
Optimal Reduction of Public Debt under Partial Observation of the Economic Growth

Giorgia Callegaro*¹

¹University of Padova – Italy

Abstract

We consider a government that aims at reducing the debt-to-gross domestic product (GDP) ratio of a country. The government observes the level of the debt-to-GDP ratio and an indicator of the state of the economy, but does not directly observe the development of the underlying macroeconomic conditions. The government's criterion is to minimize the sum of the total expected costs of holding debt and of debt's reduction policies. We model this problem as a singular stochastic control problem under partial observation. The contribution of the paper is twofold. Firstly, we provide a general formulation of the model in which the level of debt-to-GDP ratio and the value of the macroeconomic indicator evolve as a diffusion and a jump-diffusion, respectively, with coefficients depending on the regimes of the economy. These are described through a finite-state continuous-time Markov chain. We reduce via filtering techniques the original problem to an equivalent one with full information (the so-called separated problem), and we provide a general verification result in terms of a related optimal stopping problem under full information. Secondly, we specialize to a case study in which the economy faces only two regimes, and the macroeconomic indicator has a suitable diffusive dynamics. In this setting we provide the optimal debt reduction policy. This is given in terms of the continuous free boundary arising in an auxiliary fully two-dimensional optimal stopping problem.

*Speaker