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J. Japanese Int. Economies 20 (2006) 338–363

Journal of
THE JAPANESE
AND INTERNATIONAL
ECONOMIES

www.elsevier.com/locate/jjie

Monetary policy under a liquidity trap: Simulation evidence for the euro area

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Received 15 December 2005; revised 16 May 2006

Available online 18 July 2006

Dieppe, Alistair, and McAdam, Peter—Monetary policy under a liquidity trap: Simulation evidence for the euro area

In this paper, we analyze the conduct of monetary policy under a zero nominal interest-rate bound (hereafter ZIB) in a model economy of the euro area, namely that of the Area Wide Model. The aggregate euro-area economy is modeled to have relatively sluggish adjustment properties and a private sector with mainly backward-looking expectations. For a given ZIB benchmark, we consider variations in the monetary-policy reaction function to minimize the macro-economic consequences of such a deflationary regime. We rank the effectiveness of these remedial policies using a number of metrics and relate our results to features and properties of the model economy. *J. Japanese Int. Economies* **20** (3) (2006) 338–363. Research Department, European Central Bank.
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JEL classification: E31; E52; E58; E61

Keywords: Zero interest bound; Taylor rule; Euro area

1. Introduction

In this paper, we examine issues relating to the liquidity trap and the zero nominal interest bound (hereafter ZIB) in the context of the euro area. We do so in two dimensions. First, we examine the historical experience of the liquidity trap in the main economies, including the euro area and constituent members. Second, we perform zero-interest bound simulations on a well-

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doi:10.1016/j.jjie.2006.05.002

known macro-model of the euro area; this allows us to examine the transmission mechanisms underlying a ZIB deflationary regime and potentially to rank the performance of remedial policies, conditional on the reference model.

Svensson (2000) defined a liquidity trap as "...a situation with zero [nominal] interest rates, persistent deflation and persistent deflation expectations".[1] Deflations are thus characterized by chronic diverges between demand and potential output leading to weakening employment and growth and, in turn, embedded expectations of continued deflation.[2] Deflations essentially result in the nominal interest rate declining to zero at which point the real interest rate paid by borrowers equals the expected rate of deflation. Thus, borrowers' capacity to honor payments on the principal of their obligations may be strained, as falling prices increase the real value of such liabilities.

With nominal interest rates at their lower bound, moreover, a liquidity trap severely limits the traditional role of monetary policy in stabilizing or stimulating the economy. A form of nominal rigidity, which may adversely interact with a prolonged deflation, is the difficulty employers face in reducing nominal wages. If employees do not accept such cuts—due to "money illusion", union bargaining powers, etc.—deflation would result in increasing real wages, thereby further reducing employment and output. Finally, financial-market frictions may obstruct the reallocation of the resources required to restore balanced economic conditions. Deflations, particularly if unexpected, can lead to large redistributions of purchasing power from borrowers to lenders. To the extent that firms are net borrowers, this wealth reallocation, notably if reinforced by an erosion of firms' net worth due to falling asset prices, can have additional indirect effects. As their balance sheets deteriorate, firms may find it difficult to maintain access to external finance. Unavailability of credit may thus curtail investment and deepen the downturn. Conversely, deflationary shocks increase purchasing power and potentially improve external competitiveness.

Although the literature on preventing (and escaping from) such a trap is large and multifaceted, fundamentally most remedies boil down to proposals to raise inflationary expectations or lower expected interest rates; the general idea being for policy makers to lower interest rates along the term structure and flatten the yield curve. This, sometimes called the "policy duration" effect, implies that policy makers follow a rule that would retain a zero nominal interest rate for a period beyond what an optimal policy, in absence of the lower bound, would follow. Indeed, the analysis of Reifschneider and Williams (2000) and Eggertson and Woodford (2003) suggest that monetary policy makers remain unhindered in conducting monetary policy in a low-inflation regime, because of their ability to manipulate financial-market expectations of future policy through long-term interest rates.

Additional remedies have included: announcing a higher target of inflation (Krugman, 1998), systematic expansion of the monetary base (Clouse et al., 2000), taxing money (Goodfriend, 2000), and, in an open-economy setting, engaging in announced and controlled devaluations,

[1] Surveys on the liquidity trap can be found, for example, in Yates (2004), Fujiwara et al. (2005).

[2] In our present context, we mean deflations arising from severe negative demand shocks. Compare "beneficial" deflations—sustained improvements in productivity; improved terms-of-trade gains and trade expansion; structural reform to enhance competition—which lead to not only declining prices but also rising employment and output. Historically, there have been several such episodes: e.g., countries adhering to the gold standard experienced a mild deflation and steady growth between 1870 and 1896. This scenario has been associated with a combination of positive shocks to the demand for (gold) money and positive shocks to productivity. In more recent times, another candidate example is the secular falling in computing costs from the 1970s onwards. Recent expansionary conditions in China and India may also come to be described in such a way.

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