OPTIMAL FISCAL POLICY FOR MACROECONOMIC STABILITY: A CASE STUDY FOR SLOVENIA

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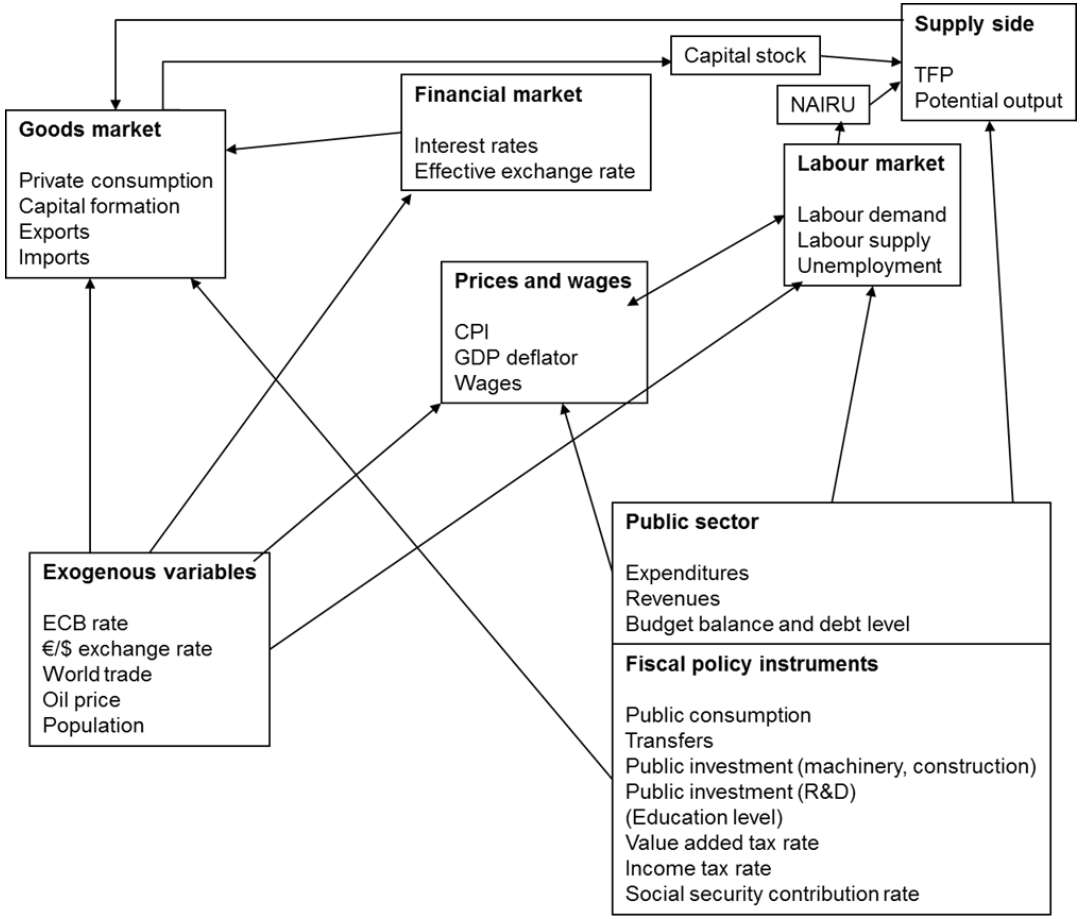
Optimal Fiscal Policy for Macroeconomic Stability

- European Economic and Monetary Union:
  - Stabilization policy: monetary policy (Eurozone) – fiscal policy (national)
- Richard Musgrave: Fiscal policy:
  - Allocation
  - Distribution
  - Stabilization
- Optimal policy (= best possible): theory of quantitative economic policy
  - Jan Tinbergen (Nobel Prize 1969), Henri Theil
  - Optimal control theory: Gregory C. Chow, David A. Kendrick

Quantitative economic policy

- Ingredients for optimization problem:
  - Positive: model of economy
  - Normative: preferences of decision maker
- Model:
  - Theoretical model
  - **Econometric model**
  - DSGE Model
  - …
- Preferences:
  - **Objective function**: utility function, welfare function, cost function,…

Econometric model: SLOPOL12



Econometric model: SLOPOL12

- Cowles Commission type econometric model
  - 75 equations, 23 of which are behavioral equations and 52 identities
  - 75 endogenous variables, 41 exogenous variables
  - Most behavioral equations are specified in error correction form
  - Estimated with data up to the end of 2023
- Supply side
  - Cobb-Douglas production function
  - TFP, NAIRU
- Demand side
  - Goods market, labor market, financial market, public sector

From Preferences to Objective Function

- Policy makers‘ preferences:
  - **Questionnaire**: survey conducted among Slovenian policy makers between 6 June 2017 and 5 July 2017

Rank	Target	Mark (1-10)
1	GDP growth	9.5
2	Ratio of public debt to GDP	8.8
3	Trade balance	8.6
4	Unemployment rate	8.5
5	Private consumption level	8.5
6	Share of investment in GDP	8.3
7	State budget level	7.0
8	Inflation rate	6.9

	BAL	CAGDP	CR	DEBT	GDPR	GRGDPR	GRYPOT	INFL	INVR	UR	YPOT
sc0	1	1	1	1	1	1	1	1	1	1	1
sc1	2	2	2	2	2	1	2	1	2	2	1
sc2	7	8.6	8.5	8.8	1	9.5	1	6.9	8.3	8.5	1
sc3	3	7	5	8	1	9	1	2	4	6	1

The Objective Function

- „Tracking“ optimization (optimum control) problem:

$$\min J = \sum_{t=1}^{T} L_t(x_t, u_t) \; with$$

$$L_t(x_t, u_t) = \frac{1}{2} \begin{pmatrix} x_t - \widetilde{x_t} \\ u_t - \widetilde{u_t} \end{pmatrix} W_t \begin{pmatrix} x_t - \widetilde{x_t} \\ u_t - \widetilde{u_t} \end{pmatrix} \quad ,$$

$$s.t. \qquad x_t = f(x_{t-1}, x_t, u_t, \theta, z_t) + \varepsilon_t, \quad t = 1, \dots, T,$$

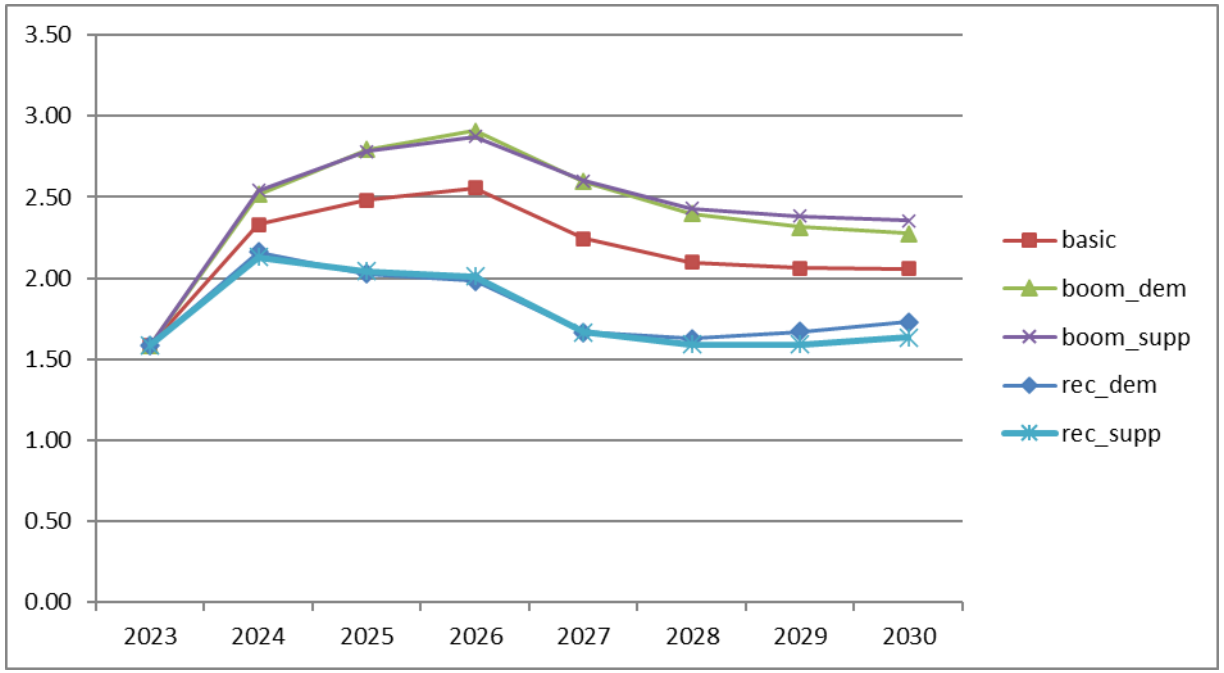
The Objective Function

- Objective variables:
  - Target variables: main – minor targets
  - Evaluated control (instrument) variables
- Weights
- “Ideal” paths of objective variables
- Extensions:
  - Discounting
  - Varying weights
  - Stochastics
  - Dynamic games
  - …
- Solutions: approximations; OPTCON3 algorithm

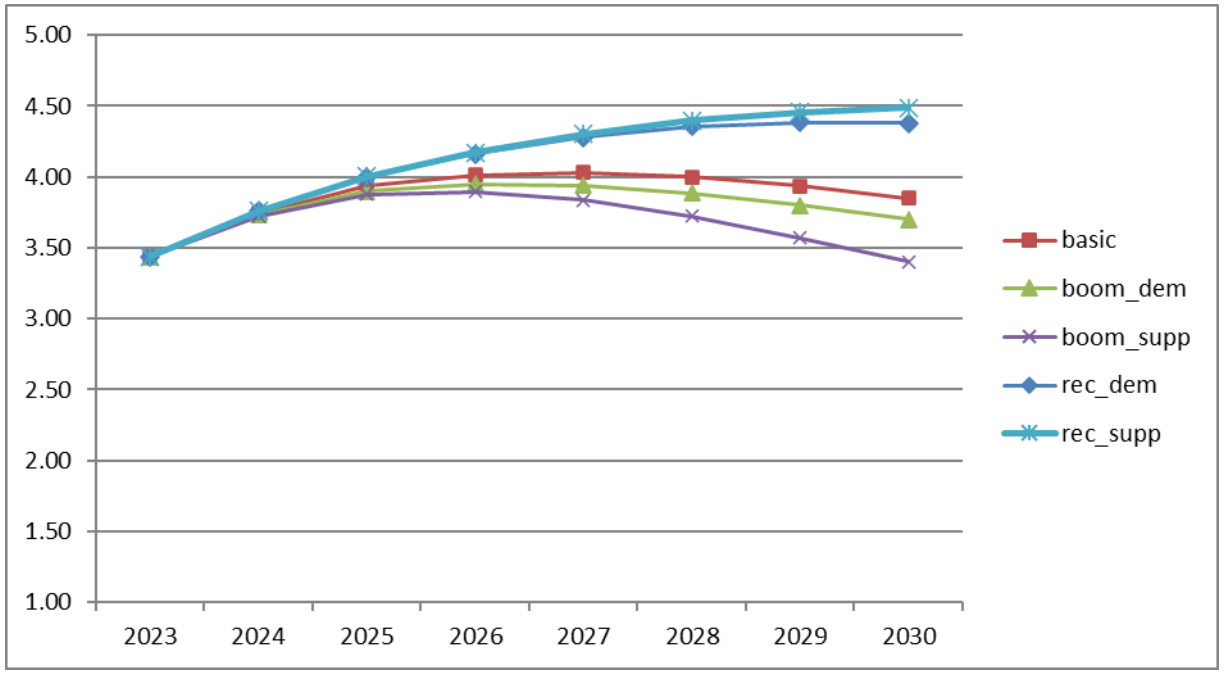
Results:
Optimal Policies in Booms and Recessions

- Baseline solution: “Business as usual” (forecast)
- Alternatives:
  - Boom – recession
  - demand – supply side
- Simulation and optimization

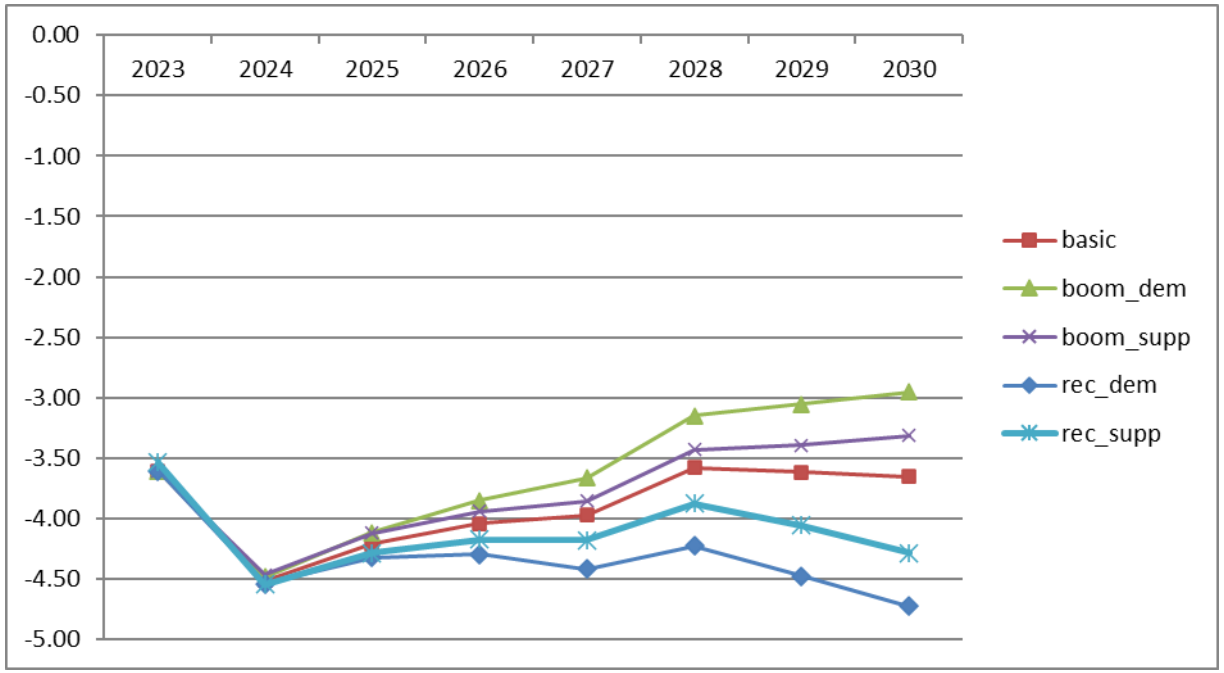
Growth rate of real GDP, percent, simulations



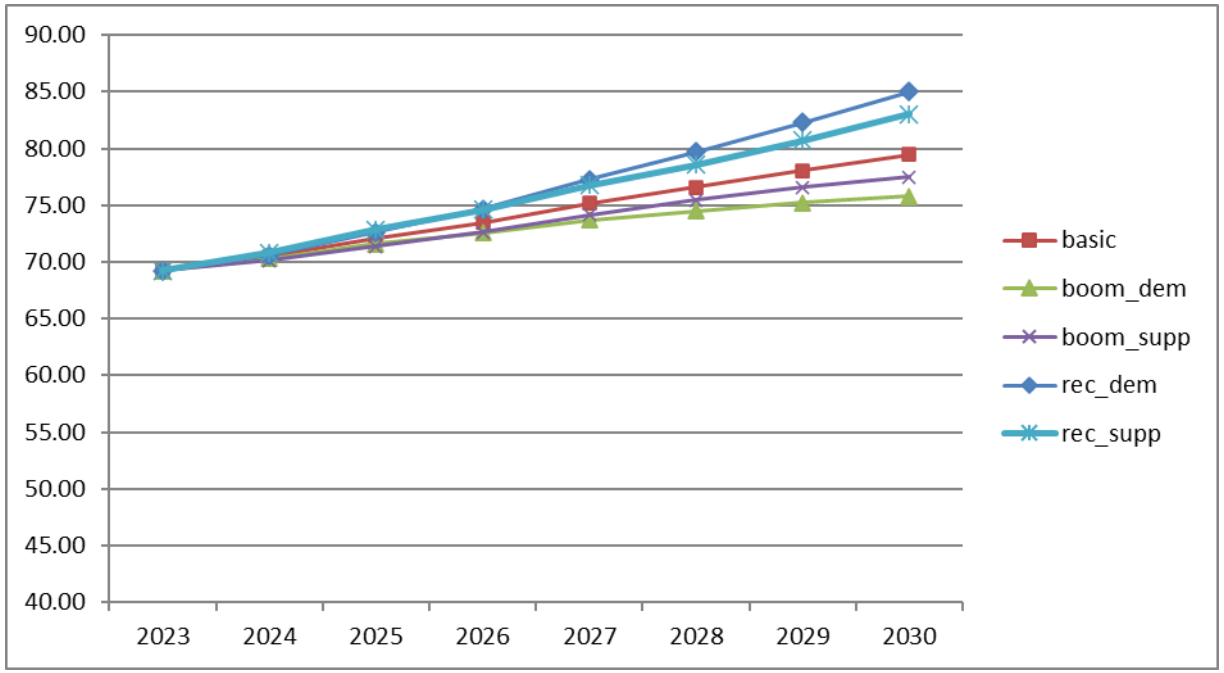
Unemployment rate, percent, simulation



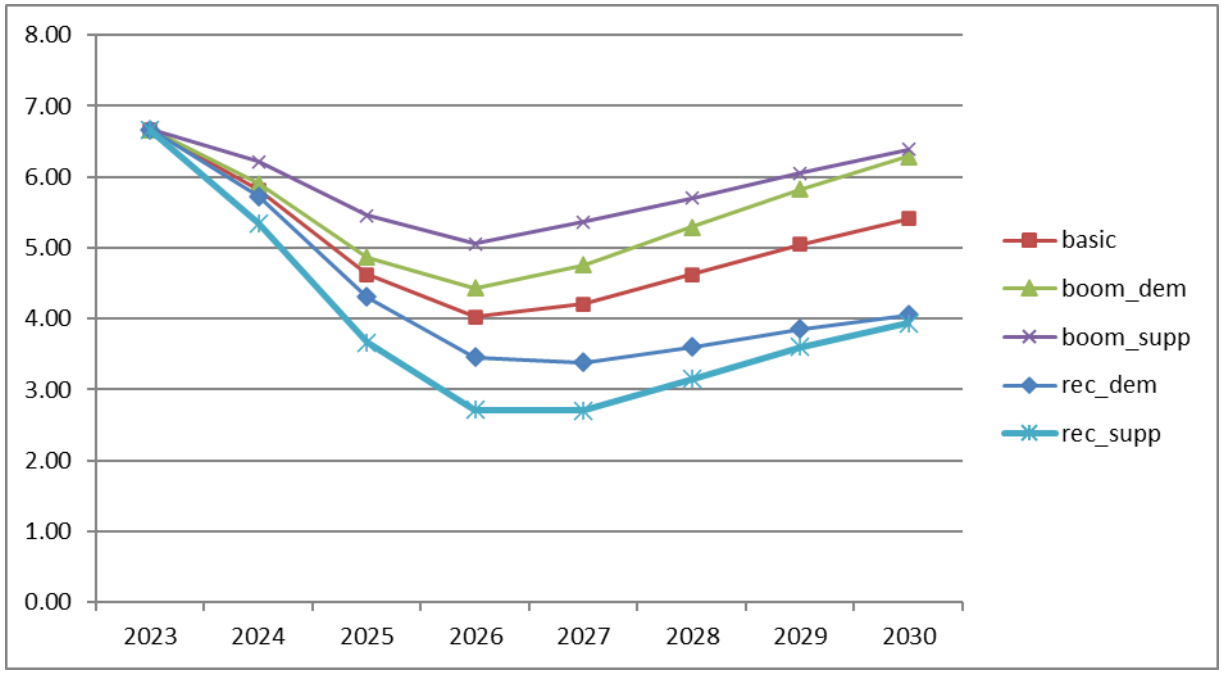
Budget balance, nominal, percent of nominal GDP, simulation



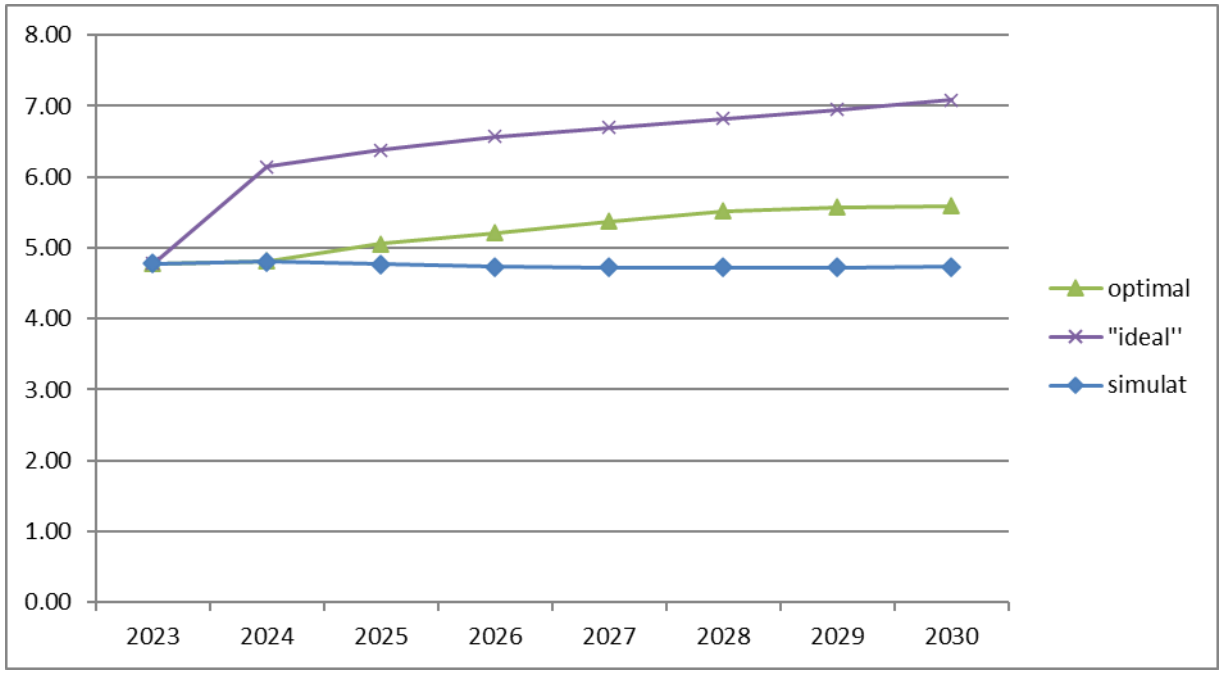
Public debt, nominal, percent of nominal GDP, simulation



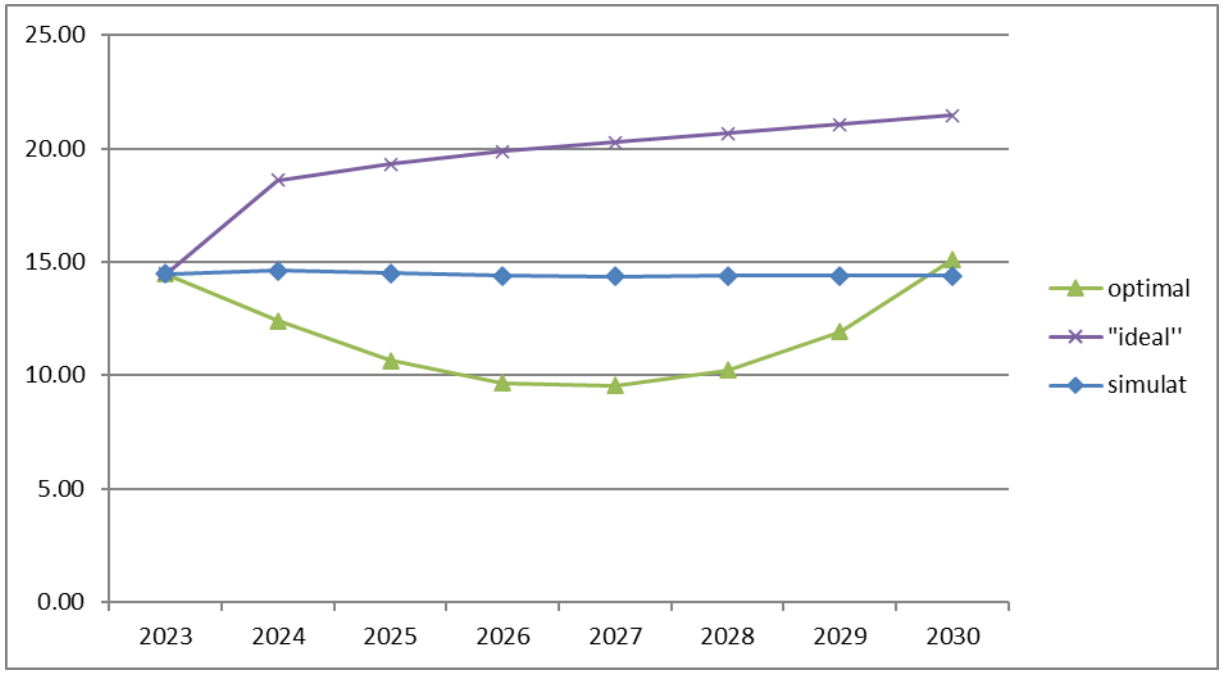
Current account surplus, nominal, percent of nominal GDP, simulation



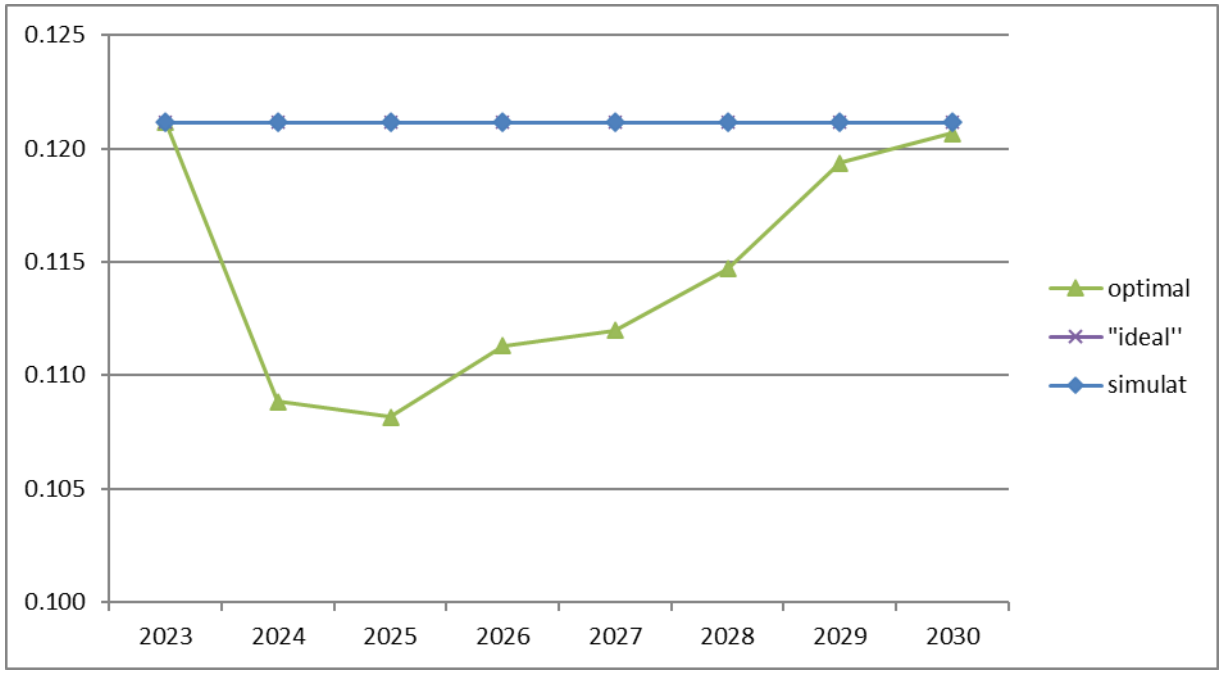
Government investment, nominal, percent of nominal GDP, optimization



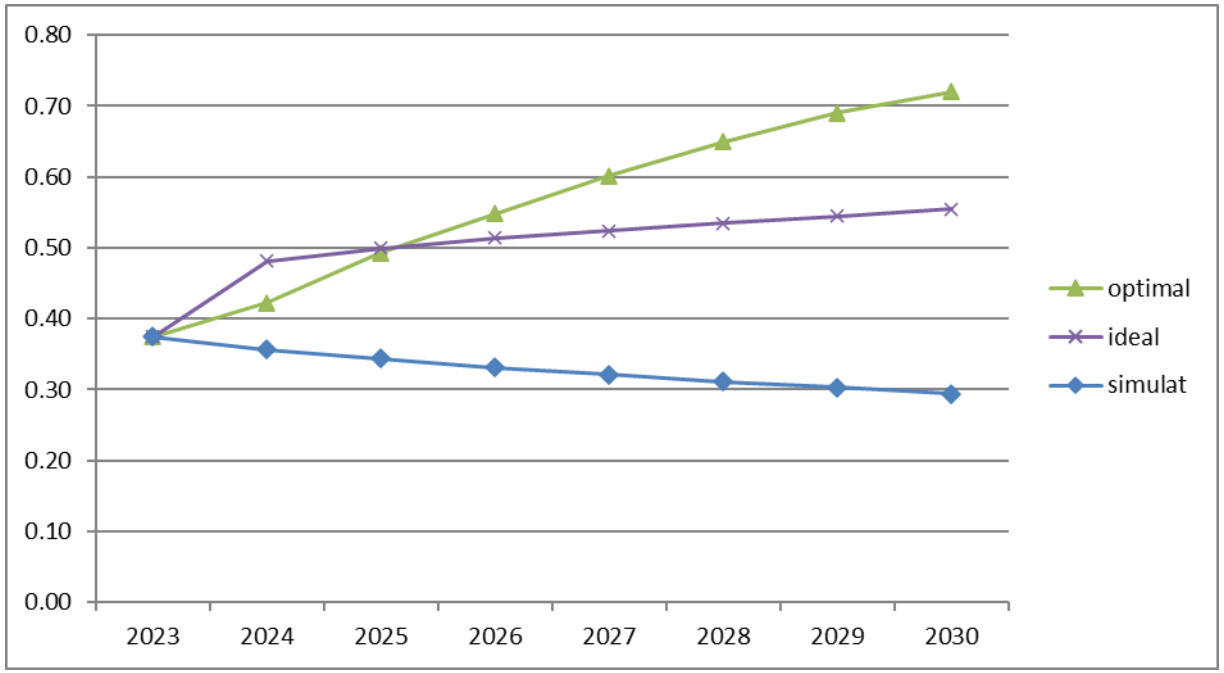
Government consumption, nominal, percent of nominal GDP, optimization



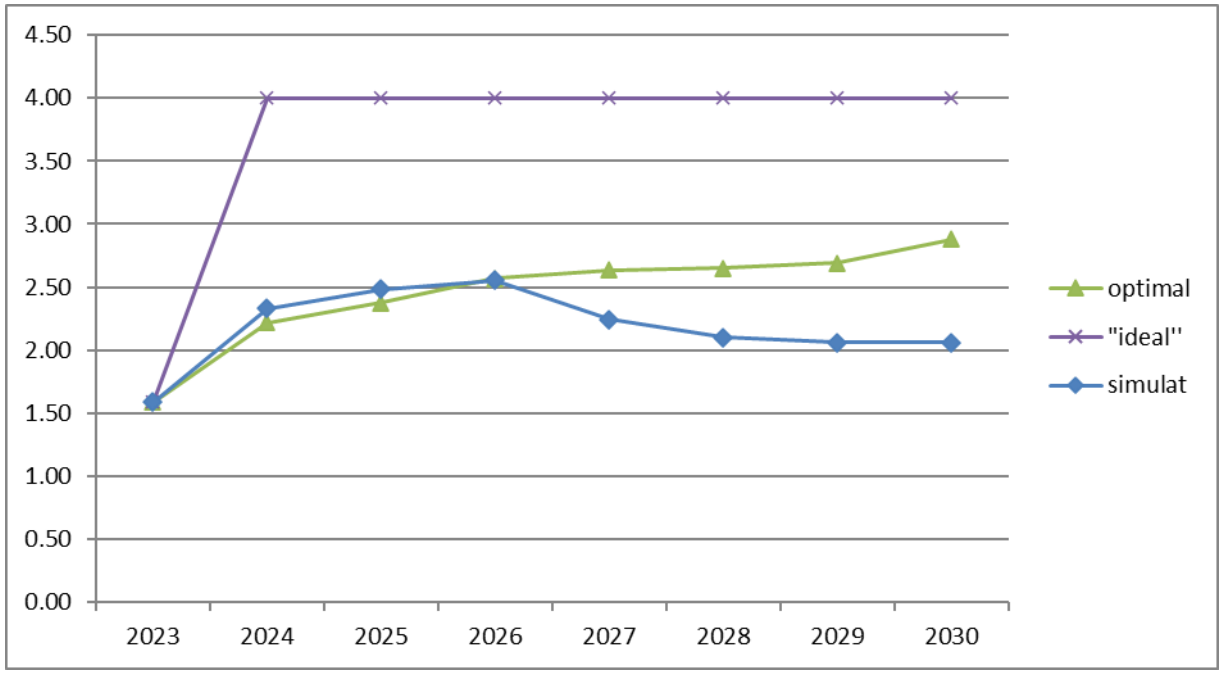
Income tax rate, average percent of income, optimization



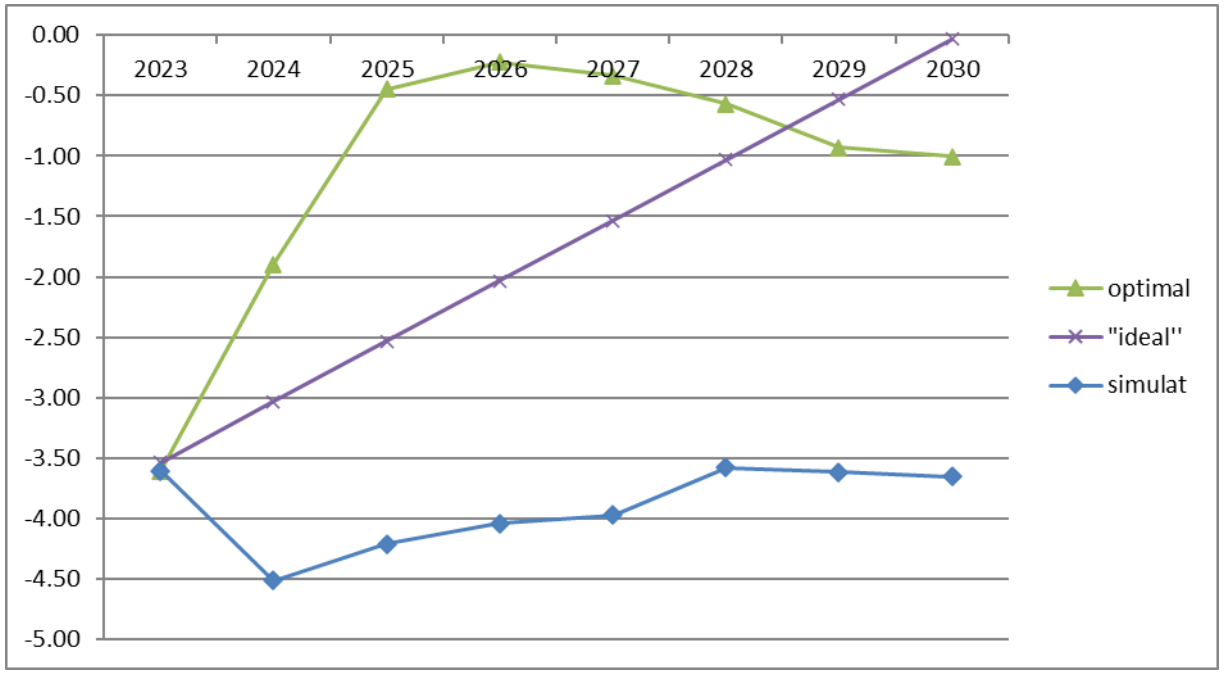
Government expenditures for R&D, nominal, percent of nominal GDP, optimization



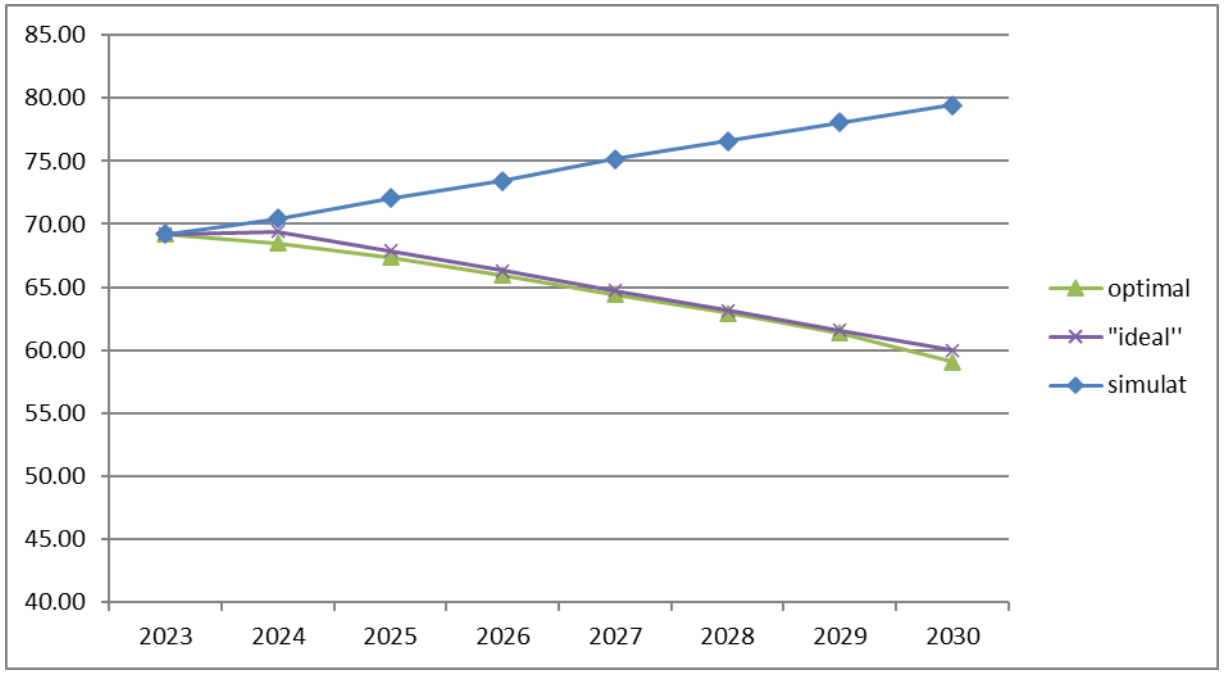
Growth rate of real GDP, percent, optimization



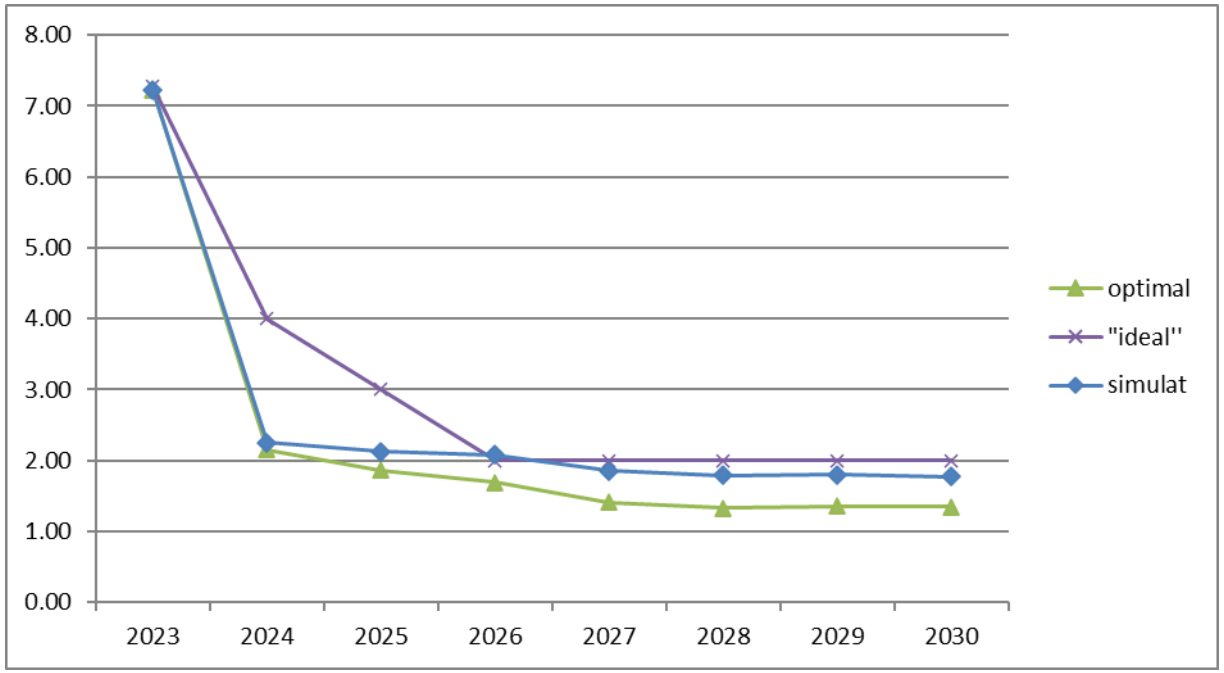
Budget balance, nominal, percent of nominal GDP, optimization



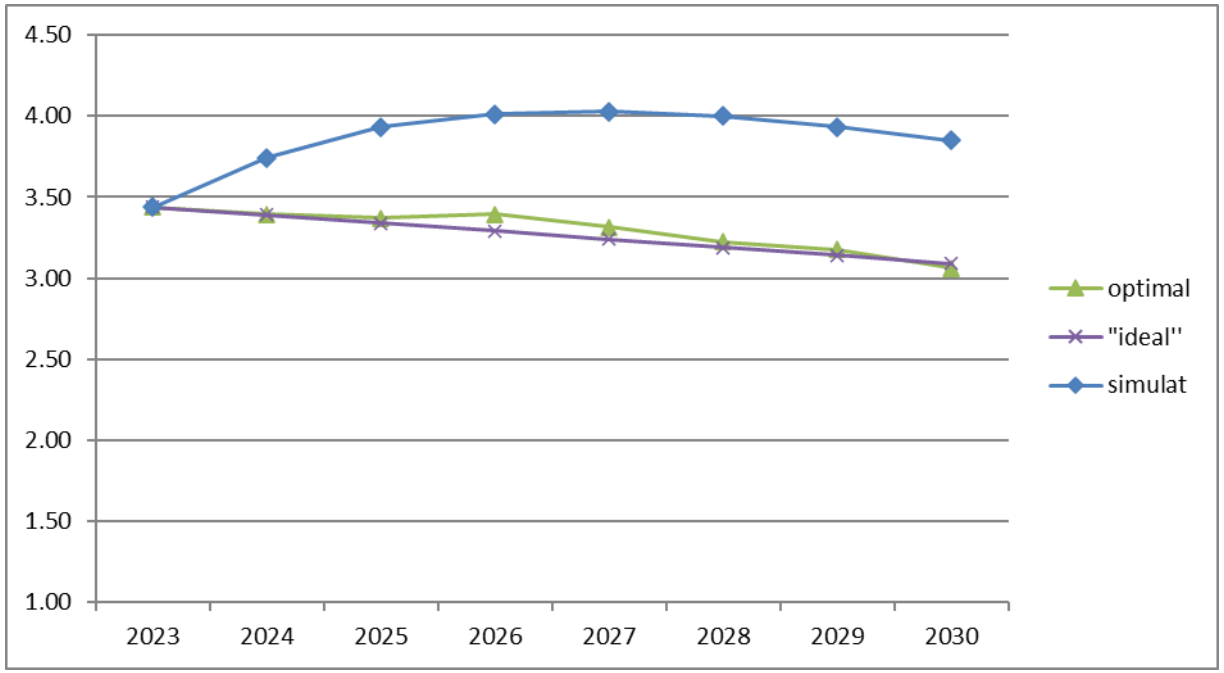
Public debt level in relation to GDP, nominal, percent, optimization



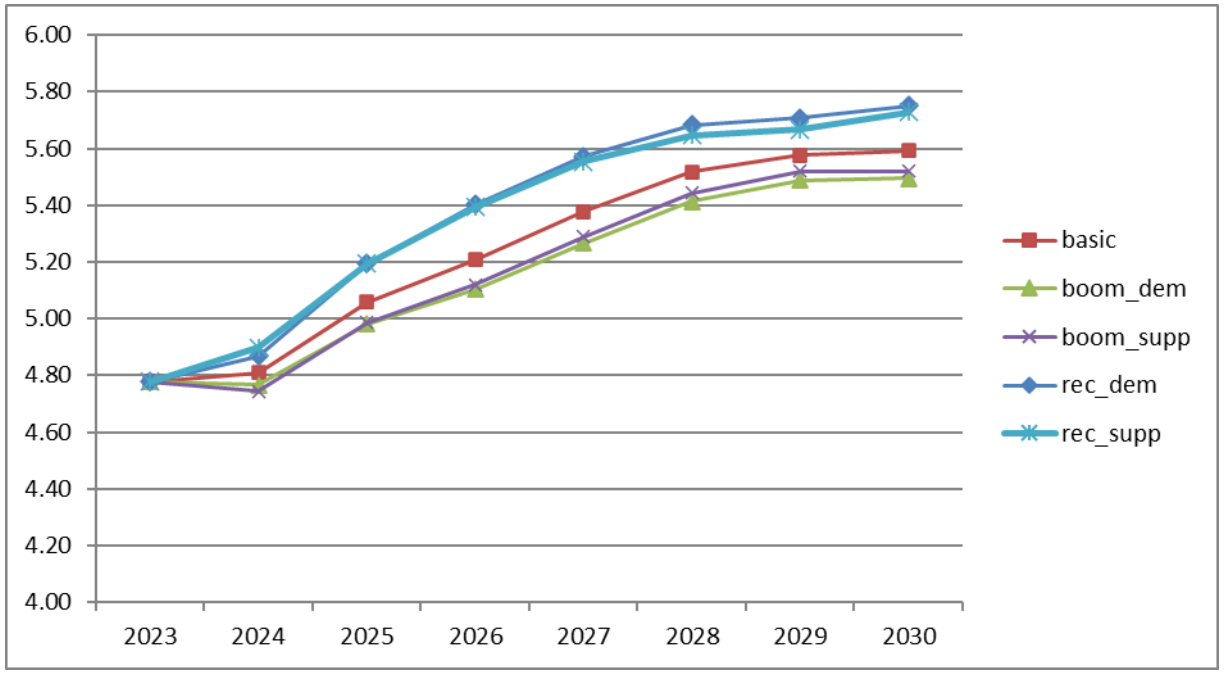
Inflation rate, optimization



Unemployment rate, optimization



Government investment, nominal, percent of GDP, optimization, different scenarios



Thank you for your attention!