

Inflation–output trade-offs in an optimization-based econometric framework applied to an open economy: The case of Japan

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Abstract

Applying an optimization-based econometric framework to an open economy for the evaluation of monetary policy, this paper examines the dissolving of inflation–output trade-offs, or improving social welfare, through inflation targeting by using data for Japan. We simulate a counterfactual inflation targeting policy with a model following New Keynesian Open-economy Macroeconomics, by estimating the historical feedback rule and deep parameters, and identifying shock processes. The findings indicate that consumer price index inflation targeting with commitment improves social welfare when compared with the historical policy in Japan. It does so through stabilizing not only the producer price inflation rate, but also output.

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1. Introduction

In the field of monetary policy in the open economy, monetary policy rules, including inflation targeting (IT), are discussed briskly. Concerning the IT, the implications derived by Aoki (2001), who finds that domestic IT dissolves inflation–output trade-offs under a closed economy, are verified by some work in New Keynesian Open-economy Macroeconomics (NOEM). From the NOEM perspective, there are some representative studies that examine the IT. With a small open economy, Gali and Monacelli (2005) show that inflation–output trade-offs are dissolved by

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Producer Price Index (PPI) IT while Benigno and Benigno (2006) and Okano (2007) show that PPI or Consumer Price Index (CPI) IT stabilize both inflation and output simultaneously within a two-country model. Moreover, Benigno and Benigno (2006) and Gali and Monacelli (2005) assert that this policy improves social welfare, which is derived with a second-order Taylor approximated utility function.

The theoretical implications derived by Benigno and Benigno (2006) and Gali and Monacelli (2005) have been recently proven by Okano (Forthcoming), who investigated IT in the UK using the optimization-based econometric framework (OEF) proposed by Rotemberg and Woodford (1997). Extending this framework to the small open economy, Okano (Forthcoming) simulates the UK economy on the assumption that the Bank of England did not adopt IT in 1992:4. The results indicate that not only the simulated PPI inflation rate but also the simulated output is more volatile than both historical paths, being the result of IT. The results also indicate that IT has improved social welfare in the UK when compared with the simulations. At this time, the policy implications derived by Benigno and Benigno (2006) and Gali and Monacelli (2005) are empirically consistent.

Following papers assuming an open economy, this paper examines dissolving inflation–output trade-offs, or improving social welfare through IT, using data for Japan after the 1990s. The assumption of an open economy has some importance for the analysis of monetary policy. For example, Aoki (2001) argues that one interesting question is whether the central bank (CB) should stabilize a broad inflation measure, which includes the prices of imported goods, or just domestic inflation. This question may be addressed only from an open-economy perspective. In addition, a more important suggestion is provided by Tille (2001). Taking notice of the Marshall–Lerner–Robinson condition, Tille (2001) shows that taking a closed economy as an approximation of a large open economy can be misleading when domestic and imported goods are poor substitutes. In such an economy, even if the home country is large enough to be regarded as a closed economy, a beggar-thyself effect arises, which depends on the elasticity of substitution between home and foreign goods. The elasticity of substitution between home and foreign goods has a significant effect on macroeconomic fluctuations; however, as long as a closed economy is assumed, it disappears.

In this analysis, we adopt the OEF proposed by Rotemberg and Woodford (1997). This framework is employed not only by Okano (Forthcoming) but also by Boivin and Giannoni (2003), Giannoni and Woodford (2003) and Amato and Laubach (2000). According to Amato and Laubach (2000), the essence of this framework is obtaining estimates of structural parameters by minimum distance estimation, and identifying shock processes to replicate the remaining time series features of the endogenous variables. These procedures make it possible to simulate counterfactual monetary policies. The framework consists of two models, including VAR and the microfounded structural model. However, unlike VAR or S-VAR, the framework can explain the changes in effects of monetary policy and can also be used for welfare analysis.

While much work using this framework implicitly assumes a closed economy, we employ the OEF applied to an open economy to verify the implications derived by Benigno and Benigno (2006) and Gali and Monacelli (2005). As discussed, studying monetary policy in an open economy is of some importance. We especially focus on the form of inflation measure; i.e., which form is suitable from the viewpoint of dissolving inflation–output trade-offs or improving social welfare. By assuming an open economy, we can address the question of whether the CB should stabilize a broad inflation measure, which includes the prices of imported goods, or merely domestic inflation, as in Aoki (2001).

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