Learning to Optimize

George W. Evans 
University of Oregon

Bruce McGough 
Oregon State University

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Abstract

How does a boundedly rational optimizing agent make decisions? Can such an agent learn to behave rationally? We address these questions in a standard regulator environment. Our behavioral primitive is anchored to the shadow price of the state vector. The regulator forecasts the value of an additional unit of the state tomorrow, and uses this forecast to choose her control. The value of the control, together with the agent’s forecast of the tomorrow’s shadow price, are then used to compute a proxy for the unobserved shadow price of today’s state vector. This proxy provides a new data point which the agent uses to update her forecasting model. We find conditions sufficient to guarantee that, over time, the regulator becomes rational. We also embed this type of boundedly rational optimizing behavior in a simple DSGE model and compare the results with those obtained from embedding other learning mechanisms such as Euler equation learning and infinite horizon learning.