SBB_DSGE

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

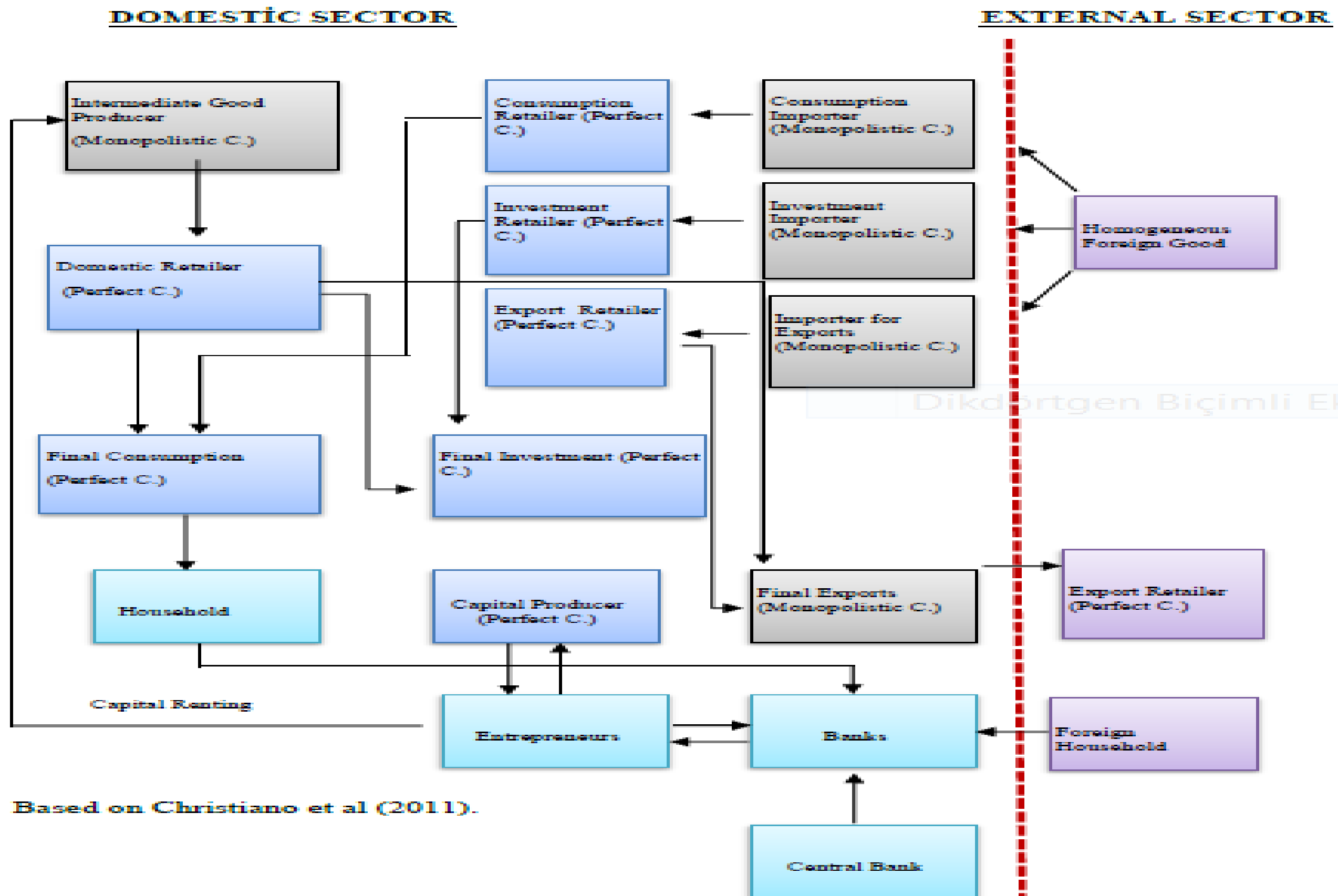**Economic Modelling Department**
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Macroeconomic Modeling for Open Economies

➢ 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

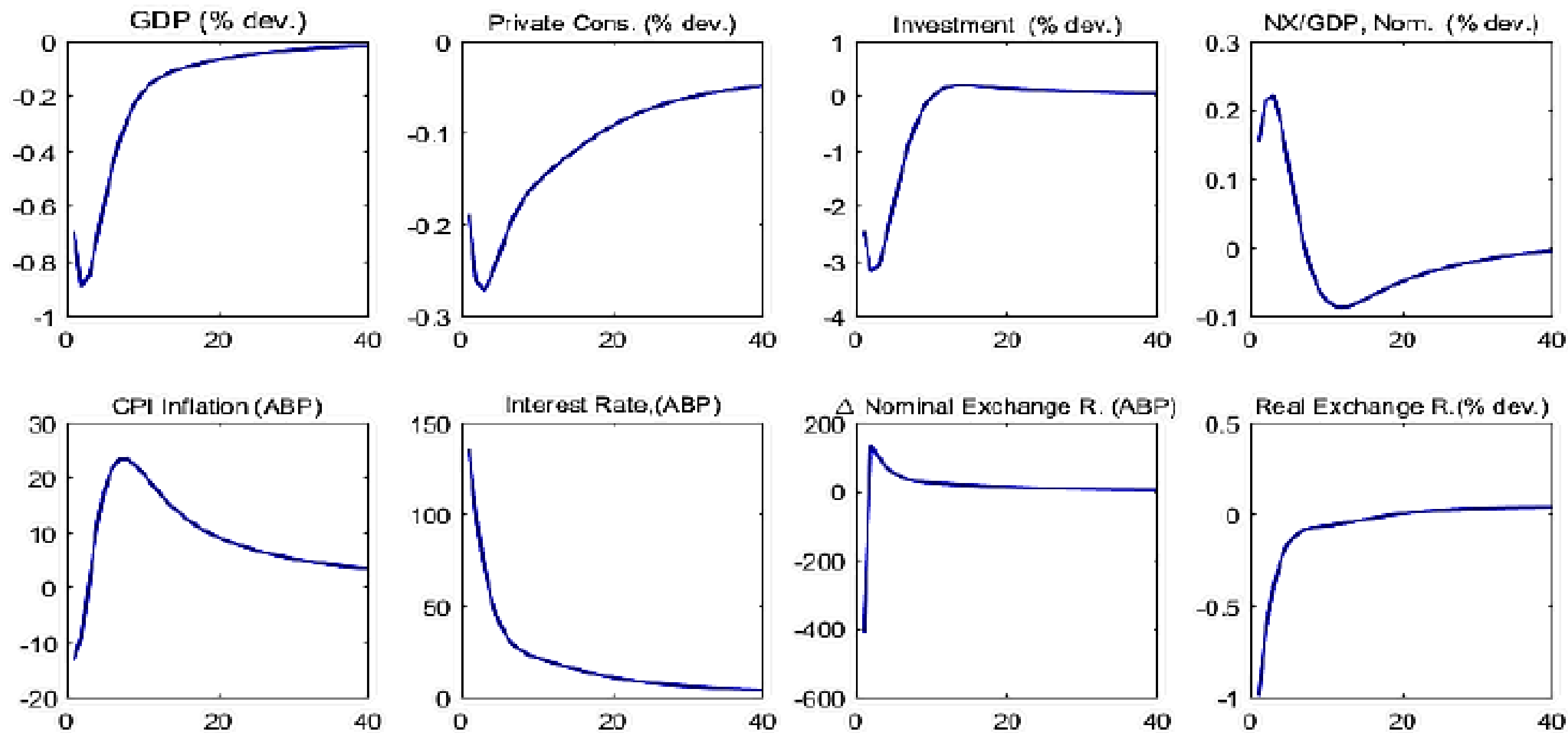DOMESTİC SECTOR   EXTERNAL SECTOR

Based on Christiano et al (2011).

➢ 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
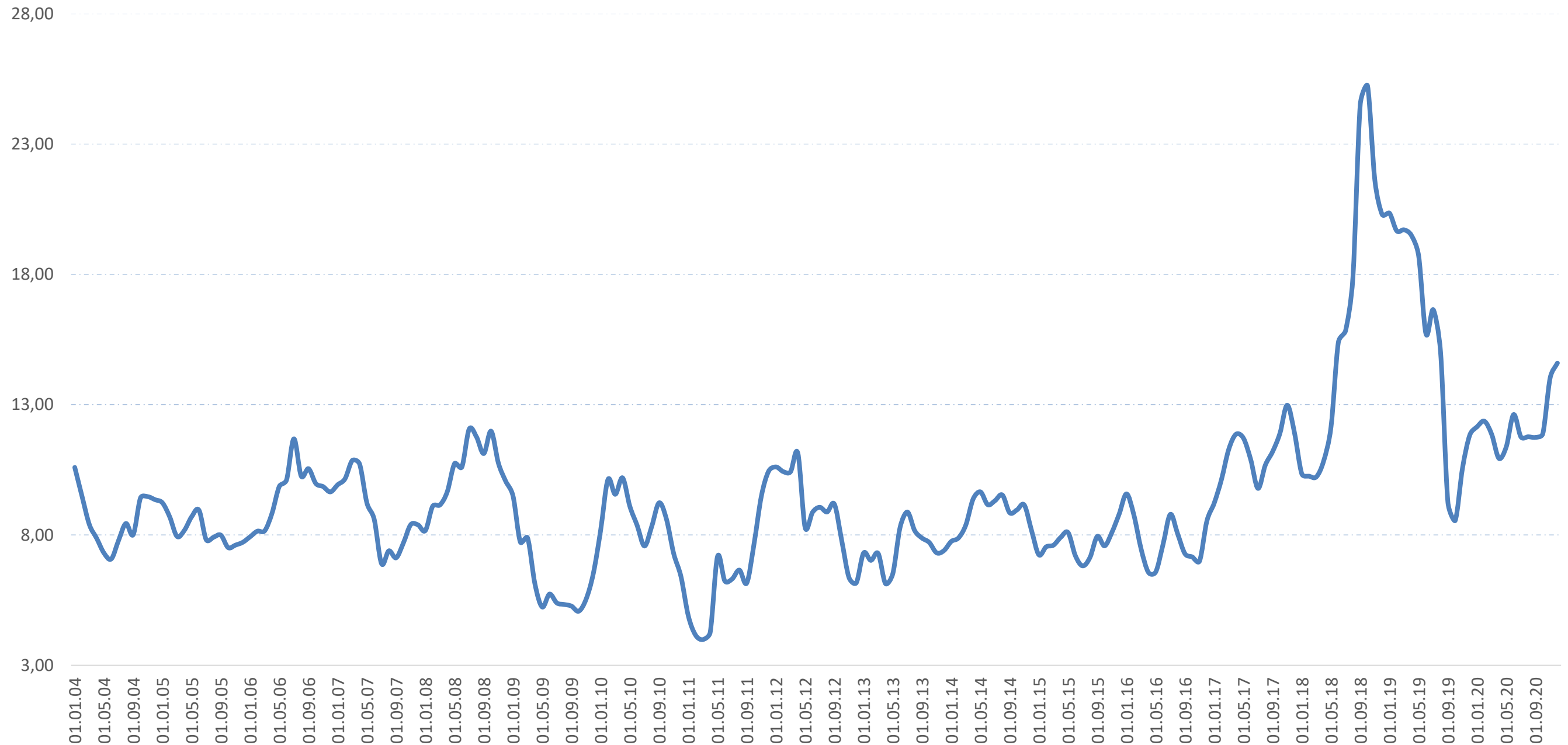
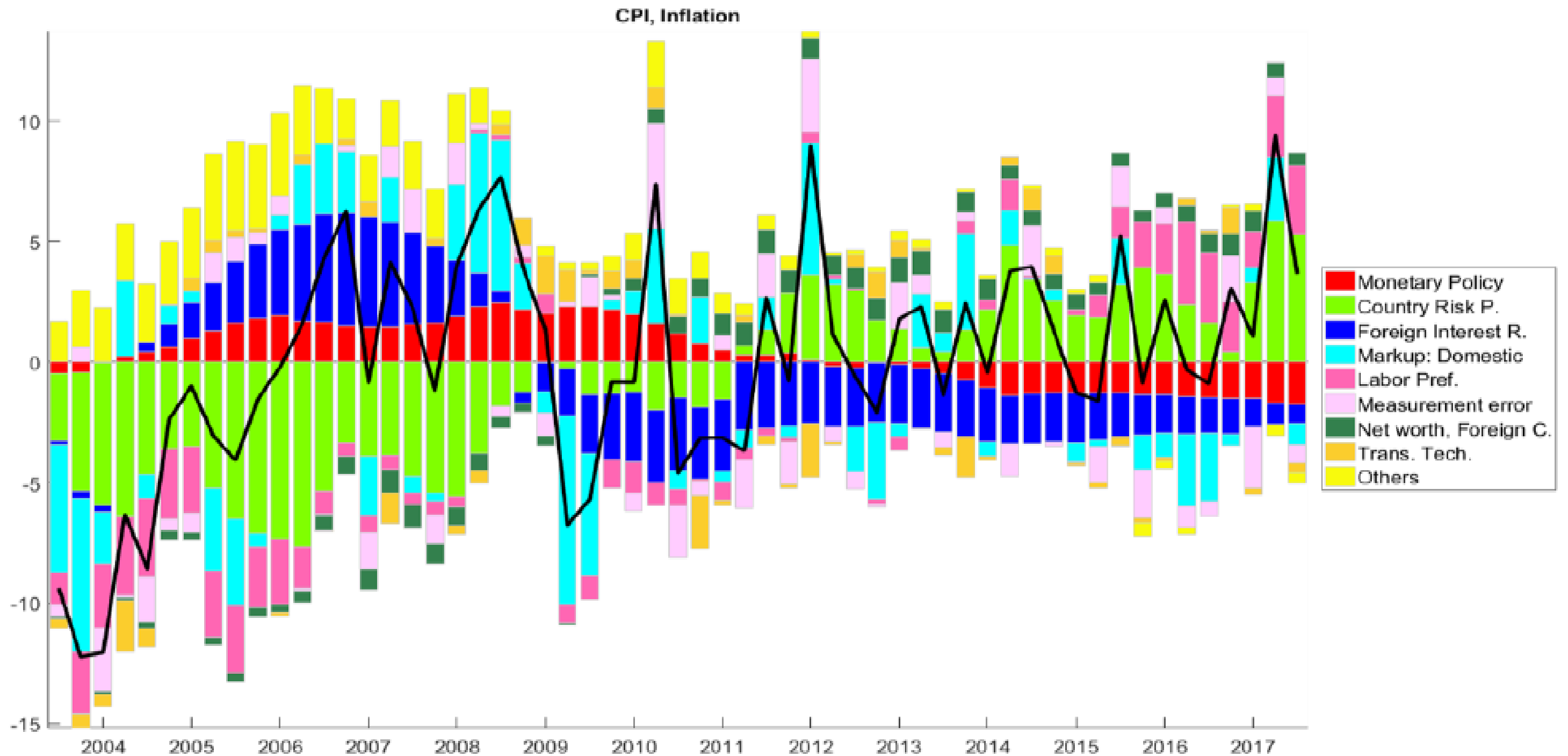➢CPI inflation response to monetary policy shock ≈ 150 bp

➢Monetary Policy Responce Function, Estimated Coefficients

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

$$\boldsymbol{r_\pi = 1.20}!!! \quad r_y = 0.15 \quad \rho_R = 0.82$$

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)

$$\left(\frac{w \times l}{gdp}\right)_{adj.} = \left(\frac{w \times l}{gdp}\right) \times \left(\frac{Employer + Self\,employed + Unpaid\,Family\,Worker}{Employer}\right)$$

- 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 leads interpretation problem

- Shock can take excessive role in business cycle inferences

- Intangibility problem for policy decision maker

GDP, growth
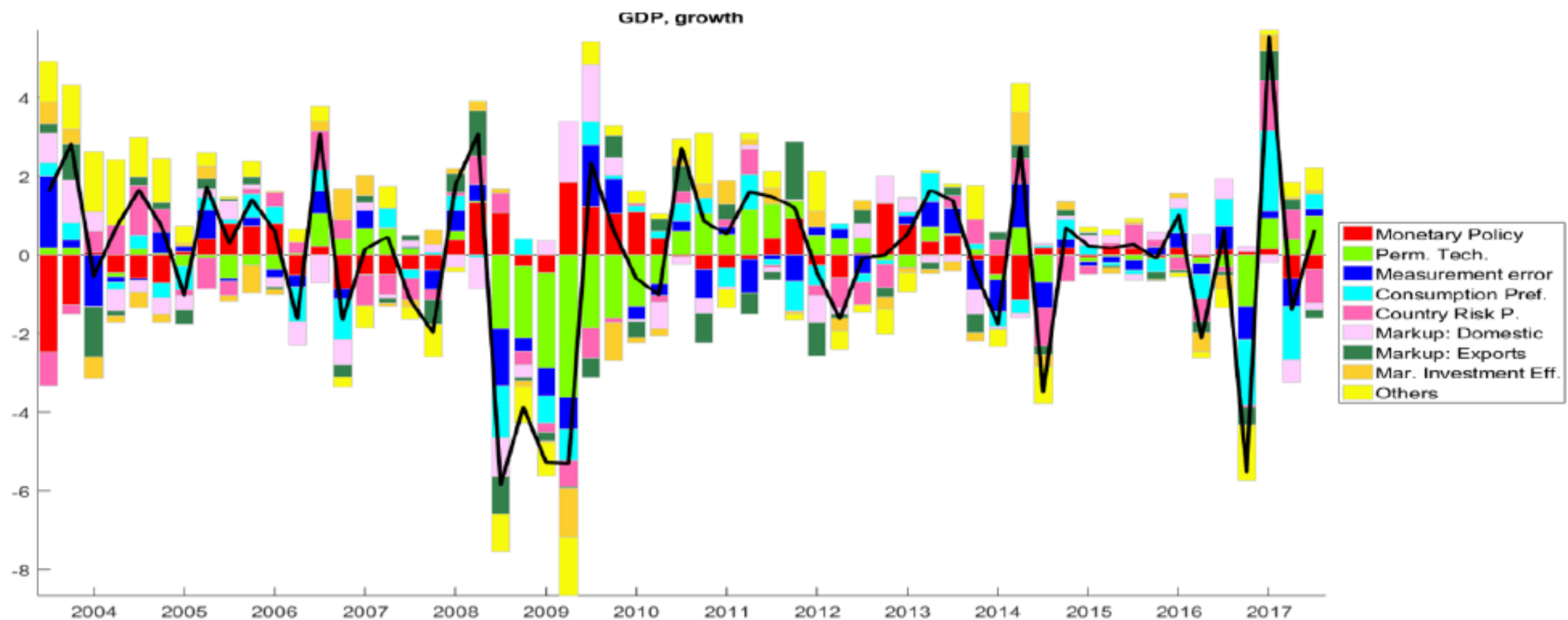
Model Fit Problem for Accounting the Variation of Some Variables

Variance Decomposition

	External Shocks															
DESCRIPTION	ε_{μ_z} Perm. Tech.	ε_ϵ Trans. Tech.	ε_Υ Mar. Eff. Inv.	ε_{ζ^c} Cons. Pref.	$\varepsilon_{\tilde\phi}$ Country Risk P.	ε_{ζ^h} Labor Pref.	ε_R Mon. Policy	ε_g Gov. Exp.	ε_{τ^d} Domestic Prod. Prices	ε_{τ^x} Export prices	$\varepsilon_{\tau^{mc}}$ Imp. Cons. Prices	$\varepsilon_{\tau^{mi}}$ Inv. Imp. Prices	$\varepsilon_{\tau^{mx}}$ Exp. Imp. Prices	$\varepsilon_{\gamma^{YP}}$ Entrep. Net worth, Dom. C.	$\varepsilon_{\gamma^{FP}}$ Entrep. Net worth, Foreign C.	$\varepsilon_{yurtdışı*}$ Foreign Shocks
Δ GDP	32,1	2,2	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
Δ 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 acoount 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