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On the Initialization of Adaptive Learning in Macroeconomic Models*

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Abstract

We review and evaluate methods previously adopted in the applied literature of adaptive learning in order to initialize agents' beliefs. Previous methods are classified into three broad classes: equilibrium-related, training sample-based, and estimation-based. We conduct several simulations comparing the accuracy of the initial estimates provided by these methods and how they affect the accuracy of other estimated model parameters. We find evidence against their joint estimation with standard moment conditions: as the accuracy of estimated initials tends to deteriorate with the sample size, spillover effects also deteriorate the accuracy of the estimates of the model's structural parameters. We show how this problem can be attenuated by penalizing the variance of estimation errors. Even so, the joint estimation of learning initials with other model parameters is still subject to severe distortions in small samples. We find that equilibrium-related and training sample-based initials are less prone to these issues. We also demonstrate the empirical relevance of our results by estimating a New Keynesian Phillips curve with learning, where we find that our estimation approach provides robustness to the initialization of learning. That allows us to conclude that under adaptive learning the degree of price stickiness is lower compared to inferences under rational expectations.

Keywords: expectations, adaptive learning, initialization, algorithms, hybrid New Keynesian Phillips curve.

JEL codes: C63, D84, E03, E37.

1 Introduction

Adaptive learning algorithms have been proposed to provide a procedural rationality view on agents' process of expectations formation. Reopening a long standing debate on how should

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