

# Restricted Perceptions and the Zero Lower Bound Episode \*

(Preliminary and incomplete, not for distribution)

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## Abstract

We consider the estimation of Markov-switching DSGE models under adaptive learning. Our starting point is that regime shifts in the economy are never directly observed by agents, but instead they indirectly infer about the regimes to the extent that it feeds back into their information set. Since the regimes are assumed to be unobserved, the information set can never coincide with that of Rational Expectations, and therefore a learning process cannot converge to the underlying Rational Expectations Equilibrium (REE). We show that in these cases, there is a so-called Restricted Perceptions Equilibrium (RPE) consistent with a given information set. We show that standard E-stability conditions apply to these equilibria for a variety of information sets. We then use a variant of the Kim & Nelson (1999) filter to estimate MS-DSGE models under constant gain adaptive learning. Based on estimations of the benchmark 3-equation NKPC and workhorse Smets-Wouters (2007) models, our results are summarized as follows: The adaptive learning models outperform the REE benchmark in all cases and the Regime-switching REE model in most cases, suggesting that Markov-switching and Adaptive Learning approaches can be complementary. Furthermore, we observe important differences in the impulse response and shock propagation structure of the models under consideration. Particularly, a financial shock and a government spending shock of the same size typically has a longer-lasting impact under adaptive learning, suggesting that the Rational Expectations models may severely underestimate both the impact of 2007-08 financial crisis, as well as the impact of a fiscal stimulus during the zero lower bound episode that followed the crisis.

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