



# Public debt and social security: Level of formality matters<sup>☆</sup>

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## ABSTRACT

This paper presents a contribution to the empirical literature concerning the relationship between social security and public debt in emerging economies. In particular, several economic and social shocks, as income inequality, were considered in the analysis. Based on the Brazilian data from 2004 to 2010, and taking into account the effects of shocks on variables which are essential to the public debt and the social security deficit, two sets of GMM models were considered. Furthermore, with the objective of testing the results, a GMM system model was built. The findings confirmed that the social security deficit significantly contributes to an increase in the public debt. Regarding the effects on social security, it was observed that an increase in the level of formality in the economy reduces the deficit. In contrast, a reduction in income inequality, real increase in the minimum wage, and increase in health benefits imply an increase in the social security deficit. Therefore, these variables play a crucial role in the search for an efficient social security management system and cannot be overlooked in ensuring fiscal sustainability.

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## 1. Introduction

Since 1999, the Brazilian economic policy has been based on the tripod of inflation targeting, primary surplus and flexible exchange rates. In particular, the introduction of primary surplus targets has guided fiscal policy and worked as a safeguard for the inflation targeting system. In other words, the patterns of primary surplus are essential to explain the evolution of fiscal and monetary policies. Therefore, it is crucial to identify and analyze which factors can erode this framework sustained by the primary surplus.

Given the importance of the difference between revenues and expenditures of the General Social Security for the primary result of the federal government, the long-term financial viability of the social security system has been one of the main topics of fiscal policy discussed in Brazil in recent decades. The Brazilian pension system runs at a deficit and may become fiscally unsustainable in the future. As a result, the need for funding of the social security system represents a source of fiscal imbalance that could set public debt onto an unsustainable path.

In recent years, the federal government has adopted a series of social measures to increase the average standard of living of the population. Those measures include, for example: encouraging the formalization

of the Brazilian labor market, promoting a real increase in the minimum wage and reducing income inequality in the labor market. The implementation of this social policy has had a direct impact on the labor market and, consequently, has implications for the financing of the social security system.

This paper seeks to make a contribution to the literature on public debt and social security by considering a variety of economic and social shocks. It is important to highlight that this study presents, in an innovative way, issues that have been neglected by the literature, but which are fundamental for the management of economic policy. As examples of this, we can cite the analysis of the effects of income inequality on the social security deficit and the impact of the social security deficit on the evolution of the Brazilian public debt.

In short, the main objective of this paper is to present empirical evidence of the relation between social security and public debt, and of the effects of social policies, adopted by the federal government, on the social security deficit. To this end, several models were estimated using the generalized method of moments (GMM). In addition to estimates of individual models, an estimation of systems of simultaneous equations was also performed.

The remainder of this paper is organized as follows. The next section provides a brief summary of the literature on public debt management. Section 3 presents a short review of the literature on social security. Section 4 shows empirical evidence, through an econometric analysis, of the relationship between the social security system and public debt and of the relationship between the social policies of the federal government and the social security system. The last section presents the conclusions.

<sup>☆</sup> The views and opinions offered in this article do not necessarily reflect those of the Central Bank of Brazil.

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## 2. Public debt: main features in the literature

It is possible to identify three perspectives regarding public debt management in the literature. The first, examines the problem of dynamic inconsistency of fiscal policies, and is represented by the models of [Giavazzi and Pagano \(1990\)](#) and [Calvo and Guidotti \(1990\)](#). The second, which considers the model of [Barro \(2003\)](#), seeks to determine the optimal structure for public debt, considering a smoothing out of tax revenues in an environment in which public spending is exogenous. The last view, represented by the models of [Missale et al. \(2002\)](#) and [Giavazzi and Missale \(2004\)](#), seeks stabilization of the public debt/GDP ratio. In general, all these models conclude that an increase in the average maturity and the partial indexation of public debt are optimal strategies for public debt management.

The [Giavazzi and Pagano \(1990\)](#) study focuses on the analysis of the roll-over of public debt. Consequently, the amount, average maturity and amortization structure of public debt are important elements in this study. The model evaluates whether the choice of a particular maturity structure can mitigate the risks of a crisis of confidence. Four basic assumptions are adopted: (i) an open economy with a fixed exchange rate regime, (ii) free capital mobility, (iii) imperfect public information about the preferences of the government or the central bank's ability to maintain the fixed exchange rate, and (iv) a high stock of public debt needing to be rolled over in all periods. The conclusion is that the central bank's ability to withstand a crisis of confidence depends on its success in managing the public debt. The concentration of debt maturities in a few periods is detrimental, because in times of crisis of confidence the government is obliged to pay higher risk premiums. Therefore, a good strategy would be to increase the average maturity of government securities, as well as to distribute their maturity dates evenly over time.

[Giavazzi and Pagano \(1990\)](#) consider several environments for optimal indexing structure and maturity of public debt. Additionally, the restriction corresponds to a social loss function which includes taxation and inflation rate. The four basic assumptions of the model are: (i) the stock of debt is a predetermined variable, (ii) government spending is the source of uncertainty in the model, (iii) strict purchasing power parity is considered, and (iv) the current government can curb the next government with respect to the use of instruments of economic policy. The result suggests that the indexation of public debt is desirable in order to avoid the use of an inflation tax. However, full indexation is not recommended because it can generate an increase in taxation as a source of financing for the public sector. Therefore, the optimal strategy would be public debt with long-term maturity, which is partially indexed.

[Barro \(2003\)](#) found that smoothing taxation stimulates the government to issue government bonds, the payments of which are contingent on government spending and taxation. Hence, when public expenditure is equal in all periods, public debt should be structured as indexed perpetuities (consoles). One advantage of adopting this structure is the ability to isolate the budget constraints from unexpected changes in the securities of different maturities indexed to the price index.

[Missale et al. \(2002\)](#) made an empirical analysis that considered the maturity of government securities suitable for fiscal stabilization. It was assumed that the stabilization of public debt would be achieved through the attainment of fiscal surplus targets. The analysis included 72 cases of fiscal stabilization, between 1975 and 1998, in the Organization for Economic Cooperation and Development (OECD) countries. The authors concluded that the optimal strategy is to increase the average maturity of public debt.

Based on the analysis of the stabilization of the Brazilian public debt/GDP ratio, [Giavazzi and Missale \(2004\)](#) recommended that the government finds sources of financing that offer low costs and low volatility of returns. Thus, the choice of public debt instruments involves a trade-off between risk and expected cost of debt servicing. Under this view, the risk is minimized when an instrument has low

return and when it is also capable of offering protection against fluctuations in the primary surplus and in the public debt/GDP ratio. The findings denoted that the use of pre-fixed government bonds and price-indexed securities was the best strategy for public debt management.

### 2.1. Change in the Brazilian public debt management

As a result of a payment balance crisis triggered by successive speculative currency attacks on several emerging economies in the second half of the 1990s, the Brazilian government adopted a flexible exchange rate system in January of 1999. Due to the exchange rate overshooting and the fact that approximately 25% of the public debt had been indexed to the exchange rate at that time, the Brazilian National Treasury adopted a new strategy for managing the country's public debt. The main objectives were the improvement of the composition of public debt and the lengthening of the maturities of government securities. One important change introduced was the establishment of primary surplus targets. As a result, the economic policy was changed and the cornerstone of the Brazilian economy became the tripod of inflation targeting, primary surplus, and floating exchange rates.

Despite the changes introduced in the political economy, which were briefly successful, the beginning of the 2000s was marked by successive shocks to the Brazilian economy that led to the failure to meet the inflation targets (see [Fig. 1](#)).<sup>1</sup> This environment created a macroeconomic instability that implied a reduction in the maturities of government securities. This scenario changed only after 2005 due to the success in achieving the targets for primary surplus and the consequent fall in the public debt/GDP ratio.

After 2002 the National Treasury adopted an assets and liabilities management strategy that strengthened the substitution of interest rate indexed securities (Selic-indexed bonds) and exchange indexed securities by fixed rate securities and inflation indexed securities.<sup>2</sup> The result of this strategy was a considerable increase in the proportion of fixed rate and inflation-indexed government securities (see [Fig. 2](#)). Moreover, the proportion of exchange indexed securities became negligible. Nevertheless, although the proportion of Selic-indexed bonds was decreased, it remains very high (approximately 35%).

In short, as pointed out by [ABP \(2012\)](#), the two main Brazilian federal public debt guidelines are: (i) gradually reducing interest rate indexed securities and exchange rate indexed securities as a manner of reducing market risk; and (ii) increasing the average maturity of outstanding debt as a way of reducing the refinancing risk. Hence, such as identified by [De Mendonça and Machado \(2013\)](#), the main variables that explain the Brazilian public debt after 1999 are: public debt average maturity, primary surplus, interest rate, and exchange rate.

An important implication of the Brazilian public debt framework is that the impact caused by an increase in the interest rate (Selic) to reduce inflationary pressure implies pressure to increase the public debt/GDP ratio. It is important to highlight that the combination of inflation targeting, a large portion of the public debt being indexed to the interest rate, and the short average maturity of the public debt, creates interdependence between fiscal and monetary policies. In particular, the generation of primary surplus has an important role in this system because it contributes to fiscal balance which, in turn, is one of the preconditions to the success of inflation targeting.<sup>3</sup>

The generation of primary surplus depends on the successful implementation of fiscal policy to achieve its goals. A successful fiscal policy is

<sup>1</sup> As examples of shocks on the Brazilian economy: instability in the American economy (2001), crisis in Argentina (2001), and political shock caused by first Lula's government.

<sup>2</sup> Regarding this strategy, see [Back and Musgrave \(1941\)](#), [Lucas and Stockey \(1983\)](#), [Bohn \(1988\)](#), and [Calvo \(1988\)](#).

<sup>3</sup> Fiscal balance eliminates the possibility of the "unpleasant monetarist arithmetic" taking place (see [Sargent and Wallace, 1981](#)).

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