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# Interest rate rules and price determinacy: The role of transactions services of bonds<sup>☆</sup>

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## Abstract

Interest rate rules have been associated with price indeterminacy when they do not respond aggressively enough to inflation. Price indeterminacy is typically associated with indeterminacy of real bond balances, suggesting that the missing element is a meaningful role for government bonds. We assume that government bonds provide arbitrarily small transactions services and show that this can dramatically change the local and global determinacy conditions. In particular, the specification of fiscal policy affects the aggressiveness with which monetary policy must respond to inflation to deliver local determinacy—a range of passive monetary policies, even an interest rate peg, may yield determinacy.

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## 1. Introduction

In standard macroeconomic models, the use of interest rate rules to characterize monetary policy can result in nominal indeterminacy; that is, the model determines

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the real variables of interest, but fails to pin down the price level. The problem typically arises when the interest rate does not respond aggressively enough to an increase in observed inflation; the classic example is an interest rate peg.<sup>1</sup> In this paper, we show that price indeterminacy is generally associated with an indeterminacy in real bond balances (making the label “nominal indeterminacy” a bit of a misnomer). This fact often goes unnoticed, since most discussions of the price indeterminacy problem assume a Ricardian model; bonds do not “matter”, and the real variables of interest can be determined without any reference to the real value of bonds. This observation suggests that the problem might be resolved by giving bonds a meaningful role in the equilibrium adjustment process.

There are, of course, different ways of introducing non-Ricardian elements, or making bonds matter, in a model. Woodford (1995), for example, considers a model with a non-Ricardian fiscal policy regime.<sup>2</sup> In this paper, we assume that the fiscal policy regime is Ricardian in the sense of Woodford—our specifications of fiscal policy ensure fiscal solvency, and the “fiscal theory of the price level” does not apply. We make bonds “matter” by assuming that government bonds (and possibly other money-market assets as well) provide transactions services. We are certainly not the first to do so.<sup>3</sup>

Our arguments do not require that bonds be a particularly good substitute for money. We show that a much wider class of interest rate rules, even interest rate pegs, can achieve price determinacy if bonds provide an arbitrarily small amount of transactions services. For this reason, we do not think our assumption will be too controversial.

If government bonds provide transactions services, then fiscal policy—as a supplier of transactions balances—will play a role in price determination. It is the interaction between monetary and fiscal policy that determines whether or not the price level is determined. In Section 3, we show how fiscal policy can set a nominal anchor when monetary policy does not. We combine the classic interest rate peg with

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<sup>1</sup>This a very old problem in monetary theory, with roots that trace back to Wicksell (1898, 1965). The “rational expectations” incarnation of the problem is due to Sargent and Wallace (1975), which spawned a large literature. Papers that have proposed resolutions of the multiplicity problem include Canzoneri et al. (1983) and McCallum (1981). More recent discussions include: Leeper (1991) Woodford (1995), Kerr and King (1996), Cushing (1999), Schmitt-Grohe and Uribe (2000), and Alstadheim and Henderson (2003).

Benhabib et al. (2001), among others, emphasize the theoretical distinction between nominal indeterminacy (of the price level) and real indeterminacy (of the inflation rate and other real variables). Carlstrom and Fuerst (2001) suggest that “good” monetary policy should deliver real determinacy, while discounting the problem of nominal indeterminacy on the grounds that it has no welfare effect.

<sup>2</sup>Woodford (1995) defines a *Ricardian* fiscal regime as one in which, for any path that the price level might take, the fiscal authority adjusts its primary surpluses to ensure fiscal solvency. In his *Non-Ricardian* regime, primary surpluses do not necessarily adjust to ensure fiscal solvency for every possible path of prices; in this regime, the equilibrium path of prices may be determined by the requirement of fiscal solvency.

<sup>3</sup>For example, Patinkin (1965) presents a model in which both money and bonds appear in the household utility function. More recently, Bensal and Coleman (1996) used the approach to study the equity premium puzzle and related issues. See also Calvo and Vegh (1995).

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