Public revenue forecasting and financial resilience: does forward-looking ability matter for states' fiscal soundness?

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Abstract

Objective: This paper seeks to answer how the degree of attainment of budgeted revenues relates to discussions about fiscal balance and financial resilience. The objective is to answer, quantitatively, if the ability to anticipate, measured by the degree of achievement of expected revenues, is associated with fiscal results, especially in periods of economic crisis.

Methodology: from the accounting data of the states and the Federal District, in the period from 2015 to 2018, we used econometric analysis in panel data, under fixed and random effects, aiming to find association between the ability to anticipate, represented by the proxy degree of attainment of budgeted revenues, and budget results and current savings.

Results: a positive and statistically significant association was found at 1% between the degree of achievement of total revenues and the dependent variable budget result, as well as the degree of achievement of expected current revenues and the dependent variable current savings. Among the control variables, the negative and statistically significant association at 1% between the level of personnel expenses in the budget and the budget result and current savings stands out, corroborating the literature on the subject.

Practical Implications: the results shed light on the importance of improving revenue forecasting instruments and their importance for fiscal soundness, contributing for public managers and legislators to pay attention to the issue.

Originality and value of the contribution: the work quantitatively evidences the importance of the ability to anticipate for the financial resilience of the subnational entities, which, together with the proxies adopted for the ability to anticipate, degree of achievement of total revenues and current revenues in the annual budget, represent a contribution to the literature on the subject.

Keywords: Financial resilience, Anticipatory Capacity, Fiscal Rules, Fiscal crisis, Fiscal Austerity

JEL: H68, H62, H72

SUMMARY

Introduction

The Fiscal Responsibility Law brought an extensive set of rules aimed at creating a framework for fiscal consolidation in the country, with rules on indebtedness, creation of new personnel expenses and expenses of continuing character, etc. Also worthy of note are the rules for public revenues, for which a complete chapter was set aside to deal with revenue estimation, limitations to the legislative branch to revise and alter the executive branch's revenue forecasts, and rules for revenue waiver. All of this aims to ensure the proper estimation of revenues and the maintenance of its base (creating restrictions on revenue waiver).

Despite the legislative effort, in Brazil's fiscal discussions little attention has been given to the preparation of budgets that are incompatible with economic reality and their role in fiscal imbalances. These estimation errors can generate additional pressures on budget execution and require greater skill in monitoring and executing the budget. Although the LRF itself brings specific rules to manage and control the execution of spending according to the effective realization of revenues in the budget, some decisions (such as increases in personnel expenses or other permanent expenses) are taken based on these prospects of revenues that do not materialize and, therefore, create additional fiscal pressure.

This theme about revenue estimates that are incompatible with reality relates to the anticipation capacity, within the scope of discussions about financial resilience, notably in the wake of the line of research developed by Steccolini et all (2016) and Barbera et all (2017). For the authors, the ability to anticipate is one of the dimensions in the analysis of financial resilience of local entities and, in general, they are evaluated in a qualitative way in the works on the subject. In this work, there will be an effort to quantitatively measure the ability to anticipate and the degree of achievement of expected revenues will be used for this purpose.

In summary, this paper proposes to discuss how the degree of attainment of expected revenues relates to discussions about fiscal balance and financial resilience. The proposed contribution is to evaluate, quantitatively, if the degree of attainment of expected revenues is related to fiscal results, especially in periods of economic crisis and, consequently, greater uncertainty.

Anticipation capacity, fiscal results and financial resilience

In recent years, especially considering the recurring economic and fiscal crises, the number of papers on government financial resilience has been growing. Notably in the wake of the line of research developed by Steccolini et all (2016) and Barbera et all (2017), which has been used in recent years as a theoretical basis for research in several countries (Germany, Austria, Brazil, the United States, France, Greece, the Netherlands, England, Italy, and Sweden, for example)[1]. In this context, in general terms, financial resilience can be understood as the ability to maintain financial solvency under negative changes in the environment, usually resulting from economic shocks.

In Barbera et all (2017), the authors seek to define patterns of financial resilience (pro-active resilience, adaptive resilience, passive/fatalist resilience and complacent resilience). These patterns

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[1]   Steccolini et all (2016) gather collection of works developed under the same framework for analyzing financial resilience in different countries.

emerge from the combination between different dimensions of financial resilience (robustness and vulnerability, anticipatory capacity, awareness, flexibility, and recovery ability). Based on this framework, several local governments from Austria, England, and Italy were analyzed and fitted into the different resilience patterns. Following the same line of research, Barbera et all (2019) analyze how patterns of crisis reactions (bouncing back or bouncing forward) are associated with vulnerability awareness and anticipatory capacity. They find associations between high ability to perceive vulnerabilities and bouncing back strategies (cutting expenses, services, investments) and high anticipatory ability with bouncing forward (reorientation, organizational innovations and in the way of providing services, etc.).

Anticipatory capacity can be understood as the ability that an authority has, or is able to build over time, to recognize and identify potential financial shocks before they arise. In the literature, anticipatory capacity is generally assessed qualitatively, although in recent work there have been efforts to express this dimension quantitatively. In this sense, this improvement has been made in works such as that of Padovani, Du Boys, and Monti (2017) and Batista and Cruz (2019), but using lagged financial variables. The assumption would be that, for example, current savings in the previous year would represent a good proxy of the ability to anticipate a crisis. Thus, higher levels of current savings in the previous year would indicate greater ability to anticipate. Although the effort is commendable, lagging indicators of fiscal results without adequate controls can and tend to show more the financial robustness of the entity than the ability to anticipate, and such works have not sought to control such effects.

In a derivation of the main research line, Barbera, Guarani and Steccolini (2020) analyze the role of accounting systems and processes in the ability to anticipate and react to crises. Through analysis of accounting data and interviews with managers they find evidence that more developed accounting systems and controls collaborated with the ability to anticipate and react to crisis. On the other hand, in places without developed forecasting and monitoring tools, the ability to anticipate and react to crisis was low and required greater support from the central government.

Boys, Padovani and Monti (2017) sought to contribute to the literature by using the resilience framework proposed in Barbera et all (2017), but with a quantitative focus on the ability to perceive vulnerabilities and how they are associated with revenue, expenditure and investment policies.

Ahrens and Ferry (2020), through a close and thorough reading of reports and news reports about English local and central government finances and strategies in coping with the constraints imposed by the COVID-19 pandemic, find evidence that while there was capacity to absorb shocks up to a certain level of risk, the capacity to anticipate, absorb and adapt was reduced.

In the Brazilian case, Aquino and Cardoso (2017), when analyzing 4 Brazilian municipalities, concluded that these entities have neither the capacity to anticipate nor long-term planning. Their actions to deal with the crisis were concentrated in short-term reactive measures, such as increasing revenues, cutting discretionary expenses, and postponing investments. Still in the Brazilian case, recently Batista and Cruz (2019) made efforts to quantitatively analyze whether vulnerability factors and anticipatory capacity influence the coping capacity of Brazilian states. For the explanatory variable forward-looking capacity, current savings with a one-period lag was used.

In a more direct strand on the relationship between unfeasible revenue forecasts and fiscal outcomes, Jonung and Larch (2004) show that overly optimistic revenue forecasts were related to budget deficits and rapid debt growth in European countries. In Golosou and Kimg (2002), on the other hand, the contribution comes to show that after analyzing 45 countries, in general there is a tendency to overestimate revenues. This tendency to overestimate was also analyzed in other studies (Goeminne at ali, 2007; Martins and Correia, 2014), which also show that political and institutional factors have an important influence on this process, notably for electoral reasons and to facilitate the discussion process regarding the distribution of resources and the feasibility of government policies and actions.

In Brazil, some studies have shown that subnational entities tend to have a low capacity to project revenues and predict the impacts of economic crises on revenues. Rocha (2008) analyzes the budget execution of the Municipalities of Rio Grande do Norte and concludes that they have low capacity to forecast revenues. Similarly, Zanatto and Heinrich (2013) analyze Municipalities of Rio Grande do Sul and reach the same conclusion that such entities did not have high capacity to forecast revenues, especially in times of economic crisis as in 2009.

The literature shows that the discussion about the ability to anticipate has a relevant impact on the financial resilience of local governments. In the same vein, the literature shows that the ability to forecast revenues and anticipate crises has notable importance in discussions about fiscal management and financial resilience.

Anticipation Capacity and Revenue Achievement Level

As mentioned, several studies address the issue of anticipatory capacity by identifying the existence of instruments, tools and processes aimed at identifying and monitoring economic crisis scenarios and their impacts on the entity. Although it is a valid path, identifying the existence of instruments and processes to identify crises and their impacts cannot measure the effectiveness of these instruments on the entity's fiscal management, but only the existence of monitoring processes. In some cases, the ability to anticipate is also evaluated through the analysis of the answers given by the interviewed managers, which again generates some degree of subjectivity to the analysis, in addition to the high cost of obtaining subsidies for the analysis.

Some recent work has sought to quantitatively measure anticipation ability. However, as already discussed, the use of lagged fiscal outcome variables does not seem to reflect the ability to anticipate adequately. The main argument in this sense is that the outcome variables lagged in one period are more associated with the dimension of fiscal soundness of the entity (robustness). In other words, the level of current savings or budgetary result provides direct evidence of whether the entity was in good or bad fiscal conditions prior to the crisis and, in isolation, says nothing about the entity's ability to anticipate. A federal entity can generate high current savings in a fiscal year for other reasons and with low anticipation capacity contract permanent expenses for the following year without noticing that the economic and fiscal conditions will deteriorate. Moreover, even if it is accepted that lagged current savings capture the ability to anticipate, if a given entity has high anticipation capacity and takes effective actions (flexibility dimension) to raise current savings, we would have in a single indicator two mixed effects (anticipation capacity and flexibility). Otherwise, a federal entity may have a

high anticipation capacity (identifying and measuring its impacts on the federal entity) and not have a well-developed flexibility dimension to generate a higher level of current savings in the year when the proximity of the crisis was identified, which would lead to the fallacious conclusion that the entity has low anticipation capacity if the proxy used is current savings lagged in one period. But all this would only be valid if the explanatory variable were the variation of current savings in the previous year and not the current savings level. When using the level of current savings, the situation gets worse and we have three different dimensions captured in the same explanatory variable (fiscal soundness, flexibility and forward-looking ability). Thus, crediting the level of current savings in the year prior to the crisis to the anticipation capacity requires building a much more sophisticated indirect effect relationship.

Despite the criticism to proxy choice, the effort of quantitative measurement presents itself as a promising line of improvement and contribution to the literature and equally represents the effort and contribution that this work proposes. Thus, this work is not interested in knowing how much or which tools were available to managers or if they had a qualitative perception of the crisis and its impacts, but rather if these tools and perceptions (or lack thereof) resulted in budget pieces compatible with the reality that presented itself and with the fiscal conditions of the entity. In addition, we seek an indicator that represents the ability to anticipate in a simple and available way, and, therefore, at a low cost.

It is within the above that the discussion about revenue estimates and the degree of achievement of these forecasts is inserted. The ability to anticipate, understood as the ability to recognize and estimate the effect of adverse events, is directly linked to the entity's ability to project revenues for the following year. If there is adequate anticipation capacity, revenue forecasts tend to be prepared incorporating the estimated effects of the coming crisis or, conversely, if there is no developed anticipation capacity, revenue estimates tend not to incorporate the effects of the crisis and, therefore, will probably be overestimated. Thus, the degree of attainment of expected revenues may represent an adequate proxy to measure the ability to anticipate.

This choice appears to be more appropriate than the indicators seen in the literature so far. This is because the degree of revenue attainment does not incorporate the effects of other dimensions of financial resilience (fiscal soundness, flexibility, and resilience). In other words, a state may have a high anticipation capacity, measured by an adequate revenue estimate, and not have the flexibility to adopt effective actions to cut expenses to maintain the entity's fiscal soundness and, therefore, compromise its ability to recover.

Finally, once the option has been justified, the challenge is to seek evidence that the degree of revenue attainment is related to the entity's fiscal solidity and financial resilience.

Methodological Aspects

To understand whether there are relationships between forward-looking ability and fiscal outcomes, this paper proposes to conduct an empirical analysis of the relationship between forward--looking ability proxy and fiscal outcomes.

In this sense, the ability to anticipate will be measured quantitatively by the ability to adequately project revenues for the following year. Thus, the ability to anticipate will be measured by the degree of achievement of current and total revenues forecasted in the annual budget.

To seek greater clarity if in fact the achievement of expected revenues is associated with fiscal performance and balanced budget, an econometric test was structured in Panel Data, under fixed and random effects, to indicate an association between the variable degree of revenue achievement and fiscal results for the period under analysis (achievement of expected revenues between 2015 and 2018). In this sense, both budget result and current savings were chosen as dependent variables. As an explanatory variable for the budget result, the degree of achievement of total revenues and as controls, the level of personnel expenses and Interest Expenses in relation to revenues, the variation of current revenues and expenses from one year to the next, the achievement of minimum savings in recent years (5%) and the GDP variation. In relation to the model for the dependent variable current savings, the explanatory variable of interest was the degree of achievement of current revenue forecasts and as controls the level of personnel expenses over revenues, as well as the variation of current revenue and expenses in relation to the previous year.

Thus, the central hypothesis is that the greater ability to anticipate, represented by the degree of achievement of the revenue forecast from the year of intensification of the economic crisis, would be associated with better fiscal results. Two hypotheses will be tested:

H1: *higher degree of achievement of total revenues foreseen in the Annual Budget Law is associated with better budget results.*

The expectation is that the greater the degree of achievement of expected revenues the greater the ability to anticipate and, consequently, the greater the conditions for the entity to maintain positive budget results. Thus, a positive association is expected between the ability to project revenues and budget results.

H2: *higher degree of achievement of current revenues foreseen in the Annual Budget Law is associated with higher level of current savings.*

In the second hypothesis we are interested in whether the ability to anticipate, as measured by the proxy degree of attainment of current revenues, is positively associated with the level of current savings.

The period is from 2015 to 2018, a period marked by severe economic crisis in Brazil. The sample involves the 27 states of the Federation during the indicated period, totaling 108 observations.

Results

Initially, seeking to understand if there is evidence that the degree of achievement of expected revenues is an important tool for fiscal balance, the table below shows the data for the period 2014 to 2018, segregating, from a total of 108 observations, the occurrences of budget deficit from those that had no budget deficit.

Table 1 - Expected Revenue Achievement per Group

Grau de Atingimento das Receitas Previstas	Com Déficit Orçamentário			Sem Déficit Orçamentário		
	Corrente	Capital	Total	Corrente	Capital	Total
Média	0.988	0.49	0.93	1.02	0.62	0.97
Desvio padrão	0.07	0.39	0.09	0.07	0.77	0.09

Source: own aggregation from fiscal data obtained from STN

From the table it can be observed a difference in average between the groups both for the attainment of current revenues, as well as capital and total revenues. Notably, the execution of capital revenues is flawed in both groups and has a higher deviation than that verified in current revenues. This has a natural explanation due to the non-recurrence of capital revenues, which are usually tied to capital transfers from the union, credit operations or disposal of assets, whose realization is not always under the control of the entity that would receive such revenues. Obviously, because they are non-recurring expenses, the expenses that are backed by these revenues cannot be current. Thus, as they finance capital expenditures, in general they are expenses with greater control capacity.

Next, as already indicated, to seek greater clarity as to whether in fact the degree of expected revenue attainment is associated with fiscal performance and balanced budget, an econometric test was structured with Panel Data to indicate an association between the variable degree of revenue attainment and fiscal results for the period under analysis (attainment of expected revenues between 2015 and 2018). The models were estimated under fixed and random effects, and the results are expressed below.

Table 1 – Econometric Results

	Resultado Orçamentário (rorc)			Poupança Corrente (poup)		
	(Efeitos Fixos)	(Efeitos Aleatórios)		(Efeitos Fixos)	(Efeitos Aleatórios)
gartotal	0.236*** (0.056)	0.156*** (0.053)	garcorr	0.267*** (0.051)	0.259*** (0.051)
DespPess	-0.495*** (0.083)	-0.235*** (0.064)	DespPess	-0.428*** (0.063)	-0.366*** (0.057)
VarDcorr	-0.003*** (0.001)	-0.0005 (0.001)	VarDcorr	-0.003*** (0.001)	-0.002*** (0.001)
VarRcorr	0.001 (0.001)	0.0003 (0.001)	VarDcorr	-0.002** (0.001)	-0.002** (0.001)
poupmin	-0.006 (0.013)	0.033*** (0.011)	Constant		0.076 (0.093)
PIB	-0.001 (0.001)	-0.0005 (0.001)			
DespJuros	-1.558*** (0.562)	-1.436*** (0.452)			
Constant		0.078 (0.122)			
Observations	108	108	Observations	108	108
R2	0.580	0.423	R2	0.513	0.416
Adjusted R2	0.393	0.383	Adjusted R2	0.323	0.393
Shapiro.test	0.550	0.302	Shapiro.test	0.128	0.091
Bptest	0.093	0.093	Bptest	0.065	0.065
F Statistic	14.598*** (df = 774) 73.316***		F Statistic	20.242*** (df = 477) 73.234***	
Note:	*p<0.1 **p<0.05 ***p<0.01		Note:	*p<0.1 **p<0.05 ***p<0.01	

Source: own aggregation

Regarding the main object of study of this work, the degree of achievement of budget revenue forecasts has a statistically significant association at the 1% level for both the dependent variable budget result and current savings. In other words: the degree of achievement of total revenue is positively associated with the budget result, while the degree of achievement of current revenues is positively associated with the level of current savings.

The result corroborates the hypotheses of this paper. Accurate revenue forecasting, or at least not overestimating revenues in the budget, reduces the space for spending without ballast, reducing the pressure for expenditure contingencies and reducing the possibility of budget deficits or reduction in current savings. Thus, the greater the ability to anticipate, especially in times of economic crisis, as

in the chosen period, the greater the financial resilience. This is indeed expected because by incorporating in the revenue forecast negative impacts of upcoming economic crises, part of the budget dispute process takes place at the time of preparation and approval of the budget pieces, thus reducing pressures during budget execution. These findings contribute to the literature on fiscal rules and financial resilience, but have practical implications in that they shed light on the question for public managers, control bodies, and legislators. Improving the instruments and institutional framework around revenue forecasting and the development of forward-looking capacity may have not insignificant empirical implications.

It is important to reinforce that in this work the focus is not on the existence of tools or on the details of the process of preparing revenue estimates, but rather on whether the ability to anticipate is related to fiscal results.

Regarding the control variables, it is worth mentioning the Personnel Expenditure variable, represented by the degree of budget commitment to personnel expenditure, whose association was statistically significant at 1% in all models. The variation in current expenditure was significant in three of the four tests. Interest expenditure was significant at 1% in the model for the dependent variable budget result. Other controls showed pointwise significance depending on the model. In the controls, the main finding that corroborates the literature on the subject is the importance of personnel expenses in defining fiscal results.

Final Conclusions

These findings contribute to the discussions regarding financial resilience and forward-looking ability.

Regarding fiscal rules, the results reinforce the importance of rules for forecasting revenues in the budget pieces and of improvements that allow the mitigation of risks of budget pieces that are disconnected from reality. On the other hand, in the discussions about the Brazilian fiscal management framework, more emphasis in the search for improvement in revenue forecasting instruments and more monitoring regarding the elaboration of non-materializable budget pieces can generate important benefits in terms of financial soundness and robustness.

As for the discussions on financial resilience and ability to anticipate, the results show that the degree of revenue achievement can be an adequate proxy for such measurement. There is a statistically significant association between being able to make better revenue forecasts under an economic crisis environment and obtaining better fiscal results. In this sense, the paper sought to contribute to the literature by defining objective and standardizable indicators to assess the ability of public entities to anticipate. Thus, the change from a subjective criterion generally seen in the literature to an objective one, together with the choice of the variable to represent this dimension of financial resilience, may represent a contribution to the topic.

Finally, it is expected that this work will have practical implications by shedding light on a discussion still little explored in Brazil: the role of budget revenue shortfalls in the fiscal imbalance of federal entities.

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