Estimating method of dynamic equilibrium models of firm dynamics

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Abstract

Hopenhayn(1992) considers a competitive environment of industry dynamics with heterogeneous firms. There exists the time-invariant stationary equilibrium distribution of firm size, and we can define the unique cross-sectional distribution, given the parameter values. Existing literatures calibrate the structural parameters by using the related panel data estimates or the indirect inference. There are several difficulties in estimation. First, there is no analytical solution of the stationary equilibrium distribution, the likelihood can be intractable and therefore we cannot utilize a benchmark maximum likelihood (ML) procedure. Second, when using several reduced-form estimation techniques, there is little or no guidance from econometric theory to choose one of the estimates, which take various values. Third, the estimates on the observed dynamic panel data are biased upward because of the attrition which comes from firms' exits. Fourth, reduced-form estimates are not the accurate alternatives of the structural parameters, because they do not consider the theoretical restrictions such as the cross-sectional restriction. Fifth, the property of the estimates based on the method of moment is generally not attractive. In order to structurally estimate the underlying parameters that can appropriately reflect the property of the distribution to overcome the short panel disadvantage, I employ the Bayesian likelihood-free inference method, named Approximate Bayesian Computation (ABC). The estimation method is effective where the likelihood is intractable but easy to simulate from the model conditional on typical parameters, can therefore be used to calculate the posterior distributions of structural parameters.

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