Essays on Aggregate Investment and Macroeconomic Dynamics

(Dissertation Abstract)

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Investment Lags and Macroeconomic Dynamics (Job Market Paper)

In the early 1980s, Kydland and Prescott introduced the real business cycle (RBC) model using dynamic stochastic general equilibrium (DSGE) framework. Since then, DSGE models have been widely used in every field of macroeconomics. Because a DSGE model is useful for policy analysis and economic forecasting only when the model is not rejected by data, a variety of richer specifications in the DSGE framework is suggested with the goal of developing a model that is able to account for the dynamic correlations that one sees in an unrestricted vector autoregression (VAR) representation of the observed variables. However, many DSGE models often omit the importance of investment lags, the delay between an investment decision and the completion, which is verified empirically, following the findings of Rouwenhorst (1991) that investment lags do not produce significant effect on output fluctuations. This paper claims that we need to specify investment more rigorously to improve the fit of the DSGE model to data. In Particular, investment lags should be specified in the DSGE model. A typical monetary DSGE model with standard capital adjustment cost specification is selected as a baseline and the models augmented with three different investment lag specifications are estimated with the maximum likelihood method to evaluate the fit to data. The findings of this study could be summarized as follows: First, the models with investment lags fit the data significantly better than the baseline model. Incorporating the investment lags improves the log likelihood and forecast accuracy significantly, and generates more realistic impulse responses. Second, the time-to-build period is estimated at six to eight quarters, confirming the findings from previous empirical literature. Third, the three models with different investment lag specification perform equally well, in terms of log likelihood and forecast accuracy. Those findings indicate that investment lags should be included in the DSGE model if a researcher pursues a better fit of the model to data and a more accurate economic forecast.

Does Business Cycle Affect Time-to-Build?

Because of investment lags, firms have to make investment decisions in advance, incorporating expectations of future economic conditions rather than their realization. If a firm is more optimistic about the future economic condition, it may choose a more costly and less time-consuming way to build new capital. Thus, investment lags could be affected by the business cycles. It is hard to get the business cycle implication from the survey data on time-to-build, since the surveys are not conducted regularly or frequently. I instead use the online database Lexis-Nexis that accumulates full text of business news articles. Using the collected information about the selected firms' investment projects, I could construct a dataset of time-to-build and magnitude of investment projects over business cycles. The analysis of these data suggests: First, the average time-to-build period is calculated around two years, which squares with other empirical studies on investment lags. Second, investment lags are not sensitive to the business cycles. The investment lags for a project which is started during a recession are not significantly longer than those for others. Third, there are few delays and cancellations of projects in the sample, which favors the common assumption of irreversibility in investment.