Understanding the NT-DSGE Model

Some basic notes on understanding the NT-DSGE model.

The model

The small open-economy model structure closely follows that of Adolfson et al. (2007) and Christoffel et al. (2008), while incorporating a more active role for fiscal policy along the lines of Coenen et al.(2013).

The basic open-economy structure is relatively standard: households consume both domestic and imported consumer goods, while optimizing agents can invest in domestic and foreign bonds. The optimizing households rent capital to firms and decide how much to invest each period, with changes to the rate of investment, as well as changes to the rate of capital utilization, subject to adjustment costs. Each household supplies a differentiated labour service to firms, allowing them to set their wage in a Calvo (1983) manner.

The model contains three types of firms: domestic producers, importers, and exporters. Domestic firms employ labour and capital in production. A differentiated good is produced by each type of firm. Prices are set following Calvo's (1983) model, but with a variation that allows for the indexation to past inflation (following Rabanal and López-Salido (2006)).

Finally, monetary policy follows a standard Taylor-type rule, while the foreign economy is assumed to be exogenous.

This basic specification is extended along the lines of Coenen et al. (2013) to include a more active role for fiscal policy. The specification of the fiscal sector balances the need for a high degree of detail, which is essential for analysing the quantitative effects of fiscal policy innovations, and tractability, which allows for the identification of the relevant transmission mechanisms. Specifically, the model includes (1) non-Ricardian (or rule-of-thumb) consumers to facilitate a direct transmission mechanism for government transfers; (2) government consumption that enters the households' utility function in a non-separable way; (3) public capital which can either be a complement or substitute for private capital, (4) time-varying distortionary taxes, and (5) a set of fiscal rules governing the endogenous response of fiscal variables.

Variables

All variables below enter the model endogenously in the model code *SAFiscal_test_3_sim.mod*.

Prices

The model incoporates headline inflation, a time-varying inflation target and the main GDP price deflator components. The pices are listed as endogenous variables in the model code.

Consumer price inflaton (headline inflation)

- Paper notation: $\widetilde{\pi}_C$ Note: Paper uses tilda
- Model notation: $\widehat{\pi}_C$ Note: Model uses hat
- Model code: piC

Inflation target (possibly time varying)

- Paper notation: $\bar{\bar{\pi}}_C$ Note: Paper uses bar tilda
- Model notation: $\hat{\bar{\pi}}^C$ Note: Model uses bar hat
- Model code: piCbar

Domestic goods inflation (producer price inflation)

- Paper notation: $\tilde{\pi}_H$ Note: Paper uses tilda
- Model notation: $\hat{\pi}_H$ Note: Model uses hat
- Model code: piH

Investment price deflator

- Paper notation: $\tilde{\pi}_I$ Note: Paper uses tilda
- Model notation: $\hat{\pi}_I$ Note: Model uses hat
- Model code: piI

Export price deflator

- Paper notation: χ_X Note: Paper only lists indexation
- Model notation: $\hat{\pi}_X$ Note: Model uses pi notation
- Model code: piX

Import price deflator

- Paper notation: χ^* Note: Paper only lists indexation
- Model notation: $\hat{\pi}_M$ Note: Model uses pi notation
- Model code: piM

GDP price deflator

- Paper notation: ? Note: Not listed in paper
- Model notation: $\hat{\pi}_Y$ Note: Model uses pi notation
- Model code: piY