A Bayesian Estimation of HANK models with Continuous Time Approach: Comparison between US and Japan *

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Abstract

This paper estimates heterogeneous agent New Keynesian (HANK) model for US and Japan through three aggregate observations: real GDP, inflation and interest rate, by adopting combination of easy-to-use computational method for solving the model, developed by Ahn, Kaplan, Moll, Winberry and Wolf (2019), and sequential Monte Carlo (SMC) method with Kalman filter applied for Bayesian estimation with parallel computing. The combination make us enjoy the estimation of HANK just using a Laptop PC, e.g., Mac Book Pro, with MATLAB, neither many-core server computer nor FORTRUN language. We show estimation results of one Asset HANK model, i.e., impulse response, fluctuations of distributions of heterogeneous agent as well as historical decomposition for both countries. Even though using the same model, different data draws different pictures.

Keywords: Heterogeneous Agent model, Linearization, Model Reduction, Bayesian estimation, Sequential Monte Carlo, Kalman Filter,
JEL Classifications: C32, E12,E21,E32, E43, E52, E62

1   Introduction

Over the last three decades, we have found there is a rapidly increasing macroeconomic literature dealing with the rich heterogeneous households in income, wealth and consumption behavior, thanks to the developing of computational

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