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# The zero-interest-rate bound and the role of the exchange rate for monetary policy in Japan ☆

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**Abstract**

In this paper we study the role of the exchange rate in conducting monetary policy in an economy with near-zero nominal interest rates as experienced in Japan since the mid-1990s. Our analysis is based on an estimated model of Japan, the United States and the euro area with rational expectations and nominal rigidities. First, we provide a quantitative analysis of the impact of the zero bound on the effectiveness of interest rate policy in Japan in terms of stabilizing output and inflation. Then we evaluate three concrete proposals that focus on depreciation of the currency as a way to ameliorate the effect of the zero bound and evade a potential liquidity trap. Finally, we investigate the international consequences of these proposals.
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## 1. Introduction

Having achieved consistently low inflation rates monetary policymakers in industrialized countries are now confronted with a new challenge—namely how to prevent or escape deflation. Deflationary episodes present a particular problem for monetary policy because the usefulness of its principal instrument, that is the short-term nominal interest rate, may be limited by the zero lower bound. Nominal interest rates on deposits cannot fall substantially below zero, as long as interest-free currency constitutes an alternative store of value.[1] Thus, with interest rates near zero policymakers will not be able to stave off recessionary shocks by lowering nominal and thereby real interest rates. Even worse, with nominal interest rates constrained at zero deflationary shocks may raise real interest rates and induce or deepen a recession. This challenge for monetary policy has become most apparent in Japan with the advent of recession, zero interest rates and deflation in the second half of the 1990s.[2] In response to this challenge, researchers, practitioners and policymakers alike have presented alternative proposals for avoiding or if necessary escaping deflation.[3]

In this paper, we provide a quantitative evaluation of the importance of the zero-interest-rate bound and the likelihood of a liquidity trap in Japan. Then, we proceed to investigate three recent proposals on how to stimulate and re-inflate the Japanese economy by exploiting the exchange rate channel of monetary policy. These three proposals, which are based on studies by McCallum (2000, 2001), Orphanides and Wieland (2000) and Svensson (2001), all present concrete strategies for evading the liquidity trap via depreciation of the Japanese Yen.

Our quantitative analysis is based on an estimated macroeconomic model with rational expectations and nominal rigidities that covers the three largest economies, the United States, the euro area and Japan. We recognize the zero-interest-rate bound explicitly in the analysis and use numerical methods for solving nonlinear rational expectations models.[4] First, we consider a benchmark scenario of a severe recession and deflation. Then, we assess the importance of the zero bound by computing the stationary distributions of key macroeconomic variables under

[1] For a theoretical analysis of this claim the reader is referred to McCallum (2000). Goodfriend (2000), Buiter and Panigirtzoglou (1999) and Buiter (2001) discuss how the zero bound may be circumvented by imposing a tax on currency and reserve holdings.

[2] Ahearne et al. (2002) provide a detailed analysis of the period leading up to deflation in Japan.

[3] For example, Krugman (1998) proposed to commit to a higher inflation target to generate inflationary expectations, while Meltzer (1998, 1999) proposed to expand the money supply and exploit the imperfect substitutability of financial assets to stimulate demand. See also Kimura et al. (2002) in this regard. Posen (1998) suggested a variable inflation target. Clouse et al. (2000) and Johnson et al. (1999) have studied the role of policy options other than traditional open market operations that might help ameliorate the effect of the zero bound. Bernanke (2002) reviews available policy instruments for avoiding and evading deflation including potential depreciation of the currency.

[4] The solution algorithm is discussed further in the appendix to this paper.

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