

## Testing asymmetries in Central Bank preferences in a small open economy: A study for Brazil<sup>☆</sup>

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### Abstract

In this paper, we extend Surico's (2007a) model to an open economy and test if the Brazilian Central Bank's loss function is asymmetric with regard to positive and negative deviations of the output gap and of the inflation rate from its target. Furthermore, we use tests for structural breaks to investigate changes in the conduct of policy and monetary authority's preferences. The results revealed that the Central Bank reacted more strongly to deviations of inflation from the target and the output gap after 2003. With regard to the monetary authority's preferences, estimates indicate only an asymmetric preference over an above-target inflation rate until mid-2003. After this period, the evidence obtained by estimating the reaction function with inflation expectations showed that the Central Bank has been more averse to positive deviations of inflation from its target.

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### Resumo

Neste trabalho, nós estendemos o modelo de Surico (2007a) para uma economia aberta e testamos se a função perda do Banco Central brasileiro é assimétrica em relação a desvios positivos e negativos do hiato do produto e da inflação em relação à meta. Além disso, nós utilizamos testes de quebra estrutural para investigar alterações na condução da política e nas preferências da autoridade monetária. Os resultados revelaram que o Banco Central reagiu mais fortemente a desvios da inflação em relação à meta e ao hiato do produto após 2003. Em relação às preferências da autoridade monetária, as estimativas indicaram, em geral, uma assimetria em favor de uma inflação acima da meta até meados de 2003. Após esse período, as evidências obtidas através da estimação da função

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de reação com expectativas de inflação mostraram que o Banco Central tem sido mais avesso a desvios positivos da inflação em relação à meta.

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*Palavras-chave:* preferências assimétricas; economia aberta; regras de taxa de juros não lineares; mudança estrutural; Banco Central do Brasil

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## 1. Introduction

Since the early 1990s, the economic literature on monetary policy actions estimated by reaction functions has increasingly expanded. [Taylor \(1993\)](#) rule is probably the most widely known reaction function specification in this literature. According to this rule, the monetary authority responds to deviations of output and inflation from the targets through nominal interest rate movements, regarded as a policy instrument. Another specification that has received considerable attention is the forward-looking reaction function proposed by [Clarida et al. \(1998, 2000\)](#). In this type of policy rule, the policymaker adjusts the current interest rate based on the expected future inflation and output gap rates. These two types of interest rate rules share a common characteristic: they are linear functions related to economic variables. This can be explained by the fact that both specifications are theoretically supported by the linear-quadratic paradigm, where the monetary authority's loss function is assumed to be quadratic while the equations for the economic structure are linear.

At recent times, however, two theoretical approaches have challenged the linear-quadratic framework underlying the linear reaction function. The first approach disproves the assumption that the economic structure is linear. [Orphanides and Wieland \(1999\)](#) derive optimal policy rules for the case where the monetary authority makes use of a quadratic loss function and a zone-linear Phillips curve that allows for nonlinearities in the short-term tradeoff between inflation and output. [Nobay and Peel \(2000\)](#) analyze an optimal discretionary monetary policy under a nonlinear Phillips curve and find out that the monetary authority can no longer eliminate the inflationary bias by defining an output target that is the same as the natural rate. [Dolado et al. \(2005\)](#) demonstrate that the central bank's optimal reaction function for an economy with a nonlinear Phillips curve is the forward-looking interest rate rule augmented to include the interaction between expected inflation and output gap.

The second theoretical approach considers that policymakers can have asymmetric preferences in terms of their goals. According to [Cukierman \(2000\)](#), politicians and the public at large are usually more averse to negative than to positive gap differences from the potential output. The vice chairman of the Federal Reserve, Alan Blinder, states that "in most situations the CB will take far more political heat when it tightens pre-emptively to avoid higher inflation than when it eases pre-emptively to avoid higher unemployment" [Blinder \(1998, pp. 19–20\)](#). Since in democracies independent central banks are not totally insensitive to political organs, this type of asymmetry may be present in the policymaker's loss function. In addition, in periods in which the monetary authority is more concerned with lending credibility to its disinflation policy, the loss ascribed to positive deviations of the inflation rate from the inflation target is likely greater than that from negative deviations with the same magnitude.

The consequences of introducing asymmetric preferences into the monetary authority's loss function have been investigated by several authors. [Cukierman \(2000\)](#) demonstrates that, when the policymaker is unsure about economic conditions and is more sensitive to negative output gaps, there is an inflationary bias even in the case where the effective output target is the potential output of the economy. This finding has been supported by empirical evidence gathered by [Cukierman and Gerlach \(2003\)](#) for a group of 22 OECD countries. [Gerlach \(2000\)](#) and [Surico \(2007a\)](#) show that the Federal Reserve was more concerned about negative than about positive output gaps in the pre-1980 period. [Bec et al. \(2002\)](#) verify that the business cycle phase, measured by output gap, has mattered in the conduct of monetary policy for Central Banks of Germany, the United States, and France. [Cukierman and Muscatelli \(2003\)](#) give evidence of nonlinearities with respect to inflation and to output gap in reaction functions estimated for Germany, the United Kingdom, and the USA. [Dolado et al. \(2004\)](#) observe that Federal Reserve preferences about inflation were asymmetric during the Volcker-Greenspan's term.

Bearing in mind what was presented earlier, the present paper aims to estimate the nonlinear reaction function for the Central Bank of Brazil so as to test asymmetries in its goals regarding the deviations of output gap and inflation from the targets. To achieve that, we extend the theoretical model proposed by [Surico \(2007a\)](#) for an open economy

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