Imperfect Information, Shock Heterogeneity, and the Flattening of the Phillips Curve*

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Abstract

Existing studies report that in Japan flattening of Phillips curve occurred after mid-1990s while the frequency of price changes at micro-level has somewhat increased during the same period. To fill in the gap, we propose and verify the view that the increase in shock heterogeneity across sectors (i.e. the increase in ratio of the variance of disaggregated shocks to that of aggregate shocks) caused flattening of Phillips curve in Japan. We develop a dynamic stochastic general equilibrium model where firms set their prices under dispersed information environment. The key feature of the model is that firms observe only their own shocks (i.e. the sum of the aggregate and disaggregate shocks) as signals for aggregate shocks, and thus noisiness of the signals increases along with the variance of the disaggregate shocks. Employing the model, we show that the responses of aggregate inflation exhibit slower adjustment to aggregate shocks by the increase in shock heterogeneity. We also numerically show that in the model the slow adjustment of inflation rates leads to flatter estimated NKPCs. We then estimate the degree of shock heterogeneity by applying principal component analysis to corporate sales data, and illustrate that in Japan, as a trend, the heterogeneity has increased over time. Further, by estimating the Phillips curve of our model, we verify that in fact the responses of aggregate inflation become slower as the shock heterogeneity increases as our model predicts.

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Keywords: Inflation dynamics, Imperfect common knowlege, Phillips curve.

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