SBB_DSGE

The DSGE Model of The Presidency of Strategy and Budget of Turkey

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OUTLINE

➢ General Structure of The SBB_DSGE
➢ Main Using Purpose of the Model
➢ Challenges and Opportunities
• A New-Keynesian DSGE model for a small open economy
• Monopolistic competition
• Price and wage rigidities
• Investment adjustment cost and capital utilization rate
• One type of household
• Three types of import goods
• Consumption habit formation
• Financial frictions
• Rest of the world modelled simply exogenously
• 52 estimated parameters
• 15 exogenous shocks
➢ Understanding the dynamics of the business cycles of Turkish Economy
➢ Monetary policy issues
➢ Scenario analysis and forecasting
➢ Examination of estimation consistency with other macroeconomic models of department

➢ Inflation dynamics
Consumer Price Inflation, Turkey
CPI inflation response to monetary policy shock $\approx 150$ bp

Monetary Policy Response Function, Estimated Coefficients

$$\log(\hat{R}_t) = \rho_R \log(\hat{R}_{t-1}) + (1-\rho_R)[r_\pi \log(\hat{\pi}_t) + r_y \log(\hat{gdp}_t)] + \epsilon_{R,t}$$

$r_\pi = 1.20$!!!  $r_y = 0.15$  $\rho_R = 0.82$
Historical Decomposition of the Consumer Inflation
1) Calibration of Capital Share/Elasticity for Cobb Douglas Production Function

- One of the important calibrated parameter in DSGE models
- Generally, estimated values for capital share within a broad band especially in emerging countries
  - In Turkey, based on academic studies, capital share ratio ranges from 38% to 65%.

**Calibration Techniques**

- Standard Econometric Method
- For consistency check and more accurate results
  - Alternative Method (Income Side, Based on Data Availability)

\[
\left( \frac{w \times l}{gdp} \right)_{adj.} = \left( \frac{w \times l}{gdp} \right) \times \left( \frac{Employer + Selfemployed + Unpaid Family Worker}{Employer} \right)
\]

- Capital share and investment shock relation
  - Investment volatility
  - More visible results

2) Consumption Habit Formation: Calibration vs Estimation
Prior Distribution Choice for Persistency Parameter of Technology Shocks (Permanent and Stationary/Transitory Technology Shocks)

- High persistency coefficient can lead to interpretation problems.
- Shock can take an excessive role in business cycle inferences.
- Intangibility problem for policy decision makers.

![Graph showing GDP growth with various shocks](chart.png)
Model Fit Problem for Accounting the Variation of Some Variables

Variance Decomposition

| External Shocks          | $\varepsilon_{\mu z}$ | $\varepsilon_{\sigma}$ | $\varepsilon_{Y}$ | $\varepsilon_{r^T}$ | $\varepsilon_{\varphi}$ | $\varepsilon_{\tau h}$ | $\varepsilon_{R}$ | $\varepsilon_{g}$ | $\varepsilon_{p, d}$ | $\varepsilon_{p, r}$ | $\varepsilon_{p, mc}$ | $\varepsilon_{p, mi}$ | $\varepsilon_{p, max}$ | $\varepsilon_{F P}$ | $\varepsilon_{FP}$ | $\varepsilon_{y_{earnings}}$ |
|--------------------------|------------------------|------------------------|--------------------|----------------------|------------------------|------------------------|-----------------|-----------------|----------------------|----------------------|------------------------|------------------------|------------------------|---------------------|---------------------|
| $\Delta$ GDP             | 32.1                   | 22.2                   | 4.4                | 12.3                 | 4.9                    | 2.0                    | 13.6            | 1.4             | 6.0                   | 5.7                   | 0.1                    | 0.5                    | 1.5                     | 0.1                 | 0.8                 | 0.9                 |
| $\Delta$ Investment      | 10.2                   | 0.1                   | 18.3               | 0.2                  | 19.6                   | 5.3                    | 16.6            | 0.0             | 5.8                   | 0.1                   | 0.2                    | 4.3                    | 0.1                     | 0.9                 | 6.5                 | 6.5                 |
| Spread, Domestic C.      | 0.3                    | 0.3                   | 12.3               | 0.0                  | 9.7                    | 0.8                    | 1.5             | 0.0             | 0.5                   | 0.0                   | 0.0                    | 0.4                    | 0.0                     | 15.3                | 1.3                 | 1.6                 |

- External Shocks account variation in GDP and investment
- External shocks can not account variation in interest rate spread for credits.
  - High measurement error
  - Being affected by other factors within the financial system that are not implied by model equations
Thank You