local finance law of 2007 (Santos et al., 2012; Droste et al., 2017b).

As Ring and Barton (2015, p. 440) have noted, an EFT scheme constitutes a "*part of a country's or a state's constitution and are regulated by additional laws and decrees.*" Based on a country or state constitution, national and/or state tax systems could allow the formulation (adoption) of intergovernmental fiscal transfers by upper-level governments conditioned to ecological-based performance on the part of local governments. Additional decrees adopted by environmental state agencies or by environmental ministries provide refinements of operational procedures that allow the implementation of such fiscal transfers. Note that the ecological fiscal transfers are only part dedicated to ecological indicators of intergovernmental fiscal transfers that traditionally use only economic performance indicators to transfer money from tax revenue. Ecological fiscal transfers expand the traditional performance-indicators used in intergovernmental fiscal transfers including also ecological ones.

In Brazil, the formulation process starts either in the legislative or executive branches. Both bodies are assigned with the power to propose a draft of the law and submit it to the legislative branch. After the formulation process, the state environmental agency enforces the EFT scheme. The adoption of EFT by Brazilian states originated several cases of delay as well as interruptions and cancellations of the environmental criteria. In most cases, the delay occurred after the first law was enacted by the legislative power and before the fiscal transfers to municipalities was effective (Paulo and Camões, 2017; Droste et al., 2015). Nine, out of seventeen states that enacted their first EFT law, incurred in this type of delay. As an extreme case, the state of Paraíba has not yet implemented its scheme.

There is a lacuna in the literature related with an in-depth understanding of these cases of failure in the implementation of EFT. The general public policy literature points that a policy delay is not rare in the policy process (DeLeon, 1978; Geva-May 2004). Through the lenses of transaction cost politics, we regard the EFT policy-making as the result of the interplay among several political actors involved, such as governors, bureaucrats, state congressmen, lobby groups, and mayors. To be more precise, we argue that the legislative branch is likely to reduce decision-making costs in order to optimize the chances of reelection and, accordingly, delegate to environmental state agencies the role of refining the details of EFT implementation. Therefore, the agency costs of the delegation process increase, which complicates the implementation process. Moreover, the delegation process may even not occur, which means that the legislative decision-making process may be interrupted.

This article offers an in-depth understanding of how delays, interruptions, and cancellations occurred in eight of the states that adopted an EFT scheme. It advances possible explanations based on the transaction-cost politics framework. The article unfolds in four sections. The next section broadly addresses the theoretical literature relevant to understand policy delay and presents a transaction costs theory to understand delays, interruptions, and cancellations of criteria in ecological fiscal transfers. Section 3 explains the policy-making process related with EFT, clarifying the roles and motivations of the political actors, both in the formulation and implementation stages of policy-making. Section 4 offers a set of in-depth cases studies of the time-lags to adopt the EFT schemes and the cases of interruption and cancellation of environmental criteria. The conclusion sums up the findings and provides some policy recommendations, as well as some suggestions for future research.

2. Transaction-cost politics perspective for understanding policy delay

The transaction-cost politics framework provides important insights to understand policy delay. Public policies emerge as the outcome of complex inter-temporal exchanges among politicians (Spiller and Tommasi, 2003), which means that the process of policy-making is plagued with information asymmetries that lead to moral hazard and/or adverse selection problems (Horn, 1995; Dixit, 1996; Epstein and O'Halloran, 1999). Moral hazard occurs because one part of the transaction may change the expected behavior after the agreement. Adverse selection comes from the fact that one part of the transaction holds more information. In both cases, one part of the transaction is in disadvantage.

As a simplification device for analytical purposes, this framework usually divides the institutional or rule-making stage and policy-making stage (Epstein and O'Halloran, 1999; Dixit, 2003). In this study, we also divide the policy-making process in two stages: i) policy formulation (adoption); and ii) policy implementation. The focus of our analysis is precisely the delay in policy-making that follows the adoption, that is, in the implementation.

In the institutional choice stage, despite being a period of strong uncertainty among political players, there is no information asymmetry (Dixit, 2003). During this period legislators produce general rules without detailing specific outcomes, that is, without pointing to special interests. This is the Constitutional stage in which it is possible to obtain the unanimous consent from political actors for general decisions (Buchanan, 1987; Dixit, 2003). Therefore, the probability of failure in this stage is very low, as long as political actors share similar powers concerning the policy to be adopted. An environment without asymmetric information and with similar shares of political power favors a more flexible and more accessible rule-making process.

The information asymmetries become relevant at the policy-making stage (Dixit, 2003; Spiller and Tommasi, 2003), which means that moral hazard and adverse selection effects among political actors begin to surface (Spiller and Tommasi, 2003). The adverse selection comes from different patterns of informational quality for decisions among players. Those with better information are in a better position. This process is likely to facilitate unexpected moves of political actors in the future, that is, the moral hazard problem. If at least one player has more veto power than the others, this may lead to failure. To avoid failures in this process, the various interests related to the established outcome of the policy have to be taken into account. It is also important to include incentive-constraints in the rules for all participants, mainly for veto-players, and the design of the policy has to include repeated interactions to create commitment ties.

The legislative policy-making process (policy formulation-adoption) constitutes the step in which political actors discuss a more

specific policy. Legislators, as self-interested political actors that seek to increase their chances of reelection, face two options at the moment of enacting a law: i) adopt vague legislation and delegate the role of refining it to avoid conflicts to public agencies and, in this way, increase their political and electoral support; or ii) adopt a detailed law that benefits certain groups but not others and risk to decrease their chances of reelection. This is not a general situation that applies to all policy domains (Epstein and O'Halloran, 1999; Horn, 1995). The delegation process varies with the type of public policy; some of them may be more relevant in jeopardizing the chances of legislator's reelection than others (Epstein and O'Halloran, 1999).

The process of delegating the role of refining a vague law to agencies implies increasing uncertainty costs and predicting all unforeseen circumstances that may affect the value of the legislation in the future. In other words, this delegation will fundamentally affect policy implementation. As Horn (1995, p. 15) has noted, the *"legislative decision-making costs are also likely to increase with the difficulty of identifying, at the time of enactment, all of the contingencies that may affect the value of legislation"*. Uncertainty is likely to increase commitment costs and, consequently, impose barriers so to achieve the desired policy outcome in policy-making under separate powers, such as between national and sub-national government. These barriers may also increase when the interaction among agencies leads to different tasks in the agent's efforts. For example, when a national state agency imposes functions on a sub-national government, they act as substitutes for their efforts. As Dixit (2003, p. 126) has noted, *"if the principal increases the power of the output-based incentive for activity 1, the agent exerts more effort on this activity, which increases his marginal cost of effort on activity 2."* In contrast, these costs can decrease when agencies act cooperatively.

Coordination faces other barriers when it comes to implementing in less-developed and emergent countries (LDCs). Dixit (2003) notes that most of these countries face problems with human capital, infrastructures for the provision of enforcement services, transparency (communication), and the design of institutions. These problems lead to information asymmetry, as well as common agency problems, in which there are several groups with varying interests and with enough power to influence policy-making agencies. These issues lead to different types of policy delay, such as the implementation of different parts of the enacted legislation and the interruption of a part or the whole public policy.

3. Ecological fiscal transfers: delay, interruptions and cancellations of criteria

The Federal Constitution of Brazil establishes that twenty-five percent of the total amount of the ICMS collected by state governments should be transferred to municipalities. Three-quarters of this amount are transferred according to the criteria of fiscal value added. The States are free to consider environmental criteria to allocate the remaining one-fourth (Moura, 2015). Overall, the EFT in Brazil constitutes a small portion of the ICMS transferred to local governments (see Fig. 1).

According to Sauquet et al. (2014, p. 250), the primary objective at the conception of the EFT was to reduce the *"biodiversity loss by stimulating the creation and management of protected areas"*. Over time, these schemes began to include criteria related to solid waste management (Silva et al., 2012; Paulo et al., 2017), water conservation policies (Paulo and Camões, 2020), education, reforestation,

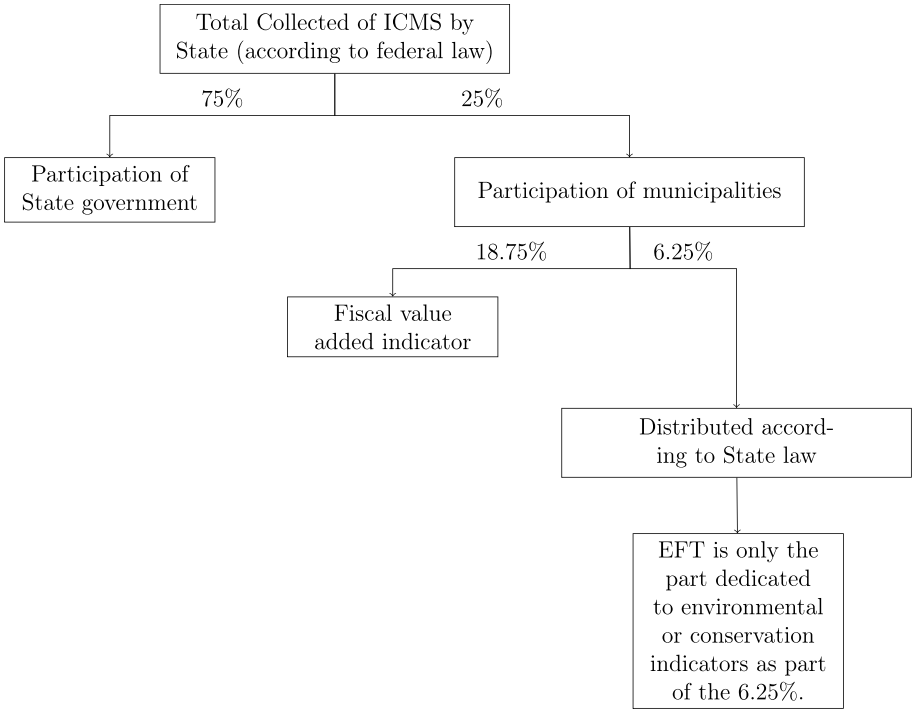

Fig. 1. EFT scheme in Brazil (Paulo and Camões, 2019b).

and fire control. However, due to the Federal Constitution, the state governments used the same percentage of ICMS to increase the number of criteria dedicated to environmental policies.

The indices of protected areas included in the EFT scheme may use either quantitative or qualitative measures. The EFT usually includes quantitative measures of total area of the PA, while local governments have to care for the quality of the protected area in order to guarantee efficient biodiversity protection. As Ring and Barton (2015, p. 442) have noted, *"qualitative indicators is an important requirement for generating better synergies between fiscal transfers and protected area regulation (…)"*. In this sense, the adoption of qualitative measurements imposes additional costs to local governments, mostly related with monitoring the protected areas (Ring and Barton, 2015; Paulo and Camões, 2019a).

Self-interested political actors face extreme uncertainty. Each state is free to use criteria to distribute the ICMS revenues among municipalities according to their policy preferences (Ring, 2008; Moura, 2015). Proposing environmental criteria involves actions on the part of both the legislative and executive branches, as well as state environmental agencies. The draft of the EFT law is proposed either by the governor or a state congressman (Paulo and Camões, 2019b). Later, when the governor receives the project, he/she chooses to approve or veto it. If the governor backs the EFT project, the legislative branch has the power to enact it. There are occasions in which a law can be proposed through citizens' initiative. After the formulation process, the state environmental agency is in charge and has the power to enforce the scheme. At this point, mayors, state congressman, governors, and lobbyist groups have enough information to anticipate their distributive losses and gains. Local governments are also likely to pressure the EFT's proposer. Accordingly, the enacted rules are not necessarily the social efficient outcomes because *"the formal rules are created to serve the interests of those with the bargaining power to create new rules"* (North, 1993, p. 360). Therefore, one has to distinguish what is an EFT delay and the standard procedures of the policy process. Delays, interruptions, and cancellations of criteria can be observed both in the formulation and implementation stages. Fig. 2 depicts the time-lags between the first EFT law enacted (policy formulation stage) and its effective implementation.

Some states delayed overall EFT implementation for more than 4 years, that is, the delay appears from the EFT adoption (enactment of the first legislation) and the beginning of its operation (implementation). The States of Paraiba, Mato Grosso do Sul, Rondônia, Piauí, and Acre are examples of this type of delay. Some other States had other problems, such as interruptions, cancellations, and determining/choosing environmental criteria for the allocation of fiscal transfers, such as in the States of Mato Grosso, Minas Gerais, and Pernambuco.

The executive and the legislative branches usually adopt environmental criteria to distribute the ICMS to municipalities but delegate the role to specify the details to environmental agencies, such as the operational procedures and specific rules that are highly dependent on technical expertise. As Ring and Barton (2015, p. 440) have noted, the EFT *"policy design, implementation and monitoring may be* supported *by environmental ministries and conservation or forest authorities"*. In general, the environmental state agencies have a certain time, established in the first general EFT law, to design the details, implement, and monitor the scheme. However, very often state agencies delay the EFT enforcement. Moreover, legislative and executive branches occasionally decide to modify some previous criteria.

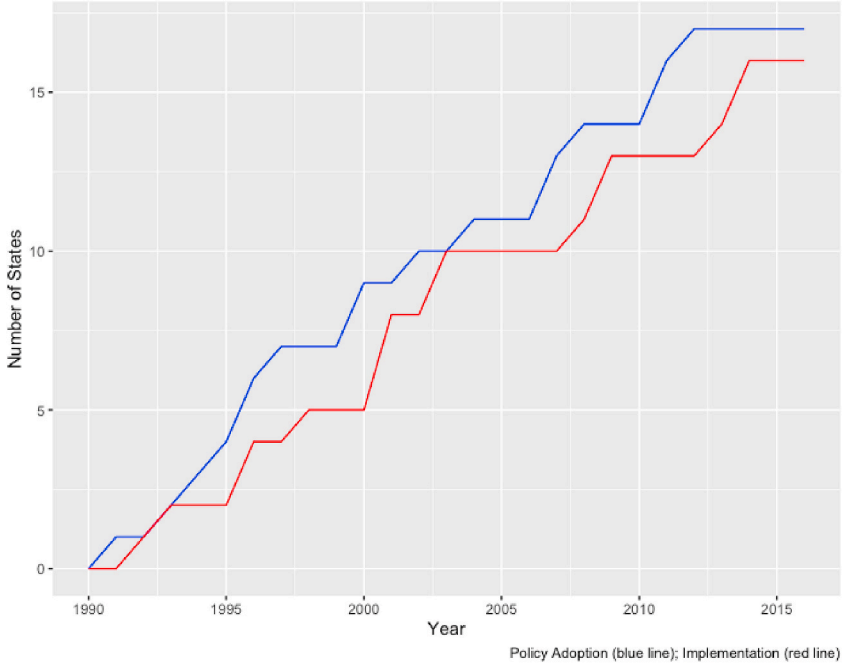

Fig. 2. EFT adoption (blue line) and implementation (red line). (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)

As always, some local governments increase the revenues with these fiscal transfers while others do not (Grieg-Gran, 2001). In a country where inequalities are prominent among local governments, this process leads to several conflicts and hampers agreements. As Dixit (2003, p. 114) notes, in situations *"where the potential winners and losers are already identified is not likely to result in an easy agreement on a "better" rule or institution"*. Moreover, the likelihood of changing EFT rules as time evolves is increasingly high, as powers change among players and they tend to respond to external political and economic shocks.

In sum, the redistributive effects of EFT reinforce delays, interruptions, and cancellations of criteria. First, one expects to find problems related with legislative decision-making costs. During the implementation process, the legislative and executive branches have incentives to deal with EFT differently. This leads to several problems in the context of redistributive policies. Second, one also expects to find problems related with the delegation process from the legislative-executive branches to the environmental state agencies. Issues related to information asymmetry lead to observation errors, and then to problems associated with adverse selection, lack of structure, and expertise in the state agencies.

4. Case studies

In order to shed light on the intricacies of the political processes that led to delay in the implementation of EFT in some Brazilian states, this section presents an empirical analysis based on a case-study design, which *"is best defined as an in-depth study of a single unit (a relatively bounded phenomenon) where the scholar's aim is to elucidate features of a larger class of similar phenomena"* (Gerring, 2004, p. 341). The details of information elucidate how the insights taken from the transaction-cost politics framework can be useful to this in-depth analysis.

With regard to the design, the decision as to what constitutes a case and how we chose our case(s), methodologically speaking, is extremely important. First and foremost, we should state that this study does not seek to conceive a design aimed at producing explanations in the statistical conventional sense of causal relationship. Rather, the intention is solely to provide an in-depth description for the furthering of our understanding of the policy-making process that led to delay. Following the recommendation of Levy (2008), a single Brazilian State case is not in itself a case for the purpose of constituting an observation. The several cases of delay are all *"cases of broader, theoretically defined classes of events"*, or according to King et al. (1994), they allow for or contribute to the generalization across populations of similar cases.

The cases of delay under analysis were selected according to the time elapsed during the effective implementation of EFT, on the one hand, and comparing those states that exhibited the least time, on the other. For the purposes of this study, there is delay in implementation when the time lag between the year of adoption of the general and abstract law and the regulation that enables implementation is more than four years. Fig. 3 depicts the states that did or did not exhibit delay of implementation since the year of adoption. This figure is tremendously indicative of the selection of our sample of cases. If we consider the time elapsed since the

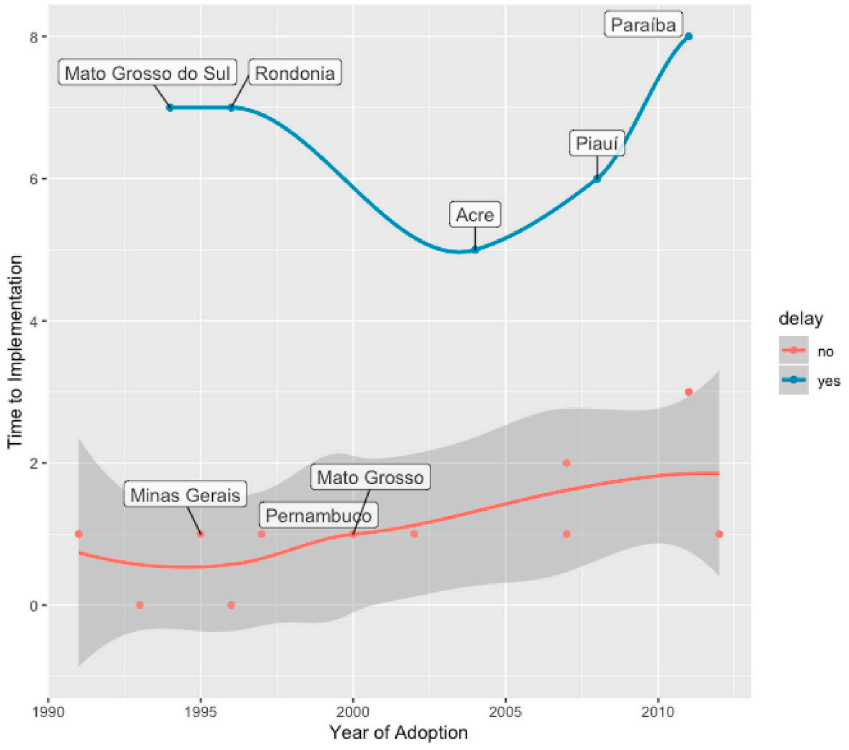

Fig. 3. EFT adoption and implementation.

adoption phase to the implementation phase, there is a clear-cut boundary between the two groups (Blatter and Haverland, 2012). In this sense, the five States are essentially outliers in the pattern of the implementation of the EFT. This pattern begs the question as to why these States and not others? We, therefore, conduct a descriptive, in-depth analysis as to why these states delayed EFT.

The States of Mato Grosso do Sul and Rondônia are the most obvious examples of delay in terms of effective delay of implementation. The State of Mato Grosso do Sul enacted its first law by the legislative authority in 1994, but the first financial transfers to municipalities according to ecological criteria happened only in 2001. The enactment of the ecological fiscal transfers in Rondônia occurred in 1996 (Rondônia, 1996), but the state government implemented them only in 2003. The EFT scheme in Rondônia State focuses on the biodiversity conservation among municipalities using the indicator related to protected areas. In the State of Acre, the enactment occurred in 2004 (Acre, 2004), but the regulation took place only in 2009 (Acre, 2009).

In the States of Piauí and Paraíba, delay exhibits different characteristics. In the State of Piauí, the problem did not lie exactly with the delay between the adoption of the law and its regulation, despite the two-year wait (from 2008 to 2010). The municipalities did not claim the financial resources they were entitled to during the first years. In the State of Paraíba, delay was due to the failure to observe constitutional rules. Other political issues may explain in more detail the delay, but from 2011 to date, the fact is that the scheme has not yet been initiated.

In addition, the interruption and suspension of environmental criteria, such as in the case of Pernambuco, Minas Gerais, and Mato Grosso, also led to delays in the implementation of the EFT. The State of Mato Grosso interrupted the criteria related to environmental sanitation in 2004. In the State of Pernambuco, the qualitative indicator to measure protected areas has not been implemented yet, despite being enacted into law. The State of Minas Gerais presented the same problem as Pernambuco, however, the delay lasted 10 years.

Table 1 summarizes EFT implementation and delays in Brazilian states, by presenting the range of criteria adopted and the percentage of ICMS dedicated to it, reasons for the delay, time-lapsed, and actions to improve its implementation.

Clearly, there are cases of interruptions and cancellations of the enactment of environmental criteria that are described in the state in-depth analyses. In addition, there are cases in which the overall EFT scheme was delayed. Table 2 summarizes the two types of cases addressed in this study, presenting the group of states with cases of delays in the overall EFT implementation and the group of states with cases of interruption, cancellation, and delays of a single environmental criterion.

In order to further understand the characteristics of these two groups, four different types information were collected from four different sources. The first type was quite simply the comparison between the year of enactment of the EFT law in each State and its regulation by decree to determine or influence the delay, published in the official government gazette. The second was collected from

Table 1
Overview of EFT implementation in Brazil.

State	Criteria adopted (first legislation)	Percentageof ICMS	Reasons for the delay	Time-lapseto implement	Improvements
Paraíba	Protected areas; Solid waste management.	10%	Noncompliance with Federal Constitution.	From 2011 on.	No improvements
Rondônia	Protected areas.	5%	Lack of technical resources.	From 1996 to 2003.	Improvements in technical resources.
Mato Grosso do Sul	Protected areas.	5%	Lack of regulation of procedures; Absence of technical resources and staff; Redistributive effects.	From 1994 to 2001	Gradual implementation of rates used in the EFT. Improvements in technical resources and staff.
Acre	Protected areas.	5%	Lack of regulation of procedures.	From 2004 to 2009.	Regulation of procedures.
Piauí	Environmental education; Reforestation; Fire control; Soil conservation; Water conservation; Biodiversity protection (protected areas); Springs of water protection; Control of pollution sources; Soil-use control; Municipal environmental Policy.	5%	Lack of regulation of procedures; Asymmetric information.	From 2008 to 2014.	Regulation of procedures.
Mato Grosso	Protected areas; Environmental sanitation; Environment.	7%	Interruption of environmental sanitation criterion.	From 2001 to 2004 (Interruption of environmental sanitation criterion in 2004).	No improvements.
Pernambuco	Protected areas; Solid waste management.	6%	Qualitative evaluation for protected area not adopted.	From 2001 on (only for the implementation of the qualitative evaluation of protected areas).	No improvements.
Minas Gerais	Environment (including protected areas and solid waste management).	0.33%	Qualitative evaluation for protected area not adopted.	From 1996 to 2005 (only for the implementation of the qualitative evaluation of protected areas).	Qualitative evaluation of protected area was implemented.

Source: compiled by authors

Table 2
Two types of case study.

Types of case study	State
Cases of delays in EFT implementation	Paraíba
	Mato Grosso do Sul
	Rondônia
	Piauí
	Acre
Cases of interruption, cancellation, and delays of environmental criteria	Mato Grosso
	Minas Gerais
	Pernambuco

Source: the authors

each EFT State law to obtain the description of the specific transfer scheme adopted. Thirdly, data was collected from the legislative branch intended to detail the policy process of adopting the EFT in the State of Paraíba, namely from the Direct Unconstitutionality Action (ADIN), number 999.2012.000549–41001 (the period of analysis comprises the years 1991–2015). Lastly, the law granting access to public information (Brazilian law 12,527/2011) was evoked to gather information regarding the problems that states faced in the adoption of EFT.

To analyze interruption, cancellation, and/or delay of environmental criteria, two general questions were addressed to the environmental State agencies, based on the law on access to public information. In order to detail the problems that might have appeared in each State during the adoption of EFT we asked: 1) Why did the environmental state agency not implement the qualitative index to measure the percentage dedicated to protected areas in the initial years following EFT enactment? 2) Why did the environmental state agency not implement the EFT scheme in the first years following the first legislation enacted? In addition to these questions, in order to analyze the specific case of the interruption of solid waste criterion in the State of Mato Grosso do Sul, one final question was formulated: 3) Why did the environmental state agency interrupt the solid waste management criterion established in the EFT scheme?

A comparison between the group of states that adopted and the group that presented delays in implementing EFT was performed. Against a backdrop of transaction costs theory framework, this analysis addresses the gradual strategy in implementing the criteria of EFT. The next three subsections describe in more detail the delay in each EFT failure. The analysis proceeds in two steps: firstly, we describe with more detail each EFT scheme adopted, including each delay, interruption, and cancellation of criteria; secondly, we compare two groups of Brazilian states: those with and those without delay in implementing EFT.

4.1. Cases of delay in EFT implementation

4.1.1. Mato Grosso do Sul

The State of Mato Grosso do Sul was the third to adopt the EFT scheme. This state is located in the Midwest region, close to Paraná, the first adopter (Moura, 2015; Paulo and Camões, 2019b). According to supplementary law 077, enacted in 1994 (Mato Grosso do Sul, 1994), the scheme constitutes the transfer of five percent of *ICMS* to the municipalities that meet the ecological requirements. This law also includes others requirements not related to environmental issues.

The EFT only began in 2001 following the enactment of the state law number 2.193/2000, state law number 2.259/2001, and its regulatory ordinance 001/2001 promulgated by the state environmental agency known as Pantanal Institute of Environment, *"Instituto de Meio Ambiente do Pantanal"*. At that moment, the criteria related to the protected areas finally started to operate in the fiscal transfers to municipalities. One interesting point is that the first law enacted in 1994 did not determine any gradual increase of the percentage dedicated to ecological issues, while the set of legislation passed in 2000 and 2001 established three years to gradually increase the rates used in the scheme. This may well have had a positive effect in reducing the resistance of the political actors in the policy implementation moment.

The data collected suggest that many reasons could explain the time gap from 1994 to 2001. The information gathered pointed to the absence of regulation of rules to apply the EFT scheme, the need to discuss the theme with the political actors involved, and the lack of technical resources and staff, mainly to deal with environmental issues.

This case illustrates a substantial absence of institutional environment to enforce EFT. The absence of technical expertise to implement the scheme may have led to problems related to adverse-selection and moral hazard: adverse selection because the municipalities are at risk of using their lands without knowing the real opportunity cost in terms of EFT revenues; and moral hazard because it could lead to the non-compliance of the requirements to be met by local governments. So, some of them may have moved at different paces in the policy implementation. Also, the first legislation enacted in 1994 did not have *"a stable structure of exchange"* (North, 1990, p. 50) because the first law did not establish a gradual pace over time to implement the percentages dedicated to environmental criteria.

4.1.2. Rondônia

The State of Rondônia was the sixth state to adopt an EFT scheme and the first adopter in the North along with the state of Amapá (Paulo and Camões, 2019b). According to supplementary law 147 (Rondônia, 1996), local governments that host protected areas in their territories receive five percent of the amount collected from the ICMS. The participation of municipalities in the ICMS also comprises the following set of criteria: agriculture and livestock, population, equal transfers, municipal area, and the value added.

In 2001, the supplementary law 147 (Rondônia, 1996) regulated the EFT procedures, and the first fiscal transfers under the criteria of protected areas started in 2003. The legislation did not predict any gradual increase of ecological rates over the years. The time-lag observed from 1996 to 2003 may be explained by the lack of technical resources, mainly resulting from the absence of information systems for management, monitoring, and transparency to enforce those fiscal transfers.

The problems reported decreased over the years. However, they imposed substantial barriers to ensure that the actions of one or more municipalities were not different as initially planned to the implementation of EFT scheme. Based on the transaction-cost politics framework, a state environmental agency is essential to monitor the EFT scheme and, accordingly, to minimize moral hazard issues.

4.1.3. Acre

The state of Acre was the eleventh to adopt an EFT scheme and the third in the North following the States of Rondônia and Tocantins. The law 1530/2004 (Acre, 2004) created the EFT under the name ICMS Verde. The first scheme comprised five percent of the amount collected of the ICMS and a gradual increase of the percentage dedicated to environmental. In addition, the same law assigned to the environmental agency the task to regulate the technical criteria related to environmental issues. However, this regulation was enacted only in 2009, by the decree 4918/2009 (Acre, 2009).

This research faced severe barriers in obtaining detailed information explaining the gap from 2004 to 2009. We only know that the main problem that could explain the delay is the lack of regulation of procedures to enforce the EFT scheme. The environmental state agency reported the lack of an adequate structure to specify the legislation and, accordingly, impose the policy instrument. Moral hazard problems are likely to appear in the absence of a specific environmental agency.

4.1.4. Piauí

The State of Piauí was one of the last adopters. The EFT was established in this state under the name of *ICMS Ecológico* (Piauí, 2008), comprising three categories of environmental seals to measure the conditions of environmental quality among municipalities. The requirements to achieve the full seal include local government actions related to environmental education, reforestation, fire control, soil conservation, water conservation, biodiversity protection, springs of water protection, control of pollution sources, soil-use control, and the creation of a municipal environmental policy.

The promulgation of the law occurred in 2008 and the state environmental agency defined the details of the scheme in 2010. However, only in 2014 did the first ecological fiscal transfers to municipalities occur. This time-lag from 2008 to 2014 may be explained either by the absence of enforcement rules or by asymmetric information between the state and the municipalities, mainly from 2010 to 2014.

There is no precise explanation for the delay in enacting the decree by the environmental state agency. Regarding the asymmetric information, the municipalities did not request the state permission to receive any financial resource in the early years after the enactment of the Decree in 2010. In 2014, the municipality of Teresina was the only one to meet the requirements to receive the money from EFT and, as such, received the total amount of money allocated to municipalities in that period (around 9 million BRL). In 2017, only six local governments, out of 224, were eligible to receive the EFT.

4.1.5. Paraíba

The State of Paraíba is the next to last adopter and enacted its EFT law in 2011, without any gradual increase of the percentage dedicated to environmental criteria (Paraíba, 2011). This law established four criteria for transferring part of the ICMS collected by the state to municipalities. The first comprises seventy percent according to the value added in each territory, that is, the sales of good and products; the second, twenty percent equal for all municipalities; the third, five percent related to protected areas, which can be created by either the municipality, state, or federal governments; the fourth, five percent to support local actions for solid waste management, including the treatment of at least fifty percent of the amount of waste produced in the urban area.

The primary failure in this scheme was due to the fact that the Federal Constitution of Brazil establishes that the states can freely distribute to municipalities only one-fourth of twenty-five percent of the total amount raised by ICMS, that is, 6.25 percent of ICMS. In Paraíba, the sum of protected area (5%), solid waste management (5%), and the equal transfers (20%) goes up to thirty percent, that is more than the 6.25 percent allowed.

The representative, Francisco de Assis Quintans, who belongs to a right-leaning political party, proposed the EFT scheme under the law project 111/2011. However, the governor Ricardo Coutinho, who belongs to a left-leaning political party, used his veto power in October 2011. At that moment, the governor highlighted the incongruence between the proposed EFT and the Brazilian constitution. In addition, the Paraíba's constitution determines that only the governor can propose laws related to taxes. Nevertheless, the legislative assembly of Paraíba approved the EFT following the veto. Later on, the executive power filed an action suit in the State Court to repeal the law (Direct Unconstitutionality Action 999.2012.000549–41001). So far, the effects of EFT are suspended.

The extensive literature on ecological fiscal transfers predicts two goals for state governments during the operational stage of the policy tool regarding protected areas: 1) compensation for the surplus of environmental services produced by the municipalities; and 2) encouragement for local governments to create new protected areas (Droste et al., 2017; Ring, 2008; Sauquet et al., 2014). However, these desired policy outcomes may not necessarily be achieved (Paulo and Camões, 2019a). Dixit (2003) states that in the policy process related to redistributive policies the private groups are extremely important, including the *"organized groups lobby for taxes and transfers to benefit their members, and political parties and candidates in elections [that] make promises of taxes and transfers to attract the votes of pivotal groups"* (Dixit, 2003, p. 120).

In Paraíba's, the gridlock on the legislative-executive decision-making stage plagued the EFT implementation and motivated the judiciary branch to decide for the suspension of the policy implementation process. In fact, despite the fact that the federal constitution

assigns the executive and legislative branches the task of proposing and enacting a law, the judiciary branch may also play a role during the policy process. As Dixit (2003, p. 114) noted, *"lawyers constitute a very large proportion of legislators and high-ranking members of the executive branch in many countries; they therefore wield enormous power in politics and can be a potent* veto *player opposing reform."* Therefore, interest groups from the executive and legislative branches formed by those who own environmental assets and *vice versa*, and the judiciary branch plays an essential role in the policy process to guarantee that the constitutional principles are met. Accordingly, members of the legislative and executive branches that hold more power to enact the EFT scheme can steer the policy process.

The electoral politics literature also highlights that the members near the center of the political spectrum are less ideologically oriented (Dixit, 2003), and most of the adopters of EFT in Brazil belong to a center-political party, either proposing or enacting (Paulo and Camões, 2019b). The difference between the party-ideology of the executive and legislative branches in the State of Paraíba may also explain the interruption of the implementation process. Therefore, it is essential to distribute the costs and benefits of the proposed EFT scheme among the different political actors because *"the distribution of costs and benefits also has a very direct influence on the degree of conflict among private interests at enactment and during the life of the legislation"* (Horn, 1995, p. 30).

4.2. Cases of interruption, cancellation, and delays of environmental criteria

4.2.1. Pernambuco

The State of Pernambuco was the eighth adopter and its EFT scheme is known as *ICMS Socioambiental*. According to the law 11,899/2000 (Pernambuco, 2000), two criteria were established: one percent for protected areas (PA) and four percent for composting plants or landfill. The same law established other economic and social measures for ICMS transfers: fifteen percent for the relative share of each municipality, two percent for health, two percent for education, and one percent for increasing the local tax revenue. Although no gradual increase of the percentage dedicated to environmental criteria was established, the requirements imposed by the law changed over the years.

The law 15,929/2016 (Pernambuco, 2016) established the inclusion of more criteria in ICMS transfers in 2018, namely indicators related to protected areas, solid waste management, water source and rivers, and waste recycling plants. In addition, it determines a set of social indexes, such as the number of child mortality (inversely), family health program, child enrollment in public education (kindergartens), elementary public schools, education development, jails, and the number of lethal violent crimes (inversely). By default, the ICMS transfers were also based on a set of economic indicators, measured by the gross domestic products (GDP) *"per capita"*, to stimulate the increase of municipal tax revenue and to assist less-favored municipalities.

As time evolves, political actors tend to adapt institutional arrangements due to changes in the politics and economy as a way of minimizing transaction costs (Horn, 1995; Dixit, 1996; Epstein and O'Halloran, 1999). As Horn (1995, p. 25) has noted, the *"legislators attempt to minimize transaction problems by selecting the best institutional arrangements, or "instruments," from among those available."* The quality index needed to measure the protected area has not yet been put in place. In 2002, the State of Pernambuco used only the PA *per hectare* to measure the biodiversity conservation. After that, the Index of Municipal Biodiversity Conservation (ICBM), which established measurement of the PA quality, was included in the EFT.

As of now, Pernambuco has not enforced the quality of PAs, but the EFT law is still in place. The environmental agency of the state (CPRH) has yet to fill the details in the legislation to lay down the specific rules on the quality of protected areas and enforce it in the ecological fiscal transfers. Due to the lack of expertise in this field, CPRH needs to hire specialized public servants to design the quality index of protected areas. The environmental agency of the state does not have a sharp deadline to impose the quality index. To minimize the impact of redistributive effects, they are currently using equal transfers for all municipalities.

4.2.2. Minas Gerais

The State of Minas Gerais was the fourth state to adopt the EFT by enacting its first scheme in 1996. It is known as the Robin Hood Law because of its redistributive effects. The environment criteria include solid waste management and protected areas, which may be created by the federal, state or municipal government, and by private landowners. The environmental criteria comprised 0.333 percent of the total amount of ICMS. This rate increased to 0.666 percent in 1997 and then to one percent in 1998.

The first legislation established a qualitative index to measure the protected areas in 1995, while its implementation occurred only in 2005, following the enactment of the regulatory deliberation 86/2005 by the state environmental agency (COPAM). The quality index composes the index of biodiversity conservation factor of the protected area. Currently, the quality index of protected area comprises a set of qualitative measurements, such as monitoring, level of physical quality of the protected area, the management plan of the protected area, the infrastructure of protected area, and so on.

Paulo and Camões (2019b) studied the effects on new protected areas created by local governments in Minas Gerais after the introduction of qualitative index by the state government. The findings suggest that *"the rate of designation [of municipal protected areas] slows down after the introduction of the quality criterion, which may be explained by costs associated with it."*

4.2.3. Mato Grosso

Mato Grosso was the ninth to adopt EFT and the second in the region. The enactment of the first law in 2000 comprises three

environmental criteria: 1) environmental sanitation, 2) protected areas, and 3) environment. The same law predicts other criteria for ICMS transfers, such as total area of the municipality, population, equal transfers,[2] and the increase in revenue from municipal taxes. In 2004, the complementary law 157/2004 abolished environmental sanitation criterion.

In regard to the cancellation of the environmental sanitation criterion, the law enacted in 2000 established a time horizon of three years to gradually implement the scheme. Therefore, and although the legislation writers could not predict the cancellation of this criteria, they did predict some level of uncertainty to enforce EFT. In this sense, we conclude that it can be a standard process based on the transaction cost theory.

4.3. Comparison of groups with and without delay

Comparing the two groups of Brazilian states, adopters with and without delays between the first law and the effective implementation, the gradual increase of the environmental percentages is more salient in the group without delays. In contrast, the group with delays take fewer years than the group without delay to impose the scheme on municipalities effectively. This pattern explains the delays of EFT schemes. The transaction-cost politics predicts that gradualism can minimize the resistance among political actors and, accordingly, facilitate the policy implementation process (Krutilla, 2011). Besides, it can facilitate the learning process in environmental state agencies, as most of them lack human resources and technical expertise necessary to do it. As Dixit (2003, p. 127) noted, *"the quality of administration in LDCs is often poor. In the agency context, this implies larger errors of observation"*.

4.4. Summing up

Overall, the case studies highlight four possible causal mechanisms that are likely to explain delays, interruptions, and cancellations presented throughout the policy process of adoption the EFT (see Table 3).

The case of the State of Paraíba illustrates gridlock during the policy formulation process, a situation in which the governor belongs to a left-leaning party, while the proposer in the legislative branch is from a right-leaning political party. As the theoretical framework predicts, reaching an agreement among political actors in this situation is more demanding. Also, as expected in the electoral politics literature, political party members far from the center of the ideological spectrum are less likely to reach an agreement. Therefore, it is recommended to distribute the costs and benefits of the policy tool among political actors involved in the policy process.

Also, many states presented problems related to the political-bureaucratic relationship at the implementation stage. First, some state environmental agencies were short in terms of institutional structure and technical expertise to enforce the EFT scheme (Rondônia and Mato Grosso do Sul). Second, in the case of Mato Grosso do Sul, a longer period of time was necessary to discuss the issue with municipalities, that is, the state environmental agency had to await the moment in time so that the actors could reached an equilibrium. Third, the State of Piauí illustrated problems related to asymmetric information to enforce the EFT. In the beginning, only one municipality met the requirements to receive the money from EFT.

5. Conclusion

This article described how delays, interruptions, and cancellations in the implementation of EFT occurred across Brazilian states and attempted to explain the corresponding patterns based on the transaction-cost politics framework. It contributes to EFT literature in the sense that it is the first study to address this issue in Brazil. Moreover, it focuses on another theoretical lens to understand the process of policy delay, interruptions and cancellations.

The main contribution of this research is to provide empirical evidence that the legislative decision-making costs and the agency costs can make the policy implementation of EFT more difficult. In more detail, the case studies provide evidence of absence of technical and human resources, which can lead to agency problems and issues related to party-ideology and political coalitions and also increase legislative-decision making costs. The qualitative index of protected area, which may constitute the EFT scheme, imposes additional costs to local governments because the State of Minas Gerais presented a substantial delay in implementing it (Paulo and Camões, 2019b). The state of Pernambuco has not applied it so far. However, it calls for future research so it can be empirically tested in other Brazilian states (Paulo and Camões, 2019b).

Also, we note that although the percentage of ICMS allowed for EFT remains constant over time (6.25 percent), in some cases the range of criteria expanded among states. In fact, powers change among players over time and new agendas emerge to respond to external political and economic shocks. However, there is a lack of studies that investigate whether the inclusion of more criteria on EFT jeopardizes the effectiveness of the policy tool in achieving environmental goals at the local level.

The results also provide some ground for policy recommendations, particularly for developing countries such as Brazil. In the first place, it is important to include all relevant political actors (leaders from groups of interests) from the beginning, that is, president of the association of municipalities, governors, and leaders of congress, because they can reduce future conflicts that generate transaction costs. A good design of the policy tool contributes to reduce future transaction costs that harm the implementation of the process.

Second, the lack of human resources and infrastructure increases the uncertainty among local governments to meet EFT criteria. Therefore, flexibility is a requirement so as to adopt the policy tool. Also, we suggest a gradual pace of implementation because EFT is a

[2] It is calculated dividing the value corresponding to the percentage of this criterion by the number of Municipalities in the State.

Table 3
Summing up.

State	Stage of the Policy Process	Possible causal links for Delays, interruptions and cancellations
Paraíba	Policy formulation	Executive-legislative relationship: 1) *Gridlock: executive and legislative branch controlled by different political parties.*
Mato Grosso do Sul	Policy implementation	Political-bureaucratic relationship: *2)Legislative and executive branches delegated the implementation to environmental agencies, and they have lack of structure and expertise;* 3) *Municipalities press environmental agencies to reach an equilibrium with respect to EFT criteria;* 4) *Asymmetric information among municipalities.*
Rondônia		
Pernambuco		
Piauí		

Source: the authors

redistributive policy. It can reduce the substantial financial impact on municipal budgets.

Third, flexibility should be followed by a commitment signal of the state government to support local governments during the first years and the limits of possible changes in EFT criteria should be agreed during the design of the policy tool. A commitment of a state government to offer technical support to municipal governments, for example, can reduce some uncertainty in the future among municipalities, mainly in regard to meeting EFT criteria.

Author statement

All persons who meet authorship criteria are listed as authors, and all authors certify that they have participated sufficiently in the work to take public responsibility for the content, including participation in the concept, design, analysis, writing, or revision of the manuscript. Furthermore, each author certifies that this material or similar material has not been and will not be submitted to or published in any other publication before its appearance in the Environmental Development. Also, we wish to confirm that there are no known conflicts of interest associated with this publication.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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