Two-productive sector equilibrium problems with heterogeneous agents under jump-diffusion models

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Abstract: In this talk, we assume rational expectations to pose general equilibrium models with heterogeneous firms, which can enter or exit the industry. We consider a jump-diffusion process for two different productivity dynamics corresponding to two sectors, thus extending our previous work [2]. Obstacle-type problems associated with Hamilton-Jacobi-Bellman (HJB) partial integro-differential equations (PIDEs) model the endogenous decision of firms to remain or leave each productive sector. Moreover, the probability density function of firms in each productive sector satisfies a Kolmogorov-Fokker-Planck (KFP) PIDE with a source term. Equilibrium models are completed with household problem formulations and feasibility conditions. For the numerical solution, we propose a Crank-Nicolson method for time discretization and the Adams-Bashforth scheme for the explicit treatment of integral terms. Moreover, we use augmented Lagrangian active set (ALAS) methods for solving the unilateral and bilateral obstacle problems [1], jointly with finite difference discretizations for the HJB formulations. Also, appropriate finite difference discretizations for the KFP problems are considered. For the global nonlinear equilibrium problem, we propose a Steffensen algorithm. Finally, numerical examples illustrate the performance of proposed numerical methodologies as well as the expected behaviour of economic variables.

References:

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