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Evaluation Process: Double Blind Review pelo SEER/OJS

Articulating Theoretical and Methodological Perspectives Applicable to Governmental Financial Resilience

ABSTRACT

Objective: Articulate theoretical and methodological perspectives related to Governmental Financial Resilience (GFR), considering its conceptual framework and aiming at its measurement.

Theoretical Approach: The essay addressed theoretical assumptions that show adherence to the GFR's conceptual framework and discussed potentialities and challenges when transposing methodologies for measuring resilience from other areas of knowledge.

Results: Similarities and disparities were highlighted between the conceptual framework of the GFR and the Theories of Cutback Management, Open Systems, and Complexity. Regarding measurement, some potentialities refer to obtaining a measure that represents the situation of governments from the perspective of the GFR. The main challenges arise from the distinctions between the natural environment (origin of resilience) and the social environment (application of GFR), which can be conceptual, related to the degree of precision of what is to be measured, or methodological, which deal with obtaining reliable data and significant.

Originality/Relevance: Considering the gaps in low theorization in GFR studies, which can be seen as an epistemological weakness, and the absence of methodologies to measure GFR, the essay aimed to broaden the debate, guide new dialogical possibilities between theories and conceptual framework and enable the identification of elements not captured in previous studies.

Theoretical/methodological contributions: The theorization of the GFR and the development of measures to evaluate it can contribute to academic and practical fields, with the expansion of studies and the potential application of an index as a management tool to highlight levels of vulnerability and capabilities, aiming to strengthen governments in the face of crises.

Keywords: Governmental Financial Resilience, Crises, Governments, Public Administration.

How to Cite (APA)

Batista, A. P., Cruz, C. F., Ohayon, P., Santos, O. M., Bartoluzzio, A. I. S. S. (2024). Articulating Theoretical and Methodological Perspectives Applicable to Governmental Financial Resilience. *Revista Contabilidade, Gestão e Governança*, 27 (1), 60-93. <http://dx.doi.org/10.51341/cgg.v27i1.3133>

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Received: September 05, 2023

Revised: March 03, 2024

Accepted: April 01, 2024

Published: June 30, 2024



1 INTRODUCTION

Governmental Financial Resilience (GFR) is the ability of governments to anticipate, absorb, and react to shocks that affect their finances over time. It is understood as a dynamic combination of internal and external dimensions that include financial shocks, vulnerability factors, the ability to anticipate, and the ability to cope with crises (Barbera et al., 2017; Padovani et al., 2017).

This concept emerged from studies on how governments faced the 2008 global financial crisis, which triggered an international economic crisis, causing financial and fiscal shocks to national and subnational governments (Barbera et al., 2017; Cepiku et al., 2016; Kickert, 2012).

Subsequently, the financial crisis caused by the Covid-19 pandemic came to occupy the center of GFR literature (Ahrens & Ferry, 2020), emphasizing the role that budgetary policies played in economic recovery and resilience (Dzigbede et al., 2023), given the pressures on local government finances, already impacted by the post-crisis austerity period of 2008 (Coyle & Ferry, 2022; Wójtowicz & Hodźić, 2022).

However, despite the recent arrival of the subject on Public Administration (PA) research agendas, the lack of studies that seek to promote a dialogue between the conceptual framework of the GFR and theories that show adherence to the concepts, as well as methodological treatment, is questionable. for quantitative assessment of GFR. Thus, the present essay is based on observing the theoretical fragility in GFR studies and the absence of a methodology to measure it.

The attention given to resilience, especially after the 2008 crisis, can be understood as a response to the contemporary sense of uncertainty and widespread insecurity and the search for adaptation and survival formulae, in which increased use originates, in addition to a growing sense of risk, the perception that processes associated with globalization have made

localities and regions more permeable to the effects of external processes (Christopherson et al., 2010).

Specifically, the global crisis of 2008 ended up triggering something in public management, such as the role that 9/11 played in security, driving the need for new forecasting methods, contingency planning, and responses to crises in governments' political agendas. National and subnational (Walker & Cooper, 2011).

More recently, the COVID-19 crisis impacted governments' financial systems at all levels and raised questions about the extent to which governments' financial management practices were prepared to deal with major economic disruptions and whether they potentially contributed to recovery from the crisis and resilience to future crises (Dzigbede et al., 2023; Wójtowicz & Hodźić, 2022). Thus, understanding resilience becomes fundamental to addressing the causes and effects of significant global challenges (Brunetta et al., 2021).

Despite this, the body of knowledge developed has not yet been able to propose a theory of GFR nor to develop an objective methodology for its measurement, unlike other areas of knowledge such as Ecology, Engineering, and Economics, which have specific conceptual structures and methodologies for its measurement.

This essay aims to articulate theoretical and methodological perspectives related to GFR, considering its conceptual framework and aiming to measure it by proposing parameters and guidelines that support a quantitative assessment. In addition, potentialities and challenges that may arise when transposing the measurement of resilience from other areas of knowledge are discussed.

The lack of theorization in GFR studies can be seen as an epistemological weakness, limiting the subject's development. Thus, the present essay is justified by expanding the debate, guiding new dialogical possibilities between theories and conceptual framework, and

enabling the identification of elements not captured in previous studies, aiming for scientific deepening.

Furthermore, developing a quantitative measure or GFR index can contribute to the academic and practical fields, expanding studies and extending the index's application and interaction with other indicators already used in public management (Iacuzzi, 2022). The index highlights vulnerability levels, anticipation, and coping capabilities to strengthen governments in crises.

2 GOVERNMENTAL FINANCIAL RESILIENCE: Origins and conceptual framework

2.1 Origins of Resilience

Although the term 'resilience' is relatively new in the discourses of public managers, resilience itself does not represent a new concept. Several areas of knowledge already use this term, given its multidisciplinary and multidimensional characteristics (Boin & Van Eeten, 2013; Davoudi et al., 2012; Duit, 2016; Pike et al., 2010).

Originating from the Latin root *resilire*, which means 'to return,' the term 'resilience' was first used by physical scientists to denote spring characteristics and describe the stability of materials and their resistance to external shocks. In the 1960s, along with the emergence of systemic thinking, resilience entered the field of Ecology, where multiple meanings of the concept emerged, being rooted in different worldviews and scientific traditions (Davoudi et al., 2012; Walker & Cooper, 2011).

In ecological systems, resilience determines the persistence of relationships within a system. It is a measure of the capacity of these systems to absorb changes in the system's state variables, direction, and parameters and persist. In this definition, resilience is a system property, and persistence or probability of extinction is the result.

In Engineering, resilience represents the ability to resist stress, survive, adapt, recover from a crisis or disaster, and move forward (Kammouh et al., 2017). It also refers to the

capacity of territorial systems to respond systemically and dynamically to present and future shocks related to significant global challenges through transformation processes, which involve the natural and anthropic characteristics of a territorial system, its performance, quality, and functions (Brunetta et al., 2021).

For Social Sciences, which has attracted increasing interest from researchers, resilience refers to the organizational capacity to recover from crises and reduce risks (Saliterer et al., 2017). Specifically in Economics, the concept refers to regions' unequal and differentiated abilities to react, respond, and deal with uncertainty, volatility, and rapid changes (Pike et al., 2010).

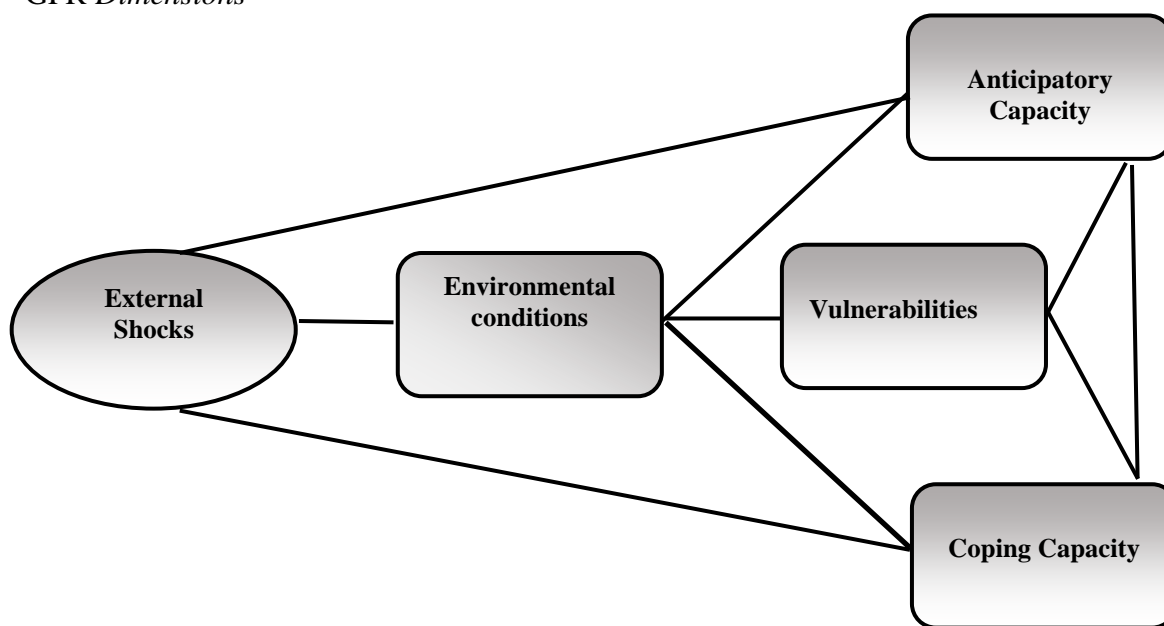
Despite the different areas of knowledge, the concepts include terms such as resisting, adapting, reacting, responding, coping, and recovering, which generally support the concept of GFR. Resilience arises from defying the natural course of the impact caused by a shock through reaction, adaptation, and recovery to overcome vulnerabilities or instabilities arising from the pressure of shocks.

2.2 GFR Conceptual Framework

Despite the many meanings and uses of the term 'resilience,' the focus of this essay is GFR, which, according to the conceptual framework, is the result of the interaction of environmental conditions and organizational dimensions over time (Barbera et al., 2017), as per Figure 1.

Shocks represent unexpected external or internal events that significantly impact an organization's finances, negatively affecting its financial position and potentially threatening its survival (Barbera et al., 2017; Saliterer et al., 2017). Government entities' vulnerability level can magnify the magnitude of financial shocks.

Figure 1
 GFR Dimensions



Source: Adapted from Barbera, C., Jones, M., Korac, S., Saliterer, I., & Steccolini, I. (2017). Governmental financial resilience under austerity in Austria, England and Italy: How do local governments cope with financial shocks? *Public Administration*, 95(3), 670–697. <https://doi.org/10.1111/padm.12350>

Vulnerability is interpreted as the level of exposure to shocks and appears as a result of external or internal sources configured at the interface between the environment and the organization. Thus, a series of factors contribute to the level of exposure, such as the dependence or uncertainty on own revenues or government transfers, the rigidity of expenses, the level of debt, and the degree of diversification of revenue sources. Vulnerabilities must be identified to develop actions aimed at treating weaknesses or adapting and controlling external factors to identify financial shocks before they occur (Barbera et al., 2017; Saliterer et al., 2017).

Anticipatory capacity refers to the availability of tools and resources, in force or accumulated over time, that allow organizations to identify and better manage their vulnerabilities and recognize potential financial shocks before they arise. These tools include internal and external monitoring processes and can occur within a medium-term financial planning framework or be incremental over time. They enable organizations to identify the nature, probability, deadline, scale, and possible impacts of shocks. It is essential to highlight

that the ability to anticipate is not limited to the presence of systems to plan, control, and manage risks. It is also related to situation awareness and decision-making (Barbera et al., 2017; Saliterer et al., 2017).

Coping capacity, which remains inactive in times of order and becomes visible during disruption, refers to the resources and skills that allow shocks to be faced and vulnerabilities to be managed. Dealing with shocks may require dependence on multiple coping aspects: (i) damping, which refers to the ability to absorb the impact of a shock without changes to structures or function; (ii) adaptation, understood as the ability to implement incremental changes in existing structures and functions; (iii) transformation, which concerns the ability to implement more radical changes, encompassing structures, functions, goals and values (Barbera et al., 2017; Saliterer et al., 2017).

Considering the dynamic combination between the dimensions of the GFR, the level of vulnerability not only depends on external shocks and conditions but is influenced by the existence, scope, and quality of different internal anticipation and coping capabilities. Thus, the combination of vulnerabilities and capabilities affects how shocks are perceived and interpreted, determining the attention they should receive and the level and timing of government responses (Barbera, 2017).

Despite the lack of a clearer picture of causes and consequences, the various dimensions of GFR influence each other, illustrating the dynamics of the concept and the interdependence of the dimensions. Thus, the relationships between the capabilities of anticipating and coping with vulnerabilities appear to be a complex model, with each element as a determinant and antecedent of the others, making it necessary to carry out research that addresses these relationships in more depth, better categorizing each variable (Du Boys, 2017).

In addition to the interaction between dimensions, environmental conditions, which cover aspects of the economic, institutional, and social contexts, are considered relevant in forming financial vulnerabilities and anticipation and coping capabilities (Barbera et al., 2017).

Organizations can absorb external risks or adopt new practices based on shocks. Thus, resilience can be planned, guided by anticipatory tools, or adaptive, more related to coping. The first involves using predetermined planning resources; the second arises in response to crises or emerging situations.

Regardless, public sector organizations face high uncertainty during the shock regarding the objectives to be pursued and the means to achieve them (Tallaki & Bracci, 2021). Therefore, they need a comprehensive view of the internal and external situation and tools and resources capable of assisting decision-making processes in response to the crisis. Adopting resilient thinking can help public managers in this regard.

Although the concept is comprehensive, adaptable, and widely used in studies developed to date, the absence of theoretical assumptions occupies the core of this essay. It brings methodological challenges related to measuring GFR. Like Walker and Cooper (2011), it is recognized that resilience quickly infiltrated the Social Sciences, becoming a regular but little theorized term. Thus, theories that show adherence to the conceptual framework of the GFR are addressed.

3 THEORETICAL PERSPECTIVES ADHERENT TO THE GFR

The growing interest in resilience studies reflects a need among academics and professionals to better understand the conditions for effective and legitimate governance in a complex, interconnected, and volatile world full of new deficiencies in understanding systemic risks. The resilience framework can accommodate this shift in perspective, as it does not require a precise ability to predict the future but a qualitative ability to design systems

capable of absorbing and accommodating future events that arise and take unexpected forms (Duit, 2016; Holling, 1973).

However, the lack of theorization in GFR studies may limit potential advances related to the topic. Considering the lack of a theory of GFR, theoretical frameworks are sought whose assumptions show adherence to the conceptual framework of GFR, namely, Cutback Management Theory (CMT), Open Systems Theory (OST), and Complexity Theory (CT). These theories were chosen because they present the most appropriate analytical structures for understanding GFR, as presented below.

3.1 Cutback Management Theory (CMT)

The CMT has been referenced in studies dealing with public sector management in crisis contexts (Barbera et al., 2016; Cepiku & Bonomi Savignon, 2012; Levine, 1978; Raudla et al., 2013). In this context, studies on GFR (Barbera et al., 2017; Padovani et al., 2017) also consider the CMT in their theoretical references, even though such theory does not fill the main field of discussion.

The financial crisis experienced by several Western countries in the 1970s (Raudla et al., 2013) and the lack of signaling and monitoring tools on the part of governments caused a return to questions about the effects of resource scarcity on public organizations and their management systems. According to Levine (1978), deciding where, how, and what to cut was considered a test of managerial intelligence and courage.

Seeking to understand the causes of public organizations' decline, Levine (1978) developed a typology of organizational disorder and the corresponding sets of tactics and decision rules for managing cuts, giving shape to the CMT. Such rules generically illustrate how strategic cuts and management choices were made based on the criteria of convenience, analysis, and 'courage,' considering long-term organizational well-being and the effect of cuts on the lives of employees and other stakeholders (Levine, 1978).

Part of the literature on cut management was based on the arguments of Levine (1978), who sought to study the passive role of management in conducting cuts. Thus, his studies helped examine the effects of organizational decline on management, the effects on the government budget, and the consequent discontinuity of public policies or government programs. The main conclusions were: (i) the difficulty in predicting the effects of the cuts, (ii) short-term political influences, (iii) the penalization of efficient organizations, (iv) the inability of long-term planning, and (v) concerns about human resources (Cepiku & Bonomi Savignon, 2012; Levine, 1978).

When studying the effects of the crisis on government finances and the consequent period of austerity, the range of knowledge produced based on CMT assumptions can help understand governments' resilience levels. It highlights the causes of financial shocks, which vulnerabilities can enhance, and classifies how governments signal or face the crisis. Thus, to some extent, the theory contributes to the development of the GFR, offering an apparatus for understanding government reactions to crises.

Academic interest in the CMT was rekindled after the 2008 global crisis, which boosted investigations into the management of cuts, fiscal stress, and the ability to react to shocks, giving rise to the concept of GFR. Studies on how governments deal with crisis and austerity continued to be developed in the post-crisis period, contributing to the accumulation of knowledge about the strategies, reports, and classifications of fiscal and organizational responses (Barbera et al., 2017), which touch on the CMT assumptions.

However, it is essential to highlight the weaknesses of the CMT highlighted in the literature and limit its use as a perspective for GFR studies. One of the risks perceived in managing cuts is that they compromise organizational capacity in the present and unreasonably in the future (Cepiku & Bonomi Savignon, 2012).

Furthermore, although the CMT provides a classification and description of government reactions to the crisis, it leaves organizational conditions, capabilities, and histories in the background, which could affect reactions (Barbera et al., 2016). Developing anticipation and coping capabilities is a preponderant part of the GFR's conceptual framework, so subduing them has almost the same proportion as invalidating them.

Another weakness is that recent events of global magnitude, such as the 2008 financial crisis and the inaccuracy of forecasts, have cast doubt on the validity and generalization of the CMT's assumptions that all public management strategies would lead to the continuous expansion of revenues to cover public expenditure. Responses to the shocks of the 2008 crisis were rooted in past strategies and limited by organizational capacity (Barbera et al., 2016). While comparative discussions are potentially useful, all governments must find their instruments to deal with the crisis.

Crisis literature continued to develop, giving way to studies on how governments deal with austerity, considering environmental shocks as part of the organizational life cycle (Cepiku & Bonomi Savignon, 2012; Pollitt, 2010).

The existence of shocks originating in an external environment that impact the internal environment of organizations and governments demonstrates that one cannot ignore the environment in which one is inserted. Interactions with the external environment are constant and require the development of specific management strategies. Environmental interaction is one of the OST's assumptions, discussed below.

3.2 Open Systems Theory (OST)

OST comes from the developments of General Systems Theory, both idealized by Von Bertalanffy (1950a, 1950b). According to its assumptions, a system is a set of units in mutual interrelations; that is, the elements that make up a system are dynamically related to each

other and perform a specific activity or function to achieve a common objective (Araújo & Gouveia, 2016; Motta, 1971).

OST was developed in question of previous organizational theories, which treated the organization as an independent entity. However, the organization is inserted in an external environment, the specific environment in which the system operates, and, to a certain extent, is conditioned by it (Araújo & Gouveia, 2016; Bastedo, 2004).

The organization's analysis as an open system emphasizes its relationships with the external environment, bringing the need to adapt to circumstances, as its existence involves a continuous exchange process with the environment. This environment comprises other organizations that exert economic, social, and political forces, providing essential resources that sustain and lead it toward change and survival. Therefore, an organizational system cannot survive if it cannot respond effectively to continuous and rapid environmental changes. However, the condition of an open system also imposes certain limits on the organization with the environment, which defines its sphere of action and the degree of openness to externalities (Bastedo, 2004; Motta, 1971).

In the case of social sciences, the open system model has revealed enormous potential due to its scope. In PA, the open system approach focuses on the public organization itself, as one way of studying complex organizations, such as the public sector, is to view them as an open system that dynamically interacts with the environment that surrounds it, having several inputs and outputs to guarantee its exchange with the environment (Motta, 1971).

In the GFR literature, the role of the external environment has emerged as an important factor. Financial shocks and vulnerabilities, which are dimensions of the GFR, result from exchanges between the organization and the external environment, characterizing a type of open system that must be considered when analyzing government finances. Together, the coping capacity of organizations, as a dimension of GFR, is not only used for

organizations to deal with shocks but must go further, supporting the evolution and interaction with pre-existing environmental conditions (Barbera et al., 2017; Steccolini et al., 2017).

The interaction between organizations and the external environment has intensified, especially in the current information age. New technologies, media, and connected consumers have transformed the world into a large globalized society (Araújo & Gouveia, 2016). This makes the systemic vision essential for holistic and relevant management. With this, the emergence of a new scientific paradigm is envisaged, which considers the existence of multiple variables increasingly interconnected and complex.

Considering the role of these variables in this new context, the way they influence and are influenced cannot be studied in absolute isolation, but understanding all the dynamics involved, the complexity, and between the lines of their functioning (Araújo & Gouveia, 2016). This complex environmental vision is the object of the study of CT, which is discussed below.

3.3 Complexity Theory (CT)

Considering the complex and multidimensional environment in which governments are inserted, complexity science has emerged as an essential theoretical basis for bringing dynamism, unpredictability, and non-linearity to the center of the discussion in Social Sciences, especially in PA. To a certain extent, these elements characterize the manifestation of GFR, with evidence of capabilities for anticipating and coping with shocks and managing vulnerabilities. If social phenomena are already recognized as complex and challenging to understand, CT offers promising possibilities (Klijn, 2008; Teisman & Klijn, 2008).

In this sphere, resilience has been highlighted as a watchword for new adaptive risk management models, sensitive enough to deal with integrated finance demands. Thus, CT, the more modern meaning of Complex Systems Theory, can potentially make complexity a little more manageable (Walker & Cooper, 2011).

CT has its roots in General Systems Theory (Von Bertalanffy, 1950a) and the work of mathematician Norbert Wiener on cybernetics between the 1940s and 1950s. The concepts created in these theories, such as self-organization, emergence, and feedback, are central to modern CT, an evolution of the study of systems (Carvalho & Fávero, 2020; Folloni, 2016).

Complexity is a relatively new approach in science and integrates knowledge from different areas, ranging from Physics to Biology, from Computer Science to Social Sciences, where it seeks to understand collective behavior in living systems and phenomena composed of many elements, different forms of interrelationship and with effects on various scales (Folloni, 2016; Furtado et al., 2015). Given its origins, CT is not a unified and homogeneous perspective. However, all variations start from the notion of complexity, which is also at the heart of a better understanding of public sector phenomena (Teisman & Klijn, 2008).

The central concept of complex systems presupposes dynamic systems, with many interactions between parts and non-linear behavior (Furtado et al., 2015). In PA, dynamism is evidenced by systems' ability to modify themselves to learn, evolve, and adapt, generating emergent and non-deterministic behaviors. Thus, the complexity perspective can describe how interdependent agents interact over time to increase or decrease the sustainability or resilience of government organizations (Eppel & Rhodes, 2018; Folloni, 2016).

CT views systems as nonlinear, so future states are unpredictable. As a system moves from simple to complex, given the increasing number of interactions and emerging situations, predictive mechanisms become less reliable, making appropriate management essential (Turner & Baker, 2019).

When complexity is considered, malleability is required to adapt to unpredictable and uncontrollable situations in the external environment. This suggests that CT can serve as a basis for theories about organizations in general, including government entities, which can be

conducted based on knowledge of the functioning of complex systems (Folloni, 2016; Teisman & Klijn, 2008).

In searching for correspondences between complexity and resilience, terms such as dynamism, interaction, and non-linearity can be observed from the perspective of GFR, given the constant exchanges with the external and complex environment. Such interactions, arising from different contexts, allow the manifestation of emerging qualities or patterns of behavior, which contribute to resilience in the face of shocks. By definition, complex systems, in addition to being resistant, are resilient, as changes in their configuration maintain a broader pattern, which remains over time despite the disturbances they may suffer (Folloni, 2016).

The GFR perspective brings the need for flexibility for governments to adapt to unpredictable situations, which shows adherence to the precepts of complexity. Complex systems internalize a large part of the external challenges to their existence, transforming disturbance into an endogenous characteristic of the system (Walker & Cooper, 2011).

However, resilience seems to distance itself from the possibility of spontaneous ordering and self-organization since the capacity to react to shocks must be developed by public sector decision-makers, as well as being subject to constant environmental interactions, some of which have non-linear causality. In any case, the CT shows adherence to the concepts of GFR, offering a theoretical basis for possible explanations for the resilient behavior of governments in the face of the crisis.

In short, CT is a theory aimed at understanding reality, as it studies how complex systems are and behave (Folloni, 2016). However, the limitations are worth noting, as there is a constant effort to simplify reality through discourse coding, quantification, or modeling to capture the complexity of an organizational and governmental context. Even so, proposals for measuring reality reflect the scientific effort to understand social phenomena of human and

organizational interaction elements, with an urgent need to reflect on theoretical assumptions in GFR studies.

3.4 Theoretical articulation for measuring GFR

The theoretical articulation for measuring the GFR occurs at the intersection between the theoretical assumptions and the GFR's conceptual framework. Thus, the basis for choosing the theories presented must be highlighted.

The selection of the CMT is based on the fact that budgetary and financial decisions involving revenues and expenses play a crucial role in crisis management, at which point GFR becomes evident. The management of these decisions constitutes one of the foundations of the CMT and is directly related to governments' reactions.

The option for OST is justified by the understanding that external environmental conditions directly impact government management. In this context, governments are not considered isolated units but entities susceptible to external influences. This approach allows for a more comprehensive and dynamic analysis of the interaction between the government and its surroundings, recognizing the importance of external influences on management practices.

The choice of CT is based on the observation that unstable and unpredictable behavior is distinctive of complex systems, which involve many elements in constant interaction and operate by adaptation to the environment and disturbances. This complexity and non-linearity characterize governments' actions, especially during crises when the GFR manifests itself.

Based on this, it is possible to establish a theoretical framework that outlines a continuous and gradual movement, starting from the inside of the government organization to the outside. Thus, the theoretical assumptions of the CMT are more intrinsically related to the internal decision-making process of government entities. Next, when considering the influences of the external environment, it becomes necessary to resort to the fundamentals of

OST. Then, faced with the unpredictability and instability of the external environment, especially during crises, combined with multiple and complex interactions, the principles of CT emerge to support the resilience of governments. This theoretical flow is summarized in Table 1.

Table 1

Theoretical approaches related to GFR

Theory	Theoretical scope	Theoretical limits
CMT	Typology of the main government reactions to crises.	Emphasis on the organization's internal environment with strategies focused on cutting expenses.
OST	It goes beyond the limit of governments' internal environment when considering interaction with their external environment.	It presupposes stability, linearity, and prediction, which do not correspond to the reality of governments and their surroundings, especially in crises.
CT	The multiple interactions between the internal and external environments of governments create a complex system that is constantly modifying, adapting, and evolving.	In crises, governments exhibit unpredictability, instability, and emergent behaviors, and they need to act to make complexity more manageable.

4 METHODOLOGICAL PERSPECTIVES FOR MEASUREMENT OF GFR

In general, using indices and indicators is one of the most prominent approaches to assessing resilience (Sweya et al., 2020). In mapping the GFR literature, studies with a quantitative approach explored and operationalized the framework proposed by Barbera et al. (2017), seeking to identify variables and indicators representing the dimensions of the GFR, as shown in Table 2.

The quantitative assessment of the GFR through an index is of significant importance, as it can demonstrate governments' situation from this perspective and highlight vulnerabilities, anticipation, and coping capabilities. Other methodological alternatives can be highlighted, such as using tests of differences in means, mean scores, correlations, and questionnaires, or even more complex univariate and multivariate techniques, such as linear regression, factor analysis, principal component analysis, and panel data, which denotes the possibility of using different instruments to evaluate the GFR.

Table 2

Main quantitative approaches to GFR

Authors	Objectives / Context	Nature of Data	Methods
Padovani et al. (2017)	Understand how perceived national, local, and internal vulnerability factors influenced the reaction of European local governments to the crisis. Context: 2008 global crisis (2008-2015)	Financial/Fiscal Indicators Socioeconomic Indicators	Panel Data
Steccolini et al. (2018)	Operationalize the GFR dimensions to understand which GFR development capabilities are present in European local governments and how they influence their financial and non-financial performance. Context: 2008 global crisis; migratory flow; regulatory changes; Brexit (2006-2015)	Likert scale score Financial/Fiscal Indicators Socioeconomic Indicators	Questionnaires Average scores Correlation Analysis
Batista e Cruz (2019)	Verify to what extent vulnerability factors and the capacity for anticipation influenced the coping capacity of Brazilian states. Context: 2008 global crisis; Brazilian internal crisis (2007-2016)	Financial/Fiscal Indicators Socioeconomic Indicators	Panel data
Barbera et al. (2021)	Examine the role that external shocks, anticipatory capacity, and perceived vulnerabilities of European local governments played in crisis coping strategies. Context: 2008 global crisis, migration; regulatory changes (2006-2015)	Likert scale score Financial/Fiscal Indicators	Questionnaires Factor analysis Multiple Linear Regression
Soares e Gonçalves (2022)	Examine whether the financial resilience capacity of Brazilian local governments was affected by political-electoral aspects. Context: COVID-19 (2017-2020)	Financial/Fiscal Indicators Political Indicators	Difference of means test

Considering the absence of propositions for measuring GFR, this essay addresses methodological perspectives for constructing resilience indices from other areas of knowledge, summarized in Table 3.

As can be seen, based on measurement instruments from other fields of knowledge, it is possible to synthesize the contributions that apply to the construction of a GFR index, safeguarding the necessary specificities.

Table 3

Resilience indices from other areas

Authors	Index	Area	Objective	Methods	Key Insights
Boorman et al. (2013)	The Centennial Resilience Index	Economy	A resilience index measures the resilience of emerging markets and developing countries to economic shocks.	Principal Component Analysis calculates the index and weight of the aggregation of ten sub-indices, which aggregate other underlying variables.	The index identified economies facing problems and specific areas of weakness related to growing vulnerability, serving as a basis for proposing corrective policies.
Kusumastuti et al. (2014)	The Resilience Index	Engineering	Develop a framework to assess the resilience of areas prone to natural disasters, establishing an index between preparedness (capacity to overcome disasters) and vulnerability (level of exposure to disasters).	The index corresponds to the quotient between preparedness (49 indicators) and vulnerability (18 indicators), whose scores were calculated, weighted, and aggregated using the Analytical Hierarchy Process.	Aiming to maximize preparedness potential and minimize vulnerability, greater preparedness will result in greater resilience, and greater vulnerability will result in lower resilience. The quotient has the potential to show the level of resilience to which a given observed area would be subject.
Kammouh et al. (2017)	The Resilience Index	Economy	Propose a method to assess the resilience of countries and states using indicators of the economic environment, considering risk, vulnerability, danger, and exposure.	Indicators are weighted through Dependency Tree Analysis, which determines the correlation between components. This allows new weights to be assigned to indicators in an orderly manner.	Due to the multiple determinants of resilience, the construction of the index required weighting and aggregation of indicators, given the distinct contribution between them.
Sweya et al. (2020).	Resilience of Water Supply Systems	Engineering	Develop a tool to measure resilience against flooding in water supply systems. This will prevent failures, recover from shock, and adapt to a new state after perceived vulnerability.	The instrument was developed in stages: (i) conceptual framework and (ii) evaluation tools with a semi-quantitative approach, with specific measures and scores to calculate the index, including measurement scales, weighting, and aggregation of variables.	Resilience assessment helped develop appropriate solutions to reduce vulnerabilities of assessed systems.

In short, such contributions concern (i) highlighting vulnerable areas based on specific indicators, serving as a basis for proposing corrective policies; (ii) the use of an aggregated index as a management surveillance tool; (iii) maximizing preparedness potential in order to

minimize vulnerabilities; (iv) guidance regarding the identification of possible determinants of GFR; and (v) the development of governments' reaction capabilities, with a focus on preventing failures, recovering and adapting after a shock. These actions and concerns are within the scope of the GFR.

Furthermore, multiple methods for constructing indices exist. However, concerning resilience, these methods converge on the need to weight the component indicators for aggregation into a composite index, given the different contributions of the indicators to the manifestation of the phenomenon. Thus, regardless of the method selected, it is important that the measurement is considered and that parameters are provided for directing and achieving the actions to be implemented from the perspective of the GFR.

4.1 Theoretical-methodological articulation of the GFR

The theoretical platform presented also serves as a basis for methodological alternatives, considering the conceptual framework of the GFR. In this sense, the methodological articulation must consider the inclusion of budgetary dimensions in the index, such as the different types of revenue and groups of government expenses, in addition to fiscal parameters. The CMT supports this approach, as decisions on public financial management reverberate on the level of vulnerability and the reaction capabilities of governments, whether in anticipation or coping with shocks, highlighting the GFR.

The inclusion of indicators of the fiscal, economic, social, and political environments in the GFR index should also be considered, based on the provisions of the OST, since governments are considered open systems and have their vulnerability and capabilities impacted by external phenomena.

According to the foundations of CT, unforeseen, unstable, and emerging events arise from the multiple interactions between governments' internal and external environments, such as financial, economic, political, climate, health, and social. These occurrences can impact

government finances, influencing vulnerability and crisis response capabilities. Therefore, to construct an index, one must consider the context and the occurrence of complex phenomena that are difficult to understand and cause uncertainty and disorder.

From these perspectives, the index must reflect a consistent characterization of the GFR, demonstrating the government's ability to deal with a crisis scenario, absorb the impacts, and adapt to the environment in response to a shock.

Considering the theoretical apparatus and its operationalization, combined with the conceptual framework of the GFR, it is essential to highlight that the proposals for quantitative assessment of resilience in other areas of knowledge encompass specificities that bring with them conceptual, methodological, and epistemological implications, and should be the subject of reflection in issues involving the transposition of methodologies for measuring GFR. Furthermore, it is necessary to recognize that, in the attempt to represent reality, there are challenges that add to the reflections of this essay.

5 POTENTIALS AND CHALLENGES FOR MEASUREMENT OF GFR

The literature presents a variety of qualitative explanations for analyzing resilience. However, no methodology for constructing a GFR index has been proposed. Efforts to apply resilience in different fields of knowledge have increasingly stimulated interest in measuring it, giving rise to various approaches, such as participatory assessments, statistical analyses, modeling, and metrics (Brunetta et al., 2021).

However, in Social Sciences, the instability of observed phenomena and facts makes constructing measurement instruments difficult. Continuous changes in the environment make it more challenging to determine the constancy of measurements, making it difficult to obtain a high degree of reliability and validity (Martins & Teóphilo, 2007). This suggests reflections on the potential and challenges of transposing resilience measurement from other areas of knowledge, as listed in Table 4.

Table 4

Potentials and challenges for measuring GFR

Potentialities	Challenges
Quantitative assessment of the situation of governments from the perspective of the GFR.	<p>Conceptual barrier: It is not easy to measure something unless you know exactly what to measure. This presents a challenge given the multidisciplinary nature of GFR;</p> <p>Methodological barrier: It is difficult to obtain reliable data from the Brazilian public sector due to the fragmentation of sources and low reliability. This data is self-declaratory and made available for legal compliance, which detracts from responsible and transparent tax management.</p>
GFR case studies contributed to the preparation of quantitative research, revealing variables that, combined, demonstrated resilient or non-resilient behavior by governments.	<p>Case studies cannot be generalized as they were developed in specific economic contexts.</p> <p>The metrics developed in quantitative studies are indicators defined based on what is easiest to measure, not necessarily considering what is most important.</p>
Transposition of methodologies from other areas of knowledge.	<p>As the transposition is carried out through metaphors, there can be a simplistic appropriation of the main elements, distorting concepts and meanings.</p> <p>Unlike the natural world (origin of resilience), in the social context, adaptive cycles and their results must be considered trends and not inevitable, opening space for the understanding that human interventions in processes can reduce, maintain, or increase resilience.</p> <p>Resilience is initially apolitical and power-blind, emanating from a natural environment. In the social context, where power and politics have proven influence, a limited approach to resilience can lead to exclusionary practices, as resilience for some can represent vulnerability for others.</p>
The GFR concept can stimulate multidisciplinary dialogues and collaborations.	<p>When applying an ecologically rooted concept to the social environment, one must tread carefully and ensure that critical social science insights are not lost or left aside.</p> <p>The complete predictability of future states of the social world constitutes not only an empirical impossibility but, in a certain way, a logical one.</p>

These are some of the concerns present in the literature (Brunetta et al., 2021; Davoudi et al., 2012; Misoczky, 2003; Walker & Cooper, 2011) and correspond to the reflections in this essay. Considering this, the concept of GFR goes beyond the disciplinary limit, requiring an inevitable convergence of different areas of knowledge to solve complex problems that require comprehensive interventions.

The resilience assessment allows us to consider what is in practice, what is possible regarding action and management, and at what point it would be realistically likely to fail. This is one of the global issues with the greatest impact on research (Brunetta et al., 2021).

Furthermore, resilience is a constantly changing process, leading to dynamic non-equilibrium; the GFR measure may not be a single number or result. Regarding this aspect, Bachelard's (2008, p. 262) maxim, "it is necessary to reflect to measure and not measure to reflect," applies. This imposes the need for reflection for measurement, aiming for improvement and control. Furthermore, since resilience always concerns the entity or scenario it is verified, the quantitative assessment of the GFR can strengthen government entities.

6 FINAL CONSIDERATIONS

The present essay aimed to articulate theoretical perspectives that adhere to the conceptual framework of the GFR, as well as methodological perspectives to propose parameters and guidelines that support its quantitative assessment. In addition, the potential and challenges that may arise when transposing the measurement of resilience from other areas of knowledge were discussed.

Regarding the theoretical articulation presented, the CMT contributes and serves as a typology to the main government reactions to crises. However, the theory detaches from GFR concepts by suggesting that coping strategies are limited to excessively cutting expenses and the incessant search for increased revenue. Indiscriminate spending cuts can compromise the levels of services available to the population. On the other hand, the search for revenue can increase the tax burden and the cost of living, which would be impractical in times of crisis.

In turn, the OST shows adherence to the GFR concepts by bringing the interaction between organizations' internal and external environments as its main assumption. However, there is disagreement between this theory and the GFR, given that an open system presupposes stability, linearity, and prediction, which do not correspond to the reality of

governments, especially in the context of crisis. Environmental variables from different spectrums play an essential role in building resilience by putting pressure on government finances, which, as open systems, belong to a constantly changing environment. Thus, an open social or biological system either changes or may perish in a constantly changing environment. In this case, the only way to survive is to change through adaptation, transformation, or learning and innovation processes (Misoczky, 2003).

The multiple interactions between governments and the environment in which they operate bring the idea of complexity into discussion. Hence, the CT approach sheds light on studying dynamic, non-linear systems, which contain many interactions between parts that modify, adapt, and evolve, generating emergent and sometimes non-deterministic behaviors. CT has the potential to make complexity more manageable despite the impossibility of complete predictability (Folloni, 2016; Walker & Cooper, 2011).

The external environment, from which the shocks that impact government finances come, has been increasingly chaotic and dissipative, with emerging threats of different natures. Considering this, a change in thinking is necessary for management to align with the precepts of the GFR. From this perspective, indicators such as debt, dependence on transfers, and budget rigidity should not be observed in isolation but seen as vulnerabilities that need to be managed so that the government can identify threats and shocks, whether of a financial nature or not-financial, to develop the ability to face them.

Measuring GFR can contribute to achieving this resilient thinking, as only what can be measured can be improved. Thus, the index to be constructed must be comprehensive, allowing the representation of reality despite the challenges that reductionism imposes on science. This indicates that developing GFR measurement necessarily involves critical epistemological reflections, bringing potentialities or challenges when seeking to transpose resilience measurement methodologies from other areas of knowledge.

The potential revolves around obtaining a measure representing the government entity's financial situation from the GFR's perspective. In this aspect, the methodologies presented apply to the governmental context. They allow using an aggregated index as a government monitoring tool to identify vulnerabilities and develop capabilities for anticipating and coping with crises. Thus, surveillance, prevention, recovery, shock absorption, and adaptive or transformative changes, which characterize resilience indices in other areas, are also within the scope of the GFR.

The challenges reveal themselves as conceptual barriers, which focus on the degree of precision of what is to be measured, or methodological ones, which relate to obtaining reliable and meaningful data for measurement. Despite being characterized as barriers, both contribute to developing knowledge regarding GFR.

Furthermore, when seeking to understand resilience based on concepts applied in other areas of knowledge, care must be taken to ensure that points subject to criticism by the Social Sciences are not lost, such as the possibility and importance of human interventions in the manifestation of resilience, the influence of power relations and politics in social environments, the impossibility of complete prediction of emergencies and upcoming phenomena. It is impossible to evaluate these points without the necessary criticality, without considering the multiple interactions of the social world.

As limitations of the essay, we can highlight the difficulty in theorizing phenomena observed in the public sector and their operationalization, evidenced in the conceptual and methodological barriers addressed. Aiming to broaden the debate and guide theoretical-methodological possibilities, future studies can focus on applying the theoretical and conceptual assumptions in quantitative empirical investigations into government reactions to shocks, envisioning the construction of GFR indices.

Finally, it is worth noting that the resilience perspective can accommodate changes that arise from the reconstructive questioning of the evolution of science. Resilience does not presume the accuracy of reality but better management of the complex environment in which governments are inserted. Governments need to strengthen their capabilities, and for this, the perspective of resilience can be a crucial point to guide actions in the search for balance.

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Articulando Perspectivas Teóricas e Metodológicas Aplicáveis à Resiliência Financeira Governamental

RESUMO

Objetivo: Articular perspectivas teóricas e metodológicas relacionadas à Resiliência Financeira Governamental (RFG), considerando sua estrutura conceitual e visando sua mensuração.

Abordagem Teórica: O ensaio abordou pressupostos teóricos que mostram aderência à estrutura conceitual da RFG e foram discutidos potencialidades e desafios ao se transpor metodologias de mensuração da resiliência de outras áreas do conhecimento.

Resultados: Foram destacadas similaridades e disparidades entre a estrutura conceitual da RFG e as Teorias da Gestão de Cortes, dos Sistemas Abertos e da Complexidade. Quanto à mensuração, algumas potencialidades referem-se à obtenção de medida que represente a situação dos governos sob a ótica da RFG. Os principais desafios decorrem das distinções entre o ambiente natural (origem da resiliência) e o ambiente social (aplicação da RFG), podendo ser conceituais, relacionadas ao grau de precisão do que se quer medir, ou metodológicas, que tratam da obtenção de dados confiáveis e significativos.

Originalidade/Relevância: Considerando as lacunas da baixa teorização nos estudos da RFG, que pode ser vista como uma fragilidade epistemológica, e da ausência de metodologias para medir a RFG, o ensaio visou ampliar o debate, orientar novas possibilidades dialógicas entre teorias e estrutura conceitual e possibilitar a identificação de elementos não captados nos estudos anteriores.

Contribuições teóricas/metodológicas: A teorização da RFG e o desenvolvimento de medida para avaliá-la podem contribuir nos campos acadêmico e prático, com a ampliação dos estudos e a potencial aplicação de um índice como ferramenta de gestão na evidenciação dos níveis de vulnerabilidade e capacidades, visando fortalecimento dos governos face às crises.

Palavras-chave: Resiliência Financeira Governamental, Crises, Governos, Administração Pública.

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Recebido: Setembro 05, 2023

Revisado: Março 03, 2024

Aceito: Abril 01, 2024

Publicado: Junho 30, 2024



