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Social Organizations and efficient public spending: an incentive analysis

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ABSTRACT

This study identifies the determinants of virtuous or vicious behavior by Social Organizations (SOs) in the provision of public services in Brazil and proposes institutional adjustment mechanisms to promote efficiency in public spending. Drawing on the Economics of Information, it constructs a decision model whose central result is: the probability of prosocial behavior is maximized when the SO is longstanding, genuinely altruistic, and embedded in an efficient legal environment. Model plausibility is assessed through an illustrative case study based on Newcomb-Benford's Law, applied to seven SO-managed health units across Brazilian states — the illustrative results are consistent with theoretical predictions, though the limited sample size precludes definitive generalization. Based on mechanism design theory, the study recommends prioritizing longstanding SOs with consolidated reputations, enforcing transparency with effective sanctions, and harmonizing subnational legislation toward federal standards.

Keywords: Social Organizations; Public Services; Economics of Information and Incentives; Mechanism Design; Newcomb-Benford's Law.
JEL Classification: L33; D82; H83.

SUMMARY

INTRODUCTION

Published on August 31, 2023, Complementary Law No. 200, known as the "New Brazilian Fiscal Framework," is fundamentally based on a strategy to curb the growth of public spending. This context—in which there is a need to limit the increase in public expenditures without, however, losing sight of meeting social demands—reinforces the importance of the quality of public spending—and, in particular, the efficiency of partnerships between the government and the nonprofit private sector in the provision of public services.

In Brazil, with the advent of New Public Management in the 1990s, the federal government began to increasingly share the provision of public goods and services with the Third Sector.[1] In particular, the institutional model of Social Organizations (OSs) was implemented in the 1990s and thereafter, at the federal level and in several Brazilian states, resulting in successful partnerships—such as the José Alencar Children's Hospital in Brasília and the Luzia de Pinho Melo Clinical Hospital—but also serious cases of embezzlement, such as Operation Maus Caminhos and the scandals involving OSs in Rio de Janeiro.

This asymmetry in outcomes leads to the observation that, although OSs have been operating for more than two decades in Brazil, they constitute an " " arrangement that has yet to be thoroughly examined in the context of public management and service delivery. In this regard, the objective of this study is to better understand the determinants of virtuous or corrupt behavior among Social Organizations (OSs) with a view to proposing institutional adjustment mechanisms that lead to higher quality public spending with respect to the Social Organizations system in Brazil.

The methodology combines a literature review with the development of an information and incentive economics model and, to test its validity, a statistical study based on Newcomb–Benford's Law.

The main finding of the model is that efficiency in public spending is more likely to be achieved within the partnership framework via Social Organizations when long-standing and altruistic organizations participate, within an "efficient" legal context that incorporates transparency rules and control mechanisms.

As a contribution to public finance management, the study presents recommendations based on mechanism design theory aimed at attracting altruistic and long-lived CSOs, discouraging opportunistic ones, and harmonizing subnational legislation with federal standards—recommendations that are particularly relevant in the current context of fiscal consolidation and

the pursuit of greater efficiency in public spending.

The study is organized into four sections, followed by a conclusion: contextualization of social organizations in Brazil; economic model; statistical analysis; and final considerations.

SOCIAL ORGANIZATIONS IN BRAZIL

Context and Performance of Social Organizations in Brazil

The partnership model between the State and Social Organizations arrived in Brazil with the Master Plan for the Reform of the State Apparatus (PDRAE) and the 1995 Management Reform, materializing in Law No. 9,637, of May 15, 1998, which provides for the qualification of entities as Social Organizations and the creation of the National Public-Private Partnership Program (Bugarin et al., 2003). Challenged before the Federal Supreme Court through ADI No. 1,923-5, the law was declared constitutional in 2015, consolidating the model as a legitimate alternative for public management.

Since then, the model has expanded significantly at the subnational level: with the exception of Acre, all states have their own legislation on OSs, and at least 258 municipalities have enacted laws on the matter. Currently, Brazil has 328 OSs managing 1,674 public facilities, mostly in the health sector (OSs Portal, 2023). Subnational legislation, however, diverges from federal standards in key aspects of governance, transparency, and oversight—a variation that, as will be argued, has direct implications for the incentives driving these organizations' operations.

The accumulated experience reveals mixed results. Among the successful cases, the José Alencar Children's Hospital in Brasília—accredited for excellence by ONA—and the Luzia de Pinho Melo Clinical Hospital in Mogi das Cruzes, managed by SPDM and a leading center for high-complexity care, stand out. Comparative studies corroborate this finding: an analysis by the Santa Catarina Court of Auditors (Rodrigues & Sallum, 2017) showed that hospitals managed by OSs were, on average, 46% more efficient than those under direct administration during the 2012–2017 period; Tonelloto et al. (2019) found similar results for high-complexity hospitals in São Paulo.

However, there is no shortage of counterexamples. Operation Maus Caminhos, launched in 2016, uncovered embezzlement exceeding R$ 100 million in the Amazonas health system through an OS used as a front. In Rio de Janeiro, investigations in 2020 into a kickback scheme involving the contracting of OSs to manage Emergency Care Units led to the impeachment of the state governor. An evaluation report by the CGU (2020), consolidating 21 audits conducted

between 2015 and 2020, identified the following as recurring causes of irregularities: deficient controls by supervisory entities, non-compliance in the selection and qualification process for OSs, and serious irregularities in contract execution.

This disparity in outcomes—with high-performing partnerships coexisting alongside cases of misappropriation and inefficiency—prompts an investigation into the incentives that drive the behavior of OSs, which is the focus of the following sections.

Incentives in the OS Model

Since the launch of the partnership model between the government and civil society organizations, these organizations have grown, multiplied, and diversified, leaving an unmistakable legacy of contributions to public policy (Fux et al., 2017). The challenge arising from this process is to identify the factors that determine the success or failure of these partnerships, in order to design an appropriate incentive structure.

These elements can be organized into two dimensions. The first concerns the legal framework: the government's legislation on CSOs and the management contract, which govern the relationship between the parties, establish monitoring indicators and efficiency targets, and shape the core incentives for the organizations' operations. The second dimension concerns internal and external controls: the capacity of public institutions to exercise these controls, with an adequate technical staff and processes that promote transparency and accountability within the organizations.

In addition to these institutional dimensions, the literature links positive outcomes to internal characteristics of the organizations themselves. Fux et al. (2017) argue that the ideal private partner should demonstrate alignment with the partnership's objectives, a well-established reputation, and managerial quality and maturity—and that the most stable partnerships are precisely those established with well-established organizations that do not depend exclusively on public contracts for their survival. Selection guided by these criteria helps weed out opportunistic organizations "that undermine the very purpose of seeking partnerships out of an instinct for survival or institutional greed" (Fux et al., 2017).

Two characteristics emerge as particularly relevant. The first is **longevity**: longer-standing organizations possess a results-oriented organizational culture, established expertise in the activity covered by the partnership, and operational networks that ensure diversified revenue streams—which makes them less likely to engage in behaviors that could compromise their reputation. The second is **altruism**: although all civil society organizations are formally esta-

blished as nonprofit entities, not all operate with a genuine social purpose. An organization is considered altruistic when its existence is motivated by carrying out activities for the benefit of society, with the partnership with the government serving as a means to that end—and not an end in itself. Katz and Rosenberg (2005) note that non-altruistic organizations may mimic altruistic behavior to capture the tax benefits and contracting opportunities associated with that status.

These two attributes—longevity and altruism—combined with an efficient legal and institutional environment, constitute the three pillars of the theoretical model developed in the following section.

ECONOMIC MODEL

Elements of the Decision Model

In order to theoretically analyze the incentives associated with positive and negative outcomes—in terms of benefits to society—when public services are provided by OSs acting as partners contracted by the government, and taking into account the points raised in the previous chapter, this study employed an adaptation of the model presented by Bugarin and Meneguin (2016), which addresses incentives for dedication and corruption in public service.

The model proposed here assumes the existence of two categories of OSs: long-standing (*L category*) and young (*J category*). Long-standing organizations are characterized primarily by institutional strength, with well-defined organizational missions and values and experience in the activity or service being provided. Young organizations, in turn, are characterized by their recent formation and ongoing organizational development, with internal institutional processes that are not yet consolidated. The main distinction between these organizations lies in their ability to generate revenue: long-standing institutions receive revenue from public or private funding through the delivery of products or services, via contracts or agreements, as well as from donations received based on their track record as autonomous, altruistic organizations (carrying out their institutional mission), while young institutions are supported primarily through government funding.

This difference can also be understood as a distinction regarding the present value of the future revenue stream that the organizations will receive: long-standing institutions receive the value associated with contracts, agreements, and donations—in present-value terms, S_L ly throughout their institutional existence; younger organizations, in turn, receive a lower reve-

nue $S_J < S_L$. This hypothesis of a higher present value of revenue streams for long-standing organizations is justified by the prior existence of these institutions, which has allowed them sufficient time to establish organizational strategies aimed at the continuity and sustainability of their activities, such as building a good reputation as an altruistic organization, which will lead to future contracts and donations; thus, this revenue stream will only be compromised if the organization's reputation is tarnished, whereas younger institutions receive revenue with less enduring characteristics, and their revenue stream may be significantly reduced with the termination of a public contract, for example.

Regardless of their category—whether long-standing or young—CSOs, even though they are established as nonprofit entities, derive utility from receiving revenue, which covers their operating costs. The organization also places value on the social benefit resulting from its activities. Following the altruism model (Newhouse, 1970)—which emphasizes the role of altruistic intentions among managers of nonprofit institutions—it is posited that social benefit constitutes one of the main motivations for the activities of OSs.

However, regardless of whether they are young or long-established organizations, different institutions assign varying weights to the value of their contribution to society, in light of the private returns they receive through funding (public or private) or donations. Katz and Rosenberg (2005) argue that individuals identified as altruistic may receive rents stemming from the fact that they are perceived as altruistic, and that non-altruists may attempt to capture these rents by imitating such behavior. It is assumed that there are two types of organizations: "true altruists," which place a high value on their contribution to generating social welfare (e.g. α_V), and "apparent altruists," which are motivated by obtaining the benefits available to nonprofit institutions and contracting opportunities with the public sector under this partnership model, while placing a low value on their contribution to social welfare (e.g. α_A).

In the terms explained, we can express the organization's utility $S + \alpha B_s$, where S is the present value of the total revenue resulting from its activity—which depends on the organization's category (L or J), through its revenue S_I, $I = L, J$, and the decisions made in the performance of its function; B_s is the social benefit generated by this activity; and $\alpha = \alpha_V, \alpha_A$ is the type of organization, with $\alpha_V > 1 > \alpha_A$. In this proposed model, it is assumed that the organization acts with the aim of maximizing its utility, considering the net benefit it will obtain from the following possible strategies:

a) **Strategy *r***: to operate in a manner that complies with the terms of the management contract, delivering only enough to avoid penalties, regardless of the final social outcome. This

OS will not devote effort to providing higher-quality activities or services, in order to avoid the risk of penalties and to prevent an increase in its c_r (the institutional bureaucratic cost of meeting contractual requirements), even if this approach negatively compromises the social benefit resulting from its activities. Given that this OS operates without regard for quality, the social benefit generated by this OS is considered $B_r = 0$;

b) **Strategy *s***: to act with commitment and dedication in order to deliver higher-quality results, contributing positively to social well-being, even though this approach may result in higher organizational costs and the risk of penalties due to the use of innovative methods in carrying out its activities, failure to strictly comply with the contract, or failure to meet previously agreed-upon goals. The social benefit resulting from this strategy is denoted by $B_s > 0$. In this case, the OS will devote effort to actions that promote social well-being, incurring an institutional cost c_s associated with this work that generates social benefit;

c) **Strategy *p***: acting to obtain direct private benefit through improper or underhanded means, characterized by various types of corruption, resulting in additional $B_p > 0$ revenue (positive private benefit) for the OS's managers, even if this increases the risk of punishment for irregular conduct. There is a c_p cost associated with the effort to implement corrupt management, and it is considered that no social benefit results from this.

It is assumed that the private benefit obtained through dishonest conduct is greater than the benefit to society resulting from acting in society's interest, $B_p > B_S$, that there is a net benefit from the strategies (s and p), that is, B_p , $\alpha B_S > c_e$, $e \in \{s, p\}$, regardless of their type, $\alpha = \alpha_V, \alpha_A$, and that the cost of acting boldly, according to the strategies s and p, is greater than the cost resulting from the strategy r, c_s, $c_p > c_r$, since, in order to act altruistically or corruptly, it is assumed that the OS has incurred the standard bureaucratic costs associated with the rules established by the legal framework, as well as the costs associated with acting s or p.

Given that the strategies—which are diametrically opposed, s and p arise from innovative actions, both carry the risk of punishment for corrupt conduct or for breach of contract. A potential consequence of such punishment is the loss of revenue resulting from the suspension of contracts with the government, as well as the jeopardizing of future contracts and donations—especially for organizations that enjoy a good reputation, a characteristic that favors both actions for the benefit of society and actions for private gain.

This model also considers the effect of the institutional framework (the legal design of the model and the quality of oversight exercised) on the organizations' revenue, measured according to the parameter Ω_e (Q), given the strategies e. Considering the costs and benefits of the

operational strategies for CSOs, for $S = \{S_L, S_J\}$ and $\alpha = \{\alpha_I, \alpha_A\}$, their utility will be:

When choosing the strategy r: $U(r) = \Omega_r (Q)\, S - c_r + \alpha B_r$

When choosing the strategy s: $U(s) = \Omega_s (Q)\, S - c_s + \alpha B_s$

When choosing the strategy p: $U(p) = \Omega_p (Q)\, S - c_p + B_p$

In the proposed model, the variable Q reflects the quality of partnership rules and the state's institutional control, which can be of two types, as described:

i) **Efficient** ($Q = EF$): refers to robust legislation regarding incentives, with restrictions on the composition of the management board, the definition of relevant items that must be included in the management contract, and mechanisms for transparency and efficient external oversight;

ii) **Inefficient** ($Q = IN$): This refers to weak legislation, with the potential for conflicts of interest regarding the composition of the management board, and missing or generic performance targets and indicators, which undermine transparency and effective oversight.

It is considered that rules consisting of efficient incentives and controls ($Q = EF$) create an environment with a high risk of punishment for an organization that chooses the p strategy; conversely, an environment with inefficient rules and controls ($Q = IN$) fosters impunity in the event of dishonest behavior by the organization, thus having no impact on the organization's revenue stream when it adopts the $e = p$ strategy, such that $\Omega_p(\mathrm{EF}) < 1$ and $\Omega_p(\mathrm{IN}) = 1$.

In cases where the organization chooses the strategies $e = (r, s)$, which involve fulfilling the terms agreed upon in the contract, it is understood that the legal context and the quality of control do not impact the organizations' revenue streams. Thus, we find that $\Omega_e (Q) = 1$, for $e = (r, s)$ and $Q = (EF, IN)$.

Furthermore, in accordance with the assumptions described above, the model also takes into account costs c_e according to the categories of social organizations (L or J): long-standing institutions have lower costs for acting in a manner dedicated to society (c_s), while young institutions have higher costs for acting in a manner dedicated to society, relative to one another. This is due to the fact that long-standing organizations, unlike younger institutions, have—because of their prior existence—established networks for altruistic action, as well as an organizational culture focused on providing services for the benefit of society.

Still on the subject of costs: long-standing institutions face higher costs when acting corruptly (c_p), while younger institutions face lower costs when acting corruptly , relative to one another, given that older organizations—because they receive significant revenue from dona-

tions or private funding—are subject to greater scrutiny from external, independent audits and are accountable to a larger number of stakeholders.

Finally, regarding the cost of the strategy *r*: it is considered that the cost involved in this decision (c_r) is equivalent across institutions, regardless of their age, as it takes into account only the cost of complying with the rules of the management contract, which establishes common rules for social organizations (OS) within the same entity. Thus: $c_s(L) < c_s(J)$, $c_p(L) > c_p(J)$ and $c_r(L) = c_r(J)$.

Consequently, the utility depends on the type of OS and the type of institutional environment: $U(e; (Q, I, \alpha)) = \Omega_e(Q)\, S - c_e(I) + \alpha B_e$, for $I = (L,J)$. As in $\alpha B_r = 0$:

$$U(r;(Q, I)) = \Omega_r(Q)\, S - c_r(I)$$
$$U(s;(Q, I, \alpha)) = \Omega_s(Q)\, S - c_s(I) + \alpha B_s$$
$$U(p;(Q, I)) = \Omega_p(Q)\, S - c_p(I) + B_p$$

Optimal Decisions by Health Organizations

Based on an understanding of the model's elements, possible strategies, and the utilities presented, we analyze the decisions made in different contexts:

1. For $Q = IN$: $U(r;(Q, I)) = S - c_r(I)$

$$U(s;(Q, I, \alpha)) = S - c_s(I) + \alpha B_{s>0}$$
$$U(p;(Q, I)) = S - c_p(I) + B_{p>0}$$

Comparing the utilities of the strategies *s* and *p* with that of the strategy *r*:

$$U(s;(Q, I, \alpha)) > U(r;(Q, I)) \quad (1)$$
$$U(p;(Q, I)) > U(r;(Q, I)) \quad (2)$$

For $U(s) > U(p)$:

$$- c_s(I) + \alpha B_s > - c_p(I) + B_{p>0}$$
$$\alpha B_s^{\uparrow} - B_p > + c_s(I)_{\downarrow} - c_p(I)^{\uparrow} \quad (3)$$

Observing inequality (3), we see that, for $I = L$ and $\alpha = \alpha_V$, these will be precisely the OSs most likely to choose the strategys in a scenario $Q = IN$, since $c_s(L) < c_s(J)$, $c_p(L) > c_p(J)$ and $\alpha_V > \alpha_A$, so that this probability decreases for $I = L$ and $\alpha = \alpha_A$, making the existence of such

an organization unlikely.

For $I = J$, as well as $c_s(L) < c_s(J)$ and $c_p(L) > c_p(J)$, only if αB_s is sufficiently large will that OS chooses . This implies that OSs of the type α_V will be more likely to adopt the strategy s, in this context. Furthermore, for an OS, $I = J$ and $\alpha = \alpha_A$, to derive $U(s) > U(p)$ with $Q = IN$, $c_s(J)$must be sufficiently small and/or $c_p(J)$, sufficiently high, which seems far removed from a reality with $Q = IN$, in which the rules are fragile and incapable of making $c_p(J)$ costly enough for that OS's optimal strategy to be s.

Note that, in this environment $Q = IN$, given (1) and (2), the OS's optimal decision will never be r. And the scenario is bleak, since only OSs with category $I = L$ and type $\alpha = \alpha_V$ will, at a high cost, obtain greater utility with the strategy s.

2. For $Q = EF$: $U(r;(Q, I)) = S - c_r(I)$

$$U(s;(Q, I, \alpha)) = S - c_s(I) + \alpha B_s \underbrace{\quad}_{>0}$$

$$U(p;(Q, I)) = \Omega_p(Q)\, S \underbrace{\quad}_{<S} - c_p(I) + B_p \underbrace{\quad}_{>0}$$

Comparing the benefits of s and r: $U(s;(Q, I, \alpha)) > U(r;(Q, I))$.

For $U(s) > U(p)$:

$$-c_s(I) + \alpha B_s > S\underbrace{(\Omega_p(Q) - 1)}_{<1} - c_p(I) + B_p \underbrace{\quad}_{>0}$$

$$\underbrace{c_s(I) - c_p(I)}_{\downarrow} < \overbrace{\alpha B_s - b_p}^{\uparrow} - S\underbrace{(\Omega_p(Q) - 1)}_{>0} \tag{4}$$

From (4), it follows that OSs of the types $I = L$ and $\alpha = \alpha_V$ are more likely to adopt s, since $c_s(L) < c_s(J)$, $c_p(L) > c_p(J)$, $\alpha_V > \alpha_A$ and the last term of the inequality, - S($\Omega_p(Q)$ - 1), which is positive—is greater for long-lived institutions, given that $S_L > S_J$.

The novelty in this context concerns OSs of the types $I = L$ and $\alpha = \alpha_A$ and of types $I = J$ and $\alpha = \alpha_V$, which will also adopt the strategy s with greater probability, since, given that S($\Omega_p(Q)$ - 1) is negative, the difference between $c_s(I)$ - $c_p(I)$ required for the optimal decision to be s is:

$$\alpha B_s - B_p > S(\Omega_p(Q) - 1) + c_s(I) - c_p(I) \tag{5}$$

is smaller than in the case $Q = IN$ (compare (3) and (5)).

For $I = J$ and $\alpha = \alpha_A$, since $\alpha_A < 1$, only if $c_s(J) - c_p(J)$ is sufficiently small will this OS

choose s, which can be expected to hold when $Q = EF$, with rules and controls that make $c_s(J)$ smaller and $c_p(J)$ large enough.

Furthermore, for $U(r) > U(p)$:

$$-c_r(I) > S\underbrace{\left(\Omega_p(Q) - 1\right)}_{<0} - c_p(I) + \underbrace{B_p}_{>0}$$

$$c_p(I) - c_r(I) > S\left(\Omega_p(Q) - 1\right) + B_p$$

$$\underbrace{c_r(I) - c_p(I)}_{<0} < -\underbrace{S\left(\Omega_p(Q) - 1\right)}_{>0} - B_p$$

In this case, for any of the types $I = (J,L)$ and $\alpha = (\alpha_A, \alpha_V)$, the optimal choice will depend on the difference between the costs of r and p, the more costly it is to act dishonestly, $c_p(I)$, and the less costly it is to act honestly, $c_r(I)$, the greater the likelihood that the OS will choose the socially *second best strategy r*.

Optimizing Incentives

The results found in the theoretical model suggest that an environment characterized by an inefficient legal and institutional framework of the state tends to attract corrupt behavior by OSs. Such an imbalance of incentives raises relevant questions. Does this management model deserve to be promoted? Is it possible to make changes to the legal framework of state and local governments that promote incentives for altruistic behavior and make corrupt behavior less attractive? Is there also the possibility of changes that do not require legislative amendments and that lead to improvements in the incentives involved? In order to contribute to the development of strategies that address these questions and, thereby, help improve the quality of public spending, this section applies mechanism design theory to the OS management model.

Given the previous analysis of the organizations' decisions, the proposed theoretical model provides a framework for proposals to improve the design of this partnership. There is room to better align incentives so that behavior that benefits society is rewarded and the organization derives greater utility from such actions—a possibility described by Ω_s (EF) > 1, which can be achieved by encouraging behavior that generates social benefits.

In this case, according to $Q = EF$: $U(r;(Q, I)) = S - c_r(I)$

$$U(s;(Q,I,\alpha)) = \underbrace{\Omega_s(Q)\,S}_{>S} - c_s(I) + \underbrace{\alpha B_s}_{>0}$$

$$U(p;(Q,I)) = \underbrace{\Omega_p(Q)\,S}_{<S} - c_p(I) + \underbrace{B_p}_{>0}$$

Comparing the utilities derived from s and r: $U(s;(Q, I, \alpha)) > U(r;(Q, I))$.

Thus, so that $U(s) > U(p)$:

$$
\begin{aligned}
& -c_s(I) + \alpha B_s > (\Omega_p(Q) - \Omega_s(Q))\, S - c_p(I) + B_p \\
& c_s(I) - c_p(I) < \alpha B_s - b_p - S(\Omega_p(Q) - \Omega_s(Q))
\end{aligned}
\tag{6}
$$

As a result of this new set of rules, which favors the adoption of the strategy s, behavior that benefits society becomes the better choice for more organizations of the types $I = L$ and $\alpha = \alpha_A$ as well as the types $I = J$ and $\alpha = \alpha_V$, in addition to the OSs of the types $I = L$ and $\alpha = \alpha_V$, as the difference between the costs $c_s(I) - c_p(I)$ required for the optimal decision to be s is reduced. This new design better aligns incentives with the provision of public services for the benefit of society and, consequently, reduces the State's oversight costs.

Thus, with regard to a redesign of legal provisions, the following changes are proposed to promote contracting with altruistic organizations (such as α_V), including: the establishment of a rule in the public call for proposals for partnerships with OSs that considers, when contract renewal is possible, the achievement of predefined excellence benchmarks set forth in the management contract; and that it require the organization to adopt a code of ethical conduct and an integrity policy.

Consideration should also be given to redefining the granting of subsidies and tax exemptions to nonprofit organizations, linking them to results, and establishing mechanisms to incentivize fundraising through donations, thereby contributing to the diversification of revenue sources and the strengthening of CSOs' institutional reputation.

With regard to potential changes that do not require legal amendments, a natural way to promote the adoption of the s strategy is through the establishment of awards granted by the government or by private institutions in partnership with the government, in recognition of the provision of excellent services. In this regard, it is worth highlighting the importance of the bonus mechanism in the redesign of partnerships through OSs, particularly in a context where the existing culture of punishment is flawed, as observed by Bugarin and Ribeiro (2021) in their analysis of the airport concession mechanism in Brazil. According to the article, the lower the government's credibility in enforcing penalties in the event of contractual noncompliance, the greater the likelihood that the contracted organization will fail to fulfill its obligations.

Finally, it is important to assess the characteristics related to the legal context and the exercise of external control over OSs when they operate for private benefit, within a framework

of efficient incentives—more specifically, those related to the theoretical model known as Ω_p (EF) < 1, which align with federal regulations: rules regarding the composition of the OS's governing board that eliminate adverse incentives; setting an upper limit on executive salaries; mandatory criteria to be included in management contracts; qualification of oversight institutions; and appropriate and enforced penalties. Thus, given the relevance and potential of OSs to serve the public good, considerations for optimizing incentives can greatly contribute to the quality of public services provided by nonprofit institutions acting as partners of the State.

STATISTICAL EVIDENCE

The theoretical model outlined in Section 3 is based on the following hypotheses:

Long-standing institutions, characterized primarily by institutional strength, with internalized mission and values, a well-established altruistic organizational culture, and experience in the activity or service being provided, tend to operate with greater seriousness and dedication, as they have more to lose, such as their good reputation;

Young institutions, characterized by their recent establishment and unconsolidated internal processes, tend to operate with less seriousness, as they generally have less to lose; they are sometimes formed solely for the purpose of obtaining advantages from contracts with the government, without concern for altruistic behavior;

The quality of the regulations governing the partnership and the government entity's institutional oversight can encourage the OS's performance. Effective legislation and the effective exercise of government oversight can increase the utility of an OS that operates with seriousness and dedication, providing incentives for such behavior, while also reducing the utility of an OS that does not pursue these objectives, thereby increasing the risk of dishonest conduct;

Similarly, inefficient legislation or ineffective oversight can increase the utility of an OS that engages in abusive behavior, since the risk of acting dishonestly, in this context, is lower, making the private benefit of such behavior attractive, as well as reducing the utility of an OS that behaves altruistically, diminishing the chances of reward for such behavior and increasing the risk of acting innovatively, even if the goal of the action is pro-society.

Given these four hypotheses, this study employs the provisions of Newcomb-Benford's Law (Newcomb, 1881; Benford, 1938) as a method for indirectly assessing the credibility of the proposed theoretical model, to analyze the accounting data of seven units managed by OSs in the health sector, in the form of a case study.

Newcomb-Benford's Law and aplications

Newcomb-Benford's Law (NBL) addresses the frequency of leading digits in randomly generated data sets and, contrary to the expected homogeneity, states that the first significant digit is likely to be a small number. According to NBL, the frequencies of the first digits of values in a database decrease from 1 to 9: the digit 1 appears in approximately 30% of the entries, while 9 accounts for less than 5% of these values (Bugarin & Cunha, 2015; Cunha & Bugarin, 2015; Cunha et al., 2016).

The literature shows that the LNB can be used to detect possible fraud in socioeconomic data presented to support public planning decisions (VARIAN, 1972), based on the assumption that agents who manipulate records tend to distribute the digits uniformly—a pattern that diverges from the distribution predicted by the LNB. Nigrini (2012) demonstrated that the Law can be used as an indicator of data manipulation in the accounting field.

Based on this framework, the frequencies of the first digits of the accounting data are measured, and statistical tests are applied — Z-test, Chi-Square test, and Mean Absolute Deviation (MAD) — to verify whether the magnitude of the discrepancy relative to the LNB represents a significant nonconformity, interpreted as evidence of manipulation (Nigrini, 2012; Cunha et al., 2016). The LNB is applied to the accounting data of the selected OSs, according to the methodology described below, with the objective of ranking the organizations in terms of compliance with the Law and comparing this ranking with that predicted by the economic model.

Methodology

To assess the suitability of the theoretical model, six OSs were selected—managing seven health facilities (which had the greatest data availability)—one OS manages two facilities located in different states—and the compliance of the financial statements (financial statements—Balance Sheets, available on the OSs' websites) of the seven units with the LNB. The selection was based on the characteristics indicated in the model, in order to assess the theory's suitability for the analyzed case study.

Compliance tests were conducted for each institution, based on the financial statements for the available years, using one-digit and two-digit tests, along with the Z-test, chi-square test, and mean absolute deviation (MAD) test. OSs analyzed:

1. Instituto Gnosis (2009): medical and hospital care through public and private partner-

ships. Data for the years 2014–2020[1] , in the municipality of Rio de Janeiro;

2. Viva Rio (1993): a community-based organization with projects replicated by the state. Data for the years 2010–2020[2] , in the city of Rio de Janeiro;

3. Cejam (1991): founded by professionals from Pérola Byington Hospital. Data for the years 2010–2021[3] , city of São Paulo;

4. Pró-Saúde (1967): operates in all regions of Brazil. Data: Altamira Regional Hospital/PA (2019–2022) and Mogi das Cruzes Unit/SP (2019–2021)[4] .

5. Funev (2005): affiliated with AEE (founded in 1947), operator of the Dr. Henrique Santillo State Emergency Hospital of Anápolis (Huana). Data for the years 2018–2021[5] ;

6. Imed (2013): hospital management organization in Goiás. Data regarding the management of the Trindade State Hospital, Goiás, for the years 2018–2021[6] .

Results

Table 1 presents the results of all tests based on Newcomb-Benford's Law. However, for the sake of conciseness, the discussion will focus on the Z-test and the chi-square test for the first two digits.

From the analysis, summarized in Table 1, it appears that OS Pró-Saúde, with data regarding its operations in the states of Pará and São Paulo—in the latter in partnership with the municipal government of Mogi das Cruzes—presented statistical values indicating greater compliance with the Newcomb-Benford Law for the data related to the Mogi das Cruzes facility: A critical Z-test for seven categories (11, 16, 23, 24, 44, 86, and 92) and a Chi-Square test value of 143.56 in the analysis of the first two digits. The health facility in Pará showed a critical Z-test for eight categories (10, 31, 36, 48, 60, 64, 70, and 98) and a chi-square test of 315.75 in a similar analysis.

Regarding the legal context of the facilities analyzed, unlike the legislation of the state of Pará (State Law No. 5,980, of July 19, 1996), the legislation governing OSs in Mogi das Cruzes (Municipal Law No. 6,283, of September 11, 2009) includes provisions that align the incentives, in accordance with the literature, such as the requirement that the organization demonstrate at least five years of experience in the activity that is the subject of the partnership

1 https://www.institutognosis.org.br/balanco-auditoria-independente. Accessed July 12, 2026
2 http://vivario.org.br/relatorios_dev. Accessed on: July 12, 2026
3 https://cejam.org.br/etica-transparencia. Accessed on: July 12, 2026
4 https://www.prosaude.org.br/portal-da-transparencia/prestacao-de-contas/. Accessed on: July 12, 2026
5 https://www.hospitaldeurgencias.com.br/novo/ga-new/#/list_links. Accessed on: July 12, 2026
6 https://hospital-hetrin.org.br/informacao/demonstracoes-contabeis/demonstracoes-contabeis-2019/. Accessed on: July 12, 2026

in order to obtain certification, taking into account the duration of the activity carried out by any entity of which it is a successor or subsidiary, thereby avoiding the exclusion of recently established organizations that are part of an institution with experience in the field. Thus, the statistical analysis indicates that the OS operating in more than one state or municipality—OS Pró-Saúde—showed greater statistical compliance with the LNB in the location where it operates, which has an institutional and legal environment with better-aligned incentives.

Table 1 – Application of the Newcomb-Benford Law to Health Organizations

Institution Year Founded	Location of Operations	Sample	First-Digit Test				First Two Digits Test			
			Critical Digits	Z-Test (1.96)	Chi-Square Test (15.507)	MDA Test (0.015)*	Critical Digits	Z-test (1.96)	Chi-square test (112.02)	MDA test (0.0022)*
Gnosis 2009	RJ (municipality)	874	9	2.31	7.57	0.006	45	2.84	145.56	0.0031
			-	-			60	2.31		
			-	-			65	4.46		
			-	-			91	4.11		
			-	-			98	2.88		
Viva Rio 1993	RJ (municipality)	1,072	7	2.18	16.76	0.011	39	2.13	116.71	0.0027
			-	-			40	3.86		
			-	-			56	2.89		
			-	-			67	2.90		
Cejam 1991	SP (municipal)	1,453	-	-	3.81	0.004	10	2.46	100.27	0.0022
			-	-			23	2.66		
Pró-Saúde 1967	PA (state)	835	2	2.04	25.46	0.018	10	2.94	315.75	0.0043
			3	2.42			31	2.96		
			5	3.01			36	4.01		
			-	-			48	5.15		
			-	-			60	2.67		
			-	-			64	10.10		
			-	-			70	5.47		
			-	-			98	2.52		
Pró-Saúde 1967	SP (Mogi das Cruzes)	463	1	3.05	18.48	0.020	11	3.17	143.56	0.0043
			6	2.14			16	2.99		
			-	-			23	2.05		
			-	-			24	2.01		
			-	-			44	5.19		
			-	-			86	2.09		
			-	-			92	2.94		
Funev 2005	GO (state)	1,177	-	-	5.95	0.007	27	2.32	86.27	0.0022
			-	-			44	2.37		
			-	-			88	1.97		
Imed 2013	GO (state)	935	3	1.94	14.56	0.010	21	2.65	136.18	0.0034
			8	2.26			35	2.10		
			-	-			45	3.89		
			-	-			75	2.65		
			-	-			97	2.13		

Source: Author's own calculations.

* Since there are no objective critical values for this test, Drake and Nigrini (2000) offer the following guidelines—based on their own studies of databases tested according to the

LNB—using values of 0.015 for analysis of the first digit and 0.0022 for analysis of the first two digits; values exceeding these parameters are considered indicative of non-compliance with the LNB.

It can be observed from the statistical results that the various OSs operating within the same government entity demonstrated compliance with the LNB at levels that reflect their length of operation: the longest-standing institutions showed data that were more compliant with the LNB, as in the case of the OSs Funev and Imed in the state of Goiás, founded in 2005 and 2013, respectively, and the OSs Viva Rio and Gnosis in the state of Rio de Janeiro, founded in 1994 and 2009, respectively. It should be noted that the OS Funev is an institution affiliated with the AEE, which was founded in 1947.

Furthermore, it can be observed that in the state of Goiás, although the statistics reflect the age of the institutions, the test results regarding the data from the younger OS (Imed) indicate a low level of non-compliance with the LNB—if up to five digit categories out of the 90, in the Z-test of the first two digits, do not comply with the LNB, there is no strong evidence of manipulation (Nigrini, 2012); also note that the critical values for the identified categories do not deviate significantly from the statistical reference value.

With regard to the institutional and legal environment of the state of Goiás, the legislation governing OSs — State Law No. 15,503, of December 28, 2005 — has undergone significant regulatory improvements over the past ten years, incorporating requirements for technical capacity, prohibitions on conflicts of interest, and restrictions on entering into contracts with OSs that are in default on their financial reporting obligations to any federal entity. In addition, the State Comptroller General's Office, in partnership with the Court of Auditors, publishes an official transparency ranking of OSs contracted by the state government[7] — an initiative that reinforces the "efficient" nature of Goiás's institutional environment in line with the model.

Finally, the statistical results for the Cejam OS, characterized as long-standing, indicate that the data comply with the LNB—showing a critical Z-test for two categories (10 and 23) and a chi-square test value of 100.27 in the analysis of the first two digits.

From the above, it follows that the statistical results found in the case study converge with the proposed model, supporting the validity of the theory.

7 https://agenciacoradenoticias.go.gov.br/50054-cge-divulga-ranking-de-transparencia-das-organizacoes-sociais. Accessed on: July 12, 2026

CONCLUSION

The provision of public services by Social Organizations in Brazil has accumulated more than two decades of experience, with results ranging from high-performing partnerships to serious cases of misappropriation of funds. Understanding the determinants of this asymmetry is, therefore, a necessary condition for the model to fulfill its potential as an instrument for public spending efficiency.

The theoretical model developed in this study, based on the Economics of Information and Incentives, indicates that the probability of a Social Organization (SO) adopting behavior that promotes social benefit is maximized when three conditions are met: the organization is long-standing, with a well-established reputation and organizational culture; it is genuinely altruistic, with social welfare as its central motivation; and it operates within an efficient legal and institutional environment, with clear rules governing governance, transparency, and oversight. The absence of any of these conditions—particularly an efficient institutional environment—tends to make opportunistic behavior a rational choice for the organization.

Empirical evidence based on Newcomb–Benford's Law corroborates these predictions. Among the OSs analyzed, the longest-standing ones reported financial statements that were more compliant with the law. Particularly illustrative is the case of the same OS—Pró-Saúde, founded in 1967—which demonstrated greater compliance in the state with a more comprehensive and rigorous legal environment (Mogi das Cruzes, SP) than in the state with weaker legislation (Pará), suggesting that the quality of the institutional environment can be decisive even for organizations with an established track record.

Based on these results, this study proposes institutional adjustment mechanisms guided by three objectives: to attract altruistic and long-standing OSs through selection criteria that value reputation, managerial maturity, and the adoption of integrity policies; to discourage opportunistic OSs through transparency rules with effective penalties for noncompliance; and raising the standard of subnational institutional environments by harmonizing state and municipal laws to align with the stricter standards of federal law.

The main contribution of this study lies in the integration of a formal incentive model—calibrated for the specific context of Brazilian OSs—with an indirect empirical validation of its predictions. In the context of the New Fiscal Framework and the need for greater efficiency in the use of public resources, the results presented here provide an analytical foundation for improving the regulatory framework governing OSs, thereby contributing to the agenda for quality in public

spending. The research agenda that emerges includes the extension of the empirical study to a broader sample of OSs and an analysis of the impact of specific legislative reforms on the observed behavior of these organizations.

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