# Deflationary shocks and monetary rules:
# An open-economy scenario analysis ☆

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The paper considers the macroeconomic transmission of demand and supply shocks in an open economy under alternative assumptions on whether the zero interest floor (ZIF) is binding. It uses a two-country general-equilibrium simulation model calibrated to the Japanese economy vis-à-vis the rest of the world. Negative demand shocks have more prolonged and startling effects on the economy when the ZIF is binding than when it is not binding. Positive supply shocks can actually extend the period of time over which the ZIF may be expected to bind. More open economies hit the ZIF for a shorter period of time, and with less harmful effects. Deflationary supply shocks have different implications according to whether they are concentrated in the tradables rather than the nontradables sector. Price-level-path targeting rules are likely to provide better guidelines for monetary policy in a deflationary environment, and have desirable properties in normal times when the ZIF is not binding. *J. Japanese Int. Economies* **20** (4) (2006) 665–698. International Monetary Fund, USA; Federal Reserve Bank of New York, USA; NBER, USA; CEPR, United Kingdom. © 2006 Published by Elsevier Inc.

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## 1. Introduction

In recent years, quite a few research agendas have sought to pin down the causes of deflation, mostly focusing on whether falling prices are the result of structural factors or insufficient aggregate demand. In a nutshell, structural factors such as productivity improvements in the manufacturing sector are deemed to be responsible for worldwide disinflation, while weaknesses in demand are typically assumed to be accompanied by difficulties in providing monetary policy stimulus when interest rates hit the zero interest rate floor (ZIF). Specifically, the two views above have represented recurrent themes in both the policy and academic debate on the performance of the Japanese economy over the last 15 years.[1]

This paper does not take a specific view about the historical contribution of demand and supply factors in the evolution of prices in Japan, nor makes any normative or policy statements on the best course of action in the near future. Rather, it makes the simple point that a country facing deflationary risks would benefit from an integrated approach involving macroeconomic policies able to respond appropriately to adverse aggregate demand shocks and deal with the consequences of eventual expansions in supply. Such framework would not only eliminate deflation in the short run, but also guard against falling into liquidity traps in the future.

Using a 2-country simulation model calibrated to the Japanese economy, the paper carries out a scenario analysis to illustrate possible difficulties in dealing with both demand and supply shocks when the ZIF is binding. It shows that the effects of negative demand shocks on the economy become more protracted and startling when the ZIF is binding than during normal times when it is not binding. It also shows that positive supply shocks (e.g. shocks that raise potential output) can extend the period of time during which the ZIF is expected to be binding, increasing the economy's vulnerability to adverse demand shocks. In addition, the paper comments on the relative benefits of alternative monetary rules in a deflationary environment, including price level targeting, inflation-targeting, and price-level-path targeting rules. The results indicate that price-level-path targeting rules are likely to provide better guidelines for monetary policy because they are more robust in a deflationary environment, and—when appropriately designed—have desirable properties in normal times when the ZIF is not binding.

Throughout the paper we deliberately emphasize the implications of trade and financial openness on the effectiveness of monetary rules in a deflationary environment. This is not to restate the point made elsewhere (e.g. McCallum, 2000 and Svensson, 2001) that in an open-economy context policymakers can escape a liquidity trap by engineering the appropriate path for the exchange rate. Rather, we show that in the face of negative demand shocks, more open economies are less vulnerable to the problems associated with the ZIF: other things being equal, they hit the ZIF for a shorter period of time, and with less harmful effects. In addition, openness can reverse the sign of the short-term response of real exchange rates to shocks. With low openness, deflation results in a very high and persistent rise in real interest rates that strengthens the home currency in real terms. In contrast, with greater openness real interest rates are not expected to increase or even remain at a high level for a long time, and the real exchange rate depreciates on impact.

Finally, the mechanism of transmission of deflationary supply shocks is significantly affected by whether they are concentrated in the tradables or the nontradables sector. In both cases the appropriate policy response is to reduce interest rates when it is possible (either now or in the

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[1] See e.g. Callen and Ostry (2003), Eggertsson and Woodford (2003, 2004), and Hunt and Laxton (2001, 2003), Hayami (2001), Hayashi and Prescott (2004), Krugman (1998), McCallum (2000), and Svensson (2001).