INTERNATIONAL MONETARY FUND

The Role of a Stabilizing Expenditure Rule in Fostering Macro-Fiscal Stability

Simulation-Based Evidence from Poland

Andrzej Torój, Joanna Bęza-Bojanowska, Rafał Chmura, Kareem Ismail, Dominika Kroschel, W. Raphael Lam, Agnieszka Szczypińska, Bartłomiej Wiśnicki

WP/25/238

2025
NOV

WORKING PAPER

 WP/25/238

IMF Working Paper
European Department

The Role of a Stabilizing Expenditure Rule in Fostering Macro-Fiscal Stability: Simulation-Based Evidence from Poland*

Prepared by Andrzej Torój, Joanna Bęza-Bojanowska, Rafał Chmura, Kareem Ismail, Dominika Kroschel, W. Raphael Lam, Agnieszka Szczypińska, Bartłomiej Wiśnicki

Authorized for distribution by Geoff Gottlieb
November 2025

ABSTRACT: The paper investigates the properties of Poland's Stabilizing Expenditure Rule (SER) in the context of economic governance reform in the EU. The analysis uses a granular macroeconometric model (Chmura et al., 2024) that incorporates heterogeneous fiscal multipliers across expenditure items and endogenous tax bases. This novelty supports emprically-grounded simulations to analyze the impact of adverse shocks on output, fiscal balances, and debt dynamics, including through the binding expenditure rules and potential shifts in the composition of expenditures. Our results show that the SER generally ensures lower fiscal deficits (and debt path) than policies that only target the compliance with the Stability and Growth Pact (SGP) thresholds. This is because of the inherent corrective mechanism built in the SER that requires a tightening of fiscal stance when rules are breached. The SER is shown to have counter-cyclical properties, although the extent depends also on the parameters in the correction mechanism.

RECOMMENDED CITATION: Torój, Andrzej, Joanna Bęza-Bojanowska, Rafał Chmura, Kareem Ismail, Dominika Kroschel, W. Raphael Lam, Agnieszka Szczypińska, Bartłomiej Wiśnicki . 2025. "The Role of a Stabilizing Expenditure Rule in Fostering Macro-Fiscal Stability: Simulations-based Evidence from Poland", IMF Working Paper No.25/XX, Washington, D.C.

JEL Classification Numbers:	C53, E17, E62, H60
Keywords:	Fiscal Rules; Debt Sustainability; Stabilizing Expenditure Rule; Poland; Econometric Model

* The authors are very grateful for the inputs and comments from Hassan Adan, Gosta Ljungman, Tjeerd Tim, and Jan Kees Martijn.

* "The author(s) would like to thank" footnote, as applicable.

Author's E-Mail Address:	atoroj@sgh.waw.pl; joanna.beza-bojanowska@mf.gov.pl; rchmur@sgh.waw.pl; kismail@imf.org; dominika.kroschel@mf.gov.pl; wlam@imf.org; agnieszka.szczypinska@mf.gov.pl; bwisni@sgh.waw.pl

WORKING PAPERS

The Role of a Stabilizing Expenditure Rule in Fostering Macro-Fiscal Stability: Simulation-Based Evidence from Poland

Prepared by Andrzej Torój[1], Joanna Bęza-Bojanowska[2], Rafał Chmura[2 3], Kareem Ismail[4], Dominika Kroschel[2], W. Raphael Lam[4], Agnieszka Szczypińska[2], Bartłomiej Wiśnicki[3]

[1] SGH Warsaw School of Economics; corresponding author: atoroj@sgh.waw.pl
[2] Ministry of Finance in Poland
[3] SGH Warsaw School of Economics
[4] International Monetary Fund

Contents

I. Introduction

Fiscal rules constrain fiscal policy to curb deficit bias, build buffers against downturns, and safeguard long-term stability. Some EU member states adopted such rules as early as in the 1990s, and major reforms in 2011 expanded their use. Since 2015, Poland has been implementing a national numerical fiscal rule – the Stabilizing Expenditure Rule (SER), which limits the growth of government expenditure and aligns with the requirements under EU and national legislations. It achieves this by setting an annual spending limit on the bulk of the general government (GG), which incorporates the inflation dynamics and real GDP growth. The rule also includes several provisions, including escape clauses for exceptional events and a correction mechanism that is triggered if government debt exceeds 60 percent of GDP or government deficit exceeds 3 percent of GDP, which ensures the adherence with EU requirements and national limits simultaneously. Thus the SER is designed to contain expenditure growth to stabilize debt and government spending as share of output over time.

Despite a decade of implementation, the assessment of the SER's macroeconomic impact remains limited. This paper evaluates whether strict adherence to the SER under adverse shocks - such as global downturns, cost-push inflation, interest rate hikes, revenue shortfalls, or contingent liabilities - supports debt sustainability and provides flexibility (in terms of countercyclical fiscal policies) during recessions. Outcomes are benchmarked against a '***NO SER'*** regime, which only enforces EU Stability and Growth Pact thresholds (3 percent of GDP deficit, 60 percent of GDP debt) and reflects Poland's policies before the SER was introduced. The ***NO SER*** regime is thus less restrictive: it does not explicitly cap expenditure growth nor require a 0.5 percent of GDP correction in case of even a very small breach of the thresholds (thus offering more leeway in adjustments required to meet thresholds). While it allows governments to undertake more countercyclical fiscal policies, the unconstrained fiscal stance could push up debt closer to the maximum sustainable levels. The simulated differences thus capture the incremental effects of introducing the SER.

Additionally, the paper assesses how well the SER aligns with the EU's reformed economic governance framework effective from April 2024, which emphasizes medium- and long-term debt sustainability. While debt has long been central to EU economic governance design, the new rules introduce more detailed operational guidance and country-specific expenditure paths. Accordingly, the analysis spans a 12-year horizon post-shock, focusing on debt dynamics and rebuilding of fiscal buffers.

The impact of the SER does not only affect the nominal ceiling on government expenditures but also has wider macroeconomic impact. To assess the SER's impact on the economy, the paper embeds it in a macroeconometric framework using the New Econometric Model of Public Finance (NEMPF) (Chmura et al., 2024). The model simulates shocks and policies by mapping at a highly disaggregated level links between government spending categories and GDP components, and between macroeconomic variables (e.g., tax bases) and government revenues (Annex I). This allows us to evaluate SER performance in terms of output volatility, debt dynamics, and interest rates relevant to both national and EU fiscal frameworks.

The paper is organized as follows. Section II provides a short literature review. Section III outlines the NEMPF model and how the model incorporates the SER limits. Section IV presents several illustrative shock scenarios and simulates the fiscal impact under SER and SGP. Section V discusses policy lessons. Section VI concludes.

II. Properties of Expenditure Rules: A brief literature review

Fiscal rules are defined as long-lasting constraints on fiscal policy through numerical limits on budgetary aggregates (Schaechter, 2012). Four main types of fiscal rules can be distinguished based on the type of budgetary aggregate that they seek to constrain: (1) debt rules set an explicit limit or target for public debt in percent of GDP; (2) budget balance rules constrain the overall balance, structural or cyclically adjusted balance, or balance “over the cycle”; (3) expenditure rules set limits on total, primary, or current spending; (4) revenue rules set ceilings or floors on revenues and are aimed at boosting revenue collection and/or preventing an excessive tax burden.

The main goal in creating and implementing fiscal rules is to limit discretion in fiscal policy and to reduce *deficit bias* – an inherent tendency of policymakers to create regular excessive budget deficits. One of the first fundamental contributions about the “rules versus discretion” dilemma in fiscal policy was an article by Kydland and Prescott (1977), who showed that discretionary policy often produces an inefficient equilibrium. Furthermore, as reported by Wyplosz (2002), one of the main objectives of fiscal policy should be to stabilise or reduce the level of public debt to GDP in the long term and to build buffers to be able to use the fiscal impulse as a countercyclical instrument in the short term. According to Kopits and Symansky (1998), well-defined fiscal rules can help reduce or eliminate the impact of political tendencies that lead to deficit bias. They also increase the government's credibility, which facilitates access to financing on financial markets at a lower cost and can provide support and greater public trust. Fiscal rules can be seen as a catalyst for other fiscal reforms, which would be necessary to ensure stability and provide better time consistency in decision-making. Kopits and Symansky (1998) describe an ideal fiscal rule as:

- well defined as to the indicator to be constrained, the institutional coverage, and specific escape clauses,
- transparent in government operations, including accounting, forecasting, and institutional arrangements,
- adequate to the specified proximate goal,
- consistent internally, as well as with other macroeconomic policies or policy rules,
- simple to enhance their appeal to the legislature and the public,
- flexible to accommodate exceptional unanticipated shocks beyond the control of the authorities,
- enforceable and effective.

There are inevitable trade-offs among different properties of fiscal rules (for example simplicity vs precision, flexibility vs government credibility, coverage vs operational efficiency). Throughout this study, we will pay special attention to the coverage, flexibility, and the alignment of two specific goals: anticyclical effects and debt sustainability.

One possible source of such flexibility is the provision of escape clauses in fiscal rules, allowing to raise government spending beyond fiscal rule limits under exceptional circumstances without undermining the credibility of fiscal policy. Escape clauses proved to be effective during the COVID-19 pandemic when the EU General Escape Clause was implemented to combat severe shocks. Another type of exception, ‘bad times’ clauses within correction mechanisms, can temporarily relax the provisions of the mechanism during recessions to avoid the procyclical impact of fiscal tightening.

The empirical literature on the outcomes of using fiscal rules is extensive, with key studies examining their impact on budget balance and overall fiscal stance. Debrun et al. (2008) use panel data from 1990 to 2005 to assess the influence of different types of fiscal rules on fiscal aggregates. They find that budget balance rules significantly improve fiscal outcomes. Subsequent research – including Nerlich and Reuter (2013), Maltritz & Wüste (2015), Caselli & Reynaud (2020), and Heinemann et al. (2018) – further explores these effects. Heinemann et al.'s meta-regression of studies from 1985–2012 shows a statistically significant constraining effect of fiscal rules, particularly on deficits, though less so on debt, expenditure or revenue. In studies where effect size is measurable, budget balance rules typically reduce the primary deficit by approximately 1.2 to 1.5 percent of GDP. Comparable estimates for expenditure rules remain largely unexplored.

The effect of fiscal rules on public expenditure – particularly public investment – has been extensively studied in recent years. Numerous empirical analyses (Ardanaz et al., 2021; Delgado-Téllez, 2022; De Biaise & Dogherty, 2022; Chmura, 2023a), as summarized by Blesse et al. (2023), explore this relationship. While findings vary, most of the evidence suggests that fiscal rules may hinder public investment. European experiences over the past decade, especially before the COVID-19 pandemic, frequently linked these rules to underinvestment (Thygesen et al., 2019; Basdevant et al., 2020). A recurring finding in the literature is that the design of fiscal rules plays a critical role in shaping investment outcomes. This insight is particularly relevant amid the EU's current reforms and the growing spending pressures among EU member states. on defense, energy transition, and aging populations.

A related strand of the literature examines how fiscal rules influence the cyclical behavior of fiscal policy and the volatility of economic growth. Early contributions (e.g., Levinson, 1998; Fatás and Mihov, 2006) cautioned that strict fiscal constraints can hinder governments' ability to conduct countercyclical policy, potentially amplifying output volatility. Later work nuanced this view, emphasizing that the impact of rules depends critically on their design and interaction with debt dynamics. For instance, Brzozowski and Siwińska-Gorzelak (2010) find that balanced-budget rules may heighten expenditure volatility, whereas debt rules tend to dampen it. Combes et al. (2017) show that fiscal policy responses to the business cycle are nonlinear - when public debt exceeds a certain threshold, fiscal policy often turns procyclical. More recent analyses by the IMF (2018), Eyraud et al. (2018), Bergman and Hutchison (2022), and Chmura (2023b) emphasize that the stabilizing effect of fiscal rules depends on their design and credibility: expenditure-based and flexible rules tend to smooth economic fluctuations, while rigid balanced-budget rules can be destabilizing.

III. Accounting for the SER in a Macro-Fiscal Econometric Model

The assessment of the effectiveness of the SER takes into account four desirable features of a fiscal rule:

A. **Safeguarding debt sustainability** by introducing appropriate corrective mechanisms after periods of high deficits to minimize the risk of a fiscal crisis, in line with EU policy guidelines.

B. **Allowing necessary flexibility** in responding to major unexpected shocks outside the control of the government (such as an epidemic or a massive financial crisis), as suggested by Kopits and Symansky (1998). Escape or ‘bad times’ clauses should apply.
C. **Appropriate coverage**. In line with EU requirements for budgetary frameworks of the Member States and taking into account the coverage arguments by Kopits and Symansky (1998), the rule should cover the widest possible scope of GG expenditure to control the aggregate fiscal developments, while keeping it operational.
D. **Counter-cyclicality and ensuring stability in times of economic shocks**. The SER is intended to smooth fiscal policy by building buffers in good times and avoiding sharp expenditure cuts in downturns. However, as highlighted in the literature (Section II), fiscal rules’ effectiveness in achieving this goal depends on their design. Simulations will therefore closely examine whether the SER delivers on its counter-cyclical promise under adverse conditions.

In the simulation analysis, we examine whether the SER exhibits the desired properties (A)—(D). We also take into account the EU economic governance reform introduced in 2024 by looking at long-term debt dynamics, flexibility and by incorporating a run-up period before the shock hits, demonstrating how SER facilitates building up buffers.

In modelling macro-fiscal dynamics, the literature sometimes uses structural DSGE frameworks (e.g., Stähler & Thomas, 2012; Bušs & Grüning, 2023; Herranz & Turino, 2023). While theoretically rigorous, these models often simplify expenditure composition, impose near-balanced-budget conditions, or struggle with nonlinearities such as those embedded in the Polish SER (see Section 3.2). A pragmatic alternative is to use empirically grounded econometric models that retain theoretical underpinnings but allow greater detail and flexibility.

Accordingly, this study employs a hybrid econometric model, the NEMPF model developed by the Polish Ministry of Finance, which balances theoretical consistency with empirical fit. We simulate economic performance under the SER following several adverse shocks. Comprehensive model documentation is provided in Chmura et al. (2024), with selected blocks discussed in Kelm & Sobiech Pellegrini (2023) and Kelm & Fabiański (2023). Annex I summarizes its main features and methodology. This framework offers a tractable, highly disaggregated structure of GG revenues and expenditures, enabling a detailed mapping of macro-fiscal channels and heterogeneous fiscal multipliers across revenue and spending items.

3.1. Summary of NEMPF model properties

The model determines real GDP in a bottom-up manner, adding private and GG consumption and investment, as well as net exports. Consumption is driven by both households’ disposable income and wealth. Exports and imports are modelled separately, and depend inter alia on the level of activity in the aggregate foreign economy, domestic economy and the exchange rate. Prices and labor costs in the domestic economy vary endogenously, following cost-push and demand-pull triggers. An array of short- and long-term interest rates determine both real consumption and investment, and are determined themselves by both monetary policy and foreign developments.

The original NEMPF model from Chmura et al. (2024) is quarterly and determines GG expenditure in a bottom-up manner, comprising 11 main categories of expenditures as endogenous or exogenous variables (see Table

1 that introduces symbols used hereinafter)[1]. The individual categories feed back into the economy through heterogeneous channels, e.g. social spending increases the tax base via increase in households' disposable income and consumption, and investment spending builds capital and strengthens the supply side of the economy.

The expenditure categories are either determined by their own behavioral equations or designated as exogenous. GEFW depends on the labor productivity, labor supply and price dynamics. GES is partly CPI-dependent, mainly due to pension indexation clauses. GEIC depends on the GDP dynamics, and GESTK is connected to the wage fund developments. GEWH naturally depends on the debt level, as well as domestic and foreign interest rates. This implies that individual expenditure categories can vary in the simulations between the baseline and shock scenarios due to their dependency on different macroeconomic developments, although they do not vary along this dimension to an extent that they depend on the exogenous variables (i.e. social transfers other than pensions in GES).

Some adjustments are made to the original NEMPF model in section 3.3 to enable simulation of the SER policy regime, where expenditure must sum to at most the SER limit.

Table 1. Structure of GG expenditure (G) in NEMPF model

Category	Label	Share in G (2022)	Part of GDP?	GDP multiplier in NEMPF simulations*
Compensation of employees in the GG sector	***GEFW***	22.4%	Yes (public consumption)	1.105
Intermediate consumption of the GG sector	***GEIC***	14.4%	Yes (public consumption)	1.407
Social transfers in kind	***GESTK***	4.1%	Yes (public consumption)	1.492
Public investment	***GEIT***	9.2%	Yes (public investment)	1.747
Changes in GG sector inventories	***GEIV***	below 1%	Yes (public investment)	-
Social transfers	***GES***	35.2%	No (transfers & subsidies)	0.502
Other current transfers	***GETRC***	4.9%	No (transfers & subsidies)	0.013
Capital transfers	***GETRK***	3.8%	No (transfers & subsidies)	0.013
Debt servicing cost	***GEWH***	3.6%	No	0.013
Subsidies	***GESU***	2.3%	No (transfers & subsidies)	-0.459/0.435**
Other taxes on output and current taxes on income and wealth	***GEOTH***	below 1%	No	-
Statistical discrepancy	***GE_DIS***	below 1%	No	-

* Multiplier defined as the change in nominal GDP due to a PLN 1 in the nominal size of each fiscal variables in the same year. ** Subsidies are a direct, negative component of the GDP deflator (which is calculated as the value-added deflator adjusted for the impact of taxes and subsidies). The real GDP multiplier of subsidies is given as a second value.

[1] Labels in Table 1 are consistent with Chmura et al. (2024) for the sake of accessibility for interested Readers.

Once determined, both GG expenditure and revenue feed into the model's macroeconomic block, where they interact with GDP through several category-specific channels.. This ultimately leads to nuanced, category-dependent interactions between *G* and GDP, going beyond the simple inclusion of public consumption (GEIC, GEFW, GESTK) and investment (GEIT) in the calculation of *G*, and to an even more non-trivial structure behind the interactions between G and the GG deficit to GDP ratio. This involves three main channels:

1. **Reinforcement of consumption multiplier.** As negative shocks reduce output and consequently wages, households' disposable income decreases, which further aggravates the effect on output. If this translates into a weaker fiscal position, the government may be forced – depending on the fiscal rule - to reduce social transfers (GES) or wages (GEFW), which aggravates the impact on the disposable income.
2. **Other mechanisms of fiscal multipliers.** Similarly, a reduction in output can result through a contraction in the GG sector supply chain (GEIC) or reducing the supply of selected public goods (GESTK). This reduces taxed profits of the enterprises and the value of taxed transactions, which also translates into worse fiscal position, with a similar effect of further deterioration in economic activity.
3. **Capital accumulation channel.** If a shock reduces investment, GDP is adversely affected both in the short run (by the demand-side identity) and in the long run, due to the decline in capital and productivity. This differentiates between productivity-deteriorating reductions in GEIT and other channels of potential *G* reduction.

Consistent with standard macroeconomic relationships, GG revenues are closely linked to the overall economic position. In the NEMPF model, VAT-related revenues depend on private consumption (just as the excise tax revenues), as well as investment. CIT revenues are linked to the gross operating surplus, whereas PIT revenues and social security contributions – to the wage fund. Some minor revenue categories also depend on the aggregate value added. There is also a direct link between GG revenues and expenditure: Since the government can be constrained by deficit or debt limits, higher revenues can open the space for additional spending, particularly on discretionary areas such as public investment.

3.2. Stabilizing Expenditure Rule in Poland: Definition

The simulation scenarios considered in this paper are confronted by two fiscal policy regimes, each one under a different constraint. In the SER regime, the GG expenditure shall be equal to the value computed according to the SER. In the NO SER regime, the SER is not treated as binding, but nonetheless the GG expenditure level shall not lead to a violation of the standard European Stability and Growth Pact constraints, i.e. GG deficit of 3% GDP and GG debt of 60% GDP ('NO SER'). Given the SER formula presented below, the former one is more restrictive.

The GG expenditure equation has been implemented in line with the Polish SER adopted in 2023 and read at that time as follows:[2]

[2] In 2024, the SER was amended in the Public Finance Act. The amendments were informed by IMF technical assistance, which was in turn partly informed by the results of the model illustrated here. These amendments include corrections for growth forecasts errors in previous years.

$$G_t = G_{t-1} \cdot I_t^{\Pi} \cdot I_t^{Y} + \tilde{G}_t + E_{t-1}[\Delta DD_t] \quad (1)$$

where

$$I_t^Y = \sqrt[8]{\frac{Y_{t-2}}{Y_{t-8}} \cdot E_{t-1}\left[\frac{Y_{t-1}}{Y_{t-2}}\right] \cdot E_{t-1}\left[\frac{Y_t}{Y_{t-1}}\right]} \quad (2)$$

$$I_t^{\Pi} = \frac{\Pi_{t-2}}{E_{t-2}[\Pi_{t-2}]} \cdot \frac{E_{t-1}[\Pi_{t-1}]}{E_{t-2}[\Pi_{t-1}]} \cdot E_{t-1}[\Pi_t] \quad (3)$$

$$\tilde{G}_t = \begin{cases} -0.005 \cdot Y_t \cdot P_t^Y & E_{t-1}\left[\frac{Y_t}{Y_{t-1}}\right] \geq I_t^Y - 0.02 \ \wedge \left(E_{t-1}\left[\frac{debt_t^{GG}}{Y_t \cdot P_t^Y}\right] > 0.6 \ \vee \ E_{t-1}\left[\frac{def_t^{GG}}{Y_t \cdot P_t^Y}\right] > 0.03 \ \vee \right. \\ & \left. E_{t-1}\left[\frac{debt_{t-1}^{GG}}{Y_{t-1} \cdot P_{t-1}^Y}\right] > 0.6 \ \vee \ E_{t-1}\left[\frac{def_{t-1}^{GG}}{Y_{t-1} \cdot P_{t-1}^Y}\right] > 0.03 \right) \\ 0 & otherwise \end{cases}$$

(4)

G_t denotes GG expenditure in year t Π_t – gross CPI inflation rate (average annual price dynamics) or 1 in the case of deflation, Y_t – real GDP with price index P_t^Y as GDP deflator, $Y_t \cdot P_t^Y$ – the respective nominal GDP, ΔDD_t – the expansion of revenues due to discretionary measures on the revenue side (beyond the scope of this analysis and henceforth assumed as 0), $debt^{GG}$ and def^{GG} – general government debt and deficit, respectively.

The central equation (1) defines the nominal expenditure limit based on the last year's value, incremented with real growth and inflation developments. These are measured according to eq. (2) and (3). The inflation-related increment (3) is equal to the predicted inflation in the budget year, taking into account the forecast update and the *ex post* forecast error from the preceding two years. The growth-related increment (2) is average real GDP growth computed over an 8-year window, in which two last values are the forecast for the budget year and the nowcast for the preceding year. The resulting GG expenditure amount shall, however, be reduced from that level by 0.5% GDP (eq. (4)) if future predicted GG debt and deficit violate the SGP thresholds. This correction can only be effected if the current cyclical position is not too bad, that is, the predicted real GDP dynamics is not lower by 2 p.p. from the 8-year rolling indicator given by (2): $E_{t-1}\left[\frac{Y_t}{Y_{t-1}}\right] \geq I_t^Y - 0.02$ (henceforth: 'bad times' clause).

Special care is needed in interpreting the terms $E_{t-1}[\dots]$ and $E_{t-2}[\dots]$. G_t is in fact a predetermined variable at *t*, with its value set at *t-1*, within the annual budgeting procedures. For this reason, all endogenous variables subscripted with *t* in (1) or (3) - Y_t, $Y_t \cdot P_t^Y$, Π_t, $debt_t^{GG}$ or def_t^{GG} – shall be treated as leads or conditional expectations based on the information set available in period *t-1*. Moreover, as opposed to the notation and assumptions commonly exploited in DSGE models, this set does not include values subscribed as *t-1* because they are officially published no sooner than at *t*. Consequently, terms such as $E_{t-1}[x_{t-1}]$ (for any x) shall be regarded as nowcasting results in the year when G_t is determined, $E_{t-1}[x_t]$ as next year forecasts, $\frac{E_{t-1}[x_{t-1}]}{E_{t-2}[x_{t-1}]}$ as a factor updating a 1-year-ahead forecast made at *t-2* to a nowcast made at *t-1*, whereas $\frac{x_{t-2}}{E_{t-2}[x_{t-2}]}$ as a factor updating a nowcast into realization which becomes known one period later.

3.3. Stabilizing Expenditure Rule in Poland: Modeling within NEMPF

The specification above poses some modeling challenges (see also Annex II for more technical issues).

First, the inclusion of the SER equation, in which aggregate GG spending *G* becomes directly determined as an endogenous variable, violates the model's bottom-up design of expenditure formation. A potential discrepancy arises between the SER-determined total expenditure level and the sum of individual categories, and hence the model closure needs to be modified so that at least one expenditure category shall be determined as residual rather than following its own behavioral equation (if endogenous) or set as exogenous. In practice, a single category can be insufficient, and hence the following algorithm that sequentially reduces the following categories has been applied: (i) the public investment, (ii) *other non-social current transfers*, (iii) *other taxes on output and current taxes on income and wealth*. The priority reduction of investment spending aligns with empirical evidence, both international (Ardanaz et al. 2021) and specific to Poland. As the government expenditure to GDP ratio fell by 4.9 p.p. between 2010 and 2016 on the way out of Excessive Deficit Procedure and SER introduction, public investment accounted for a half of that change, despite its initial share in total expenditure of only 12.4%. The other current transfers category, in turn, comprises relatively most flexible transfer types, i.e. foreign aid, some part of subsidies or tax exemptions. Technically, our analysis proceeds as follows (see also Figure 1 for a graphical illustration of the algorithm):

1. Compute

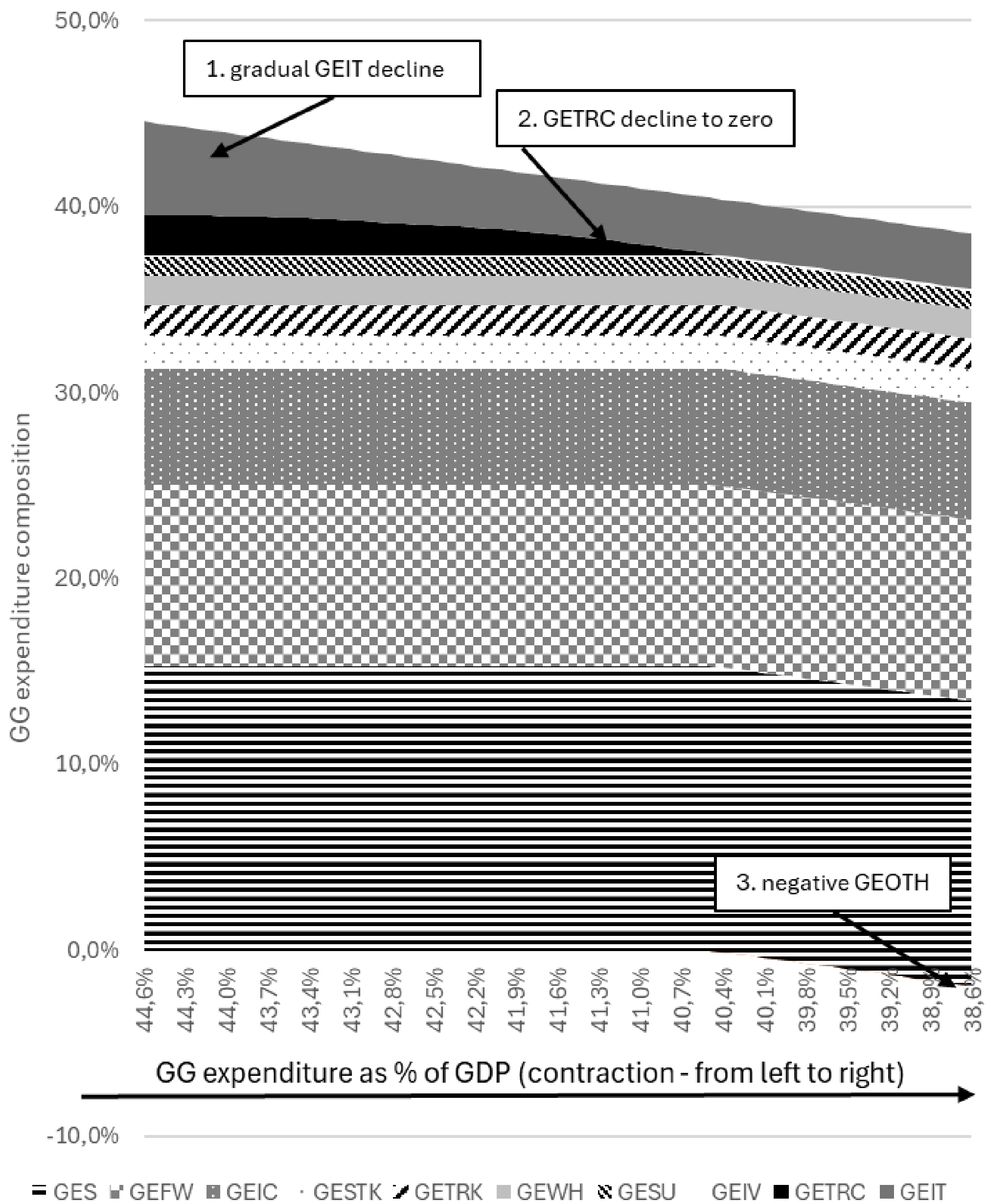
   $$G_t^* = GEIT_t^* + GEIV_t + GEIC_t + GEFW_t + GEWH_t + GESU_t + GES_t + GESTK_t + GETRC_t^* + GETRK_t + GEOTH_t^* + GE\_DIS_t \quad (5)$$

   where initial values computed from respective component's equations, or initial values of exogenous variables in the scenario, are denoted with asterisks (*).

2. If $G_t^* > G_t$ (the latter as per eq. (1) below), reduce $GEIT_t^*$ until $G_t^* = G_t$, but not below 3% $Y_t \cdot P_t^Y$. Refer to this final value as $GEIT_t$. In practice, a continuous differentiable transformation of $\frac{GEIT_t}{Y_t \cdot P_t^Y}$ as a function of G_t^* is applied that converges to 0.03 as $\frac{GEIT_t^* - (G_t^* - G_t)}{Y_t \cdot P_t^Y}$ decreases below 0.03 and to $\frac{GEIT_t^* - (G_t^* - G_t)}{Y_t \cdot P_t^Y}$ as this value increases above 0.03. This is aimed to ensure numerical stability of the model solver in the presence of an otherwise undifferentiable function.
3. Recompute G_t^* with $GEIT_t$ instead of $GEIT_t^*$. If still $G_t^* > G_t$, reduce $GETRC_t^*$ to equalize both, but not below 0. Refer to this final value as $GETRC_t^*$.
4. Recompute G_t^* with $GEIT_t$ instead of $GEIT_t^*$ and $GETRC_t^*$ instead of $GETRC_t$. If still $G_t^* > G_t$, replace $GEOTH_t^*$ with $GEOTH_t = GEOTH_t^* - (G_t^* - G_t)$. This equalizes $G_t^* = G_t$ by definition, but potentially implies negative outcomes of $GEOTH_t$ in simulation, hence discretion is required. However, in the simulations described in Section 4, these values have not fallen below historical values as % of GDP.

According to NEMPF model properties reported in Table 1, public investment (GEIT) has the highest multiplier effects out of these categories, and the multiplier of GETRC is negligible. Hence, the multiplier effect of the composite expenditure reduction is near 1.747 for small reductions, and decreases when more extensive measures are taken.

Figure 1. Structure of Fiscal Consolidation in NEMPF Simulations



As the aggregate GG expenditure level needs to be reduced under SER (horizontal axis, from left to right), the composition in model simulation changes (vertical axis): first reducing public investment (GEIT) to 3% GDP, then reducing other current transfers (GETRC) to 0, and finally decreasing GEOTH.

Second, the forward-looking elements in the SER framework require us to specify terminal conditions for the endogenous variables in order to solve the model. One option is to impose external terminal values—such as published forecasts—but this may introduce artificial stabilization effects (e.g., mean reversion) that are unrelated to the model. It may also create inconsistencies between imposed forecasts and the model's endogenous dynamics. To avoid these challenges, the paper adopts model-consistent (rational) expectations in the spirit of Muth (1961), assuming that endogenous variables grow at constant rates beyond the simulation horizon. This approach requires extending the horizon far enough for all variables to converge to their steady-state paths. Although the model is designed for short- and medium-term analysis, the model contains features that exhibit long-run stability. For this reason, simulations are extended to 2100, even though the primary effects of interest occur by 2040.

Bearing that in mind, the long-term paths of exogenous variables have been established. Interest rates for the euro area, United States and Poland are assumed to converge to an equal level. The same applies to all exogenous sources of price dynamics (euro area HICP, US CPI, euro area GDP deflator, food and energy prices worldwide) that stabilize at 2.5% per year, converging from the last observed sample levels. Foreign quantity variables (for instance, euro area real GDP) converge to grow at 0.8% per year. Domestic quantity variables grow at a higher pace until 2050, ensuring domestic GDP dynamics stabilizing at 3% y/y in that horizon. In the initial years beyond the sample, i.e. from 2023 onwards, the exogenous variables are composed of last sample values and long run values as discussed above, with a declining share of the former. Shares and ratios (e.g. proportion between foreign and domestic debt, nominal tax and social security contribution rates, loan to deposit ratio) are anchored at the last sample levels. Nominal funds grow in the long run at 2.5%+3%=5.5% per year, while unit values at 2.5%, consistently with price indices.

The presence of forward-looking variables also requires an assumption how agents form their predictions on various exogenous variables. A common simplifying assumption **is perfect foresight**—that agents know the future paths of exogenous variables with certainty and that these paths materialize as expected. This enables deterministic simulations using standard solvers (e.g., Broyden, Gauss-Seidel). However, this approach would narrow the scenario analyses to those without 'surprises', excluding cases where shocks occur after government expenditure is determined and cannot be revised—such as unexpectedly high CPI inflation or revenue shortfalls.

Consider the solution horizon in which:

A) From $t = 1$ to $t = T_1$ exogenous variables develop as expected.
B) For $t = T_1 + 1$, at least one exogenous variable takes an unexpected value. This does not, however, change expectations for $t = T_1 + 2$.
C) From $t = T_1 + 2$ to $t = T_2$, (B) is iterated forward one period at a time.
D) From $t = T_2 + 1$ onwards up to simulation horizon T, exogenous variables develop as expected (though the paths may potentially be revised as compared to expectations in step A).

Bearing this type of scenarios in mind, the following algorithm has been developed and applied on top of the classical Gauss-Seidel or Broyden solvers implemented in EViews:

1. Set the expected path of exogenous variables. Solve the model under perfect foresight[3] $t = 1$ to $t = T$.

[3] The nonlinear downward correction $\tilde{G}_t$ of GG expenditure, conditional on projected values of endogenous variables as per eq. (4), goes significantly beyond the analytic linear framework for fiscal rules proposed i.a. by Kliem and Kriwoluzky (2014) and poses numerical difficulties to all deterministic solvers pre-programmed in EViews, i.e. Gauss-Seidel, Newton and Broyden. For the purpose of obtaining a numerically stable, deterministic solution, the following algorithm has been applied. First, the model was solved with a modified version of eq. (1) in which each expectation term $E_{t-1}[x_t]$ has been replaced with x_t, that is under perfect foresight. Second, the solution from point 1 has been used as starting values for endogenous variables when solving the forward looking model including (1) as it reads.

   a. Store the solution for periods from $t = 1$ to $t = T_1$ as the final solution.
   b. Store the solution for periods from $t = T_1 + 1$ to $t = T$ as the initial values for solutions in the next steps.
2. For $t^* = T_1 + 1$ to $t^* = T_2$, period by period:
   a. Replace the previously expected value of the exogenous variable at t^* with the realized value.
   b. Solve from $t = t^*$ to $t = T$ under perfect foresight.
   c. Store solution for period $t = t^*$ as the final solution.
   d. Store solution for periods from $t = t^* + 1$ to $t = T$ as the initial values for solutions in the next steps.
3. Revise the expected paths of exogenous variables for $t = T_2 + 1$ onwards, if applicable. Solve the model under perfect foresight for $t = T_2 + 1$ to $t = T$ and store solution for these periods as final.

3.4. ‘NO SER’ policy regime

The policy outcomes under SER are compared to a ‘NO SER’ policy regime, simulated with the same core NEMPF model including the same equations for individual expenditure categories listed in Table 1. Likewise, the sum of these categories G_t^* computed with eq. (5) is confronted with an upper bound. In contrast to SER policy, there is no explicit bound such as given by eq. (1). Instead, it is given implicitly by one of the SGP inequalities $\frac{def_t^{GG}}{Y_t \cdot P_t^Y} \leq 0.03$ or $\frac{debt_t^{GG}}{Y_t \cdot P_t^Y} \leq 0.6$, whichever one is binding. Both policies can prefer to spend less than the respective limits, as long as the bottom-up expenditure composition reflects this preference. If the limits are breached, the same reduction scheme as described in Subsection 3.3 and depicted in Figure 1 is applicable. The resulting composition of government spending changes by, first, decreasing the share of public investment (down to 3% GDP), and then, reducing the amount of other social transfers to zero.

Unlike the NO SER regime, the SER framework actively promotes the accumulation of fiscal buffers through three key mechanisms. First, it mandates a consistent annual reduction in expenditures—0.5 percent of GDP—based on equation (4). Second, this adjusted expenditure level becomes the benchmark for subsequent years, as specified in the recursive equation (1), reinforcing fiscal discipline over time. Third, SER encourages forward-looking policymaking by requiring adjustments based on projected, rather than realized, fiscal outcomes. For instance, if the deficit is forecasted at 3.1 percent of GDP, SER compels an immediate correction to 2.6 percent (assuming no significant revenue measures), thereby preemptively curbing expenditure growth. In contrast, the NO SER regime remains reactive, tolerating bottom-up expenditure outcomes as long as the deficit stays within the 3.0 percent threshold. It focuses narrowly on meeting the Stability and Growth Pact (SGP) limits without fostering precautionary buffers

IV. Simulation results

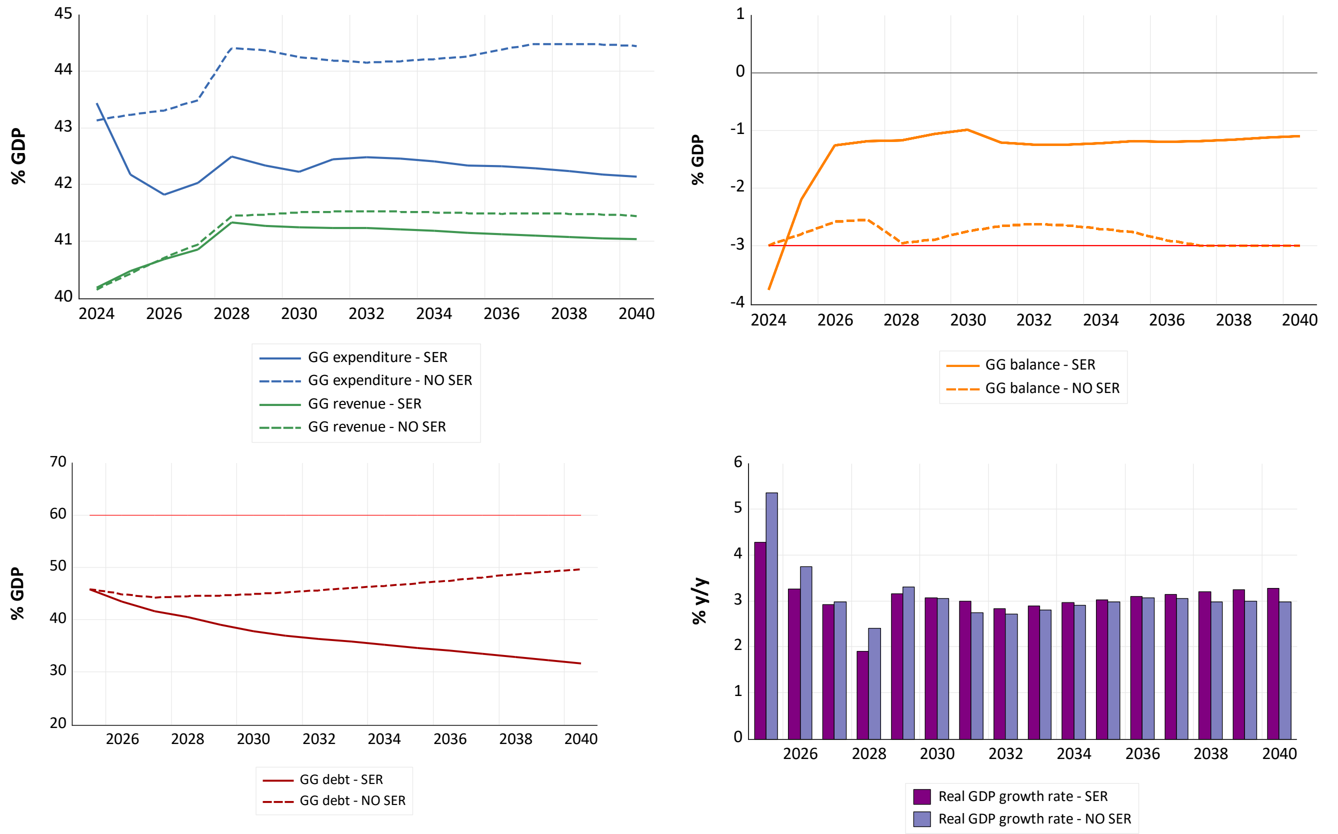
The performance of the SER was tested through a series of five adverse scenarios. The scenarios are designed to examine the medium- to long-term implications for debt sustainability (feature A; all Scenarios – as summarized in the concluding Figure 8) and the SER’s counter-cyclical properties (feature D; all scenarios, in particular Scenario 1). Scenario 4 is designed specifically to investigate the coverage changes (feature C). Flexibility (feature B) is additionally discussed in the following Section on policy, by considering two possibilities: (i) using the 'bad times' clause as an escape clause (rather than just a condition to delay the correction (4)) and (ii) adjusting the correction size. We also look at the sensitivity of selected spending categories such as public investment or social transfers to shocks under SER compliance.

All shock scenarios have been benchmarked against the Ministry of Finance baseline scenario, with shocks applied in (or around) 2028 with the model simulated from 2024. The exact timing of shocks is only illustrative, but the four years of forecast prior to the shock allow model variables to be around their long-term equilibrium by the introduction of the shock.

The baseline scenario reflects the Ministry of Finance (historical) short- and long-term forecasting assumptions as of late 2023 and early 2024. Real GDP growth in the euro area is assumed at 2-4 percent until 2027, and then gradually declines towards 0.8% until 2050. Poland's real GDP growth is expected to stabilize gradually around 3 percent until 2040. Growth over the period 2024-2027 is higher, reflecting the economic boost from the EU Recovery and Resilience Facility funds, expected monetary easing and elevated investment activity related to defense and infrastructure projects. These effects are expected to have a decreasing impact on GDP dynamics towards 2028. The dynamics of exogenous price indices (including euro area HICP, US CPI, Polish food and energy prices) gradually subsides from the elevated levels in 2023 towards 2.5 percent in the long run. The exogenous tax and social security contribution rates and the loan-to-deposit ration remain unchanged from the levels at the end of the sample. Quota tax and subsidy rates (for example, some excise rates) grow at a pace consistent with the long-run price indices.

As an outcome on the fiscal side, the general government revenues grow steadily from 40 to 41% of GDP over the 2020s and then remain stable in 2030s across two scenarios. However, the developments on the expenditure side and the resulting balance depend heavily on the application of the SER or not (Figure 2). When SER is applied, the correction $\tilde{G}_t$ (cf. eq. (4)) is activated immediately at the start of the simulation period. As a result, the level of government expenditure is lowered, and the balance in 2028 amounts to -1.2% GDP. It is because the correction mechanism in the SER would avoid breaching the deficit threshold by kicking in at the beginning, which would tighten the growth of nominal expenditures in coming years. On the contrary, under NO SER policy regime, fiscal policy is not constrained as long as deficits are within the 3-percent of GDP level. Given the revenue assumptions, the government expenditures would be at a higher level and the overall fiscal balance in 2028 is at the threshold of -3 percent GDP, where the public investment is reduced to $GEIT_t$ as compared to initial policy preference $GEIT_t^*$ (cf. Subsection 3.3). Note that, under these circumstances, the initial fiscal stance prior to the shocks hit in 2028 is more expansionary under the NO SER policy regime. Since SER adopts a tighter fiscal stance under the correction mechanism, it allows policymakers to build some buffers for the adverse shock that occurs in 2028. As a result, an important comparison between the two policy regimes (SER and NO SER) involves not only on the fiscal policy reaction to shocks, but also the *ex ante* buffer (indicated by the initial expenditure levels) that was prevalent under SER framework but otherwise absent.

Figure 2: Baseline Simulations
(in percent of GDP)



Scenario 1 – Global recession. The foreign economy, represented in the model by the euro area, experiences a negative, transitory shock to its real GDP dynamics, which translates into a recession in Poland. The magnitude of the shock was calibrated to trigger a negative impact on Poland's GDP dynamics by 2 standard deviations in 2028, which roughly corresponds to a 5% GDP decline in the euro area throughout 2028. The low level of GDP in the euro area persists during 2029, and the GDP dynamics in the euro area return gradually to baseline levels over the subsequent 4 years.

As Poland's GDP contracts, both GG revenue and expenditure fall in absolute terms as compared to the baseline scenario. In ratios to GDP, however, both grow (Figure 3) because the decline in the denominator dominates over the decline in the numerator. This is because the reduced-form elasticity of the revenues to GDP is below unity. As the shock originates in the foreign demand, the enterprise sector – especially exporters – are affected to the highest extent, whereas private consumption – and hence VAT revenues – remain more resilient.

In line with this structure, on the revenue side, CIT is the most affected category due to decline in exporters' gross operating surplus, and the related revenues lower by 20.2% in 2028 and 15.3% in 2029 as compared to the baseline. Further contributions to the GG revenue decline come from social security contributions (-2.7%

and -4.8%), PIT (-1.5% and -3.9%) and finally VAT (-1.2% and -2.8%), which reflects a relatively weaker effect of this shock on consumption (with household savings acting as a buffer).

On the expenditure side under the SER framework, the absolute decline is weaker than on the revenue side because the new adverse developments have only limited impact on the growth-related indexation throughout the 8-year rolling window (eq. (2)). The model simulation leaves the social transfers (GES) virtually unaffected: these are mostly pensions, and unemployment benefits constitute only a minor part thereof. The decline in expenditure is therefore effected through the abrupt GDP fall and its deflationary consequences on the compensation of employees of the GG sector (GEFW, 6-8% below the baseline scenario in 2028 depending on the quarter), intermediate consumption of the GG sector (GEIC, 4-5%) and – with 2-3 quarter lag – social transfers in kind (GESTK, 2-7%).

Since the reduced form elasticities to GDP for both GG revenue and expenditure are below unity, both grow as a ratio to GDP; however, GG expenditure is more persistent and its ratio grows more. As a result, the GG balance deteriorates considerably as compared to the baseline, with a maximum difference of around 2% of GDP in 2031.

Despite these adverse developments, the correction mechanism outlined in equation (4) is not triggered until 2031, owing to the “bad times” clause. This clause delays adjustment during periods of economic stress. Once this condition no longer holds in 2031, the mechanism activates, prompting a sharp contraction in public investment (GEIT) and other current transfers (GETRC), as dictated by the operation of SER and illustrated in Figure 1
A decade after the shock occurs, the GG revenues as percentage of GDP stabilize close to the initial level. However, this is no more the case for the expenditure, and hence the GG deficit, which are permanently lower than the baseline. This is due to the incidence of correction, i.e. switch of eq. (8) to the non-zero state in 2031. Given the strongly autoregressive property of eq. (1) (or (5) alike), a one-off shift in $\tilde{G}_t$ brings G_t permanently on a new path. Once a correction is triggered, the adjusted GG expenditure level becomes a reference point for setting expenditure levels in subsequent periods.

In the NO SER scenario, where fiscal policies only comply with the Maastricht criteria for GG deficit and debt (right pane of Fig. 3), the difference between the baseline and shock scenario revenues remains limited. Under the NO SER policy regime, in order to maintain a fiscal deficit less than 3 percent of GDP, expenditure side would need to be cut, which is virtually the mirror image of the revenue side, to maintain the deficit target. In the long run, expenditure stabilizes at higher levels than the SER scenario because of a less restrictive fiscal stance to constrain expenditure growth, which will lead to a higher debt profile over the medium term. This applies to both the shock and the baseline scenario. An interesting observation is that the limited fiscal buffers under the NO SER policy regime would slightly amplify the impact of the initial adverse shock in 2028, and that persistently higher deficits (hovering around 3 percent of GDP) would translate into an increasing debt trajectory.

Scenario 2 – unexpected supply-side one-off shock. This scenario examines the fiscal impact of a one-off, adverse supply-side shock, modeled as a 5-percentage point CPI increase in 2028 due to domestic food price pressures. The elevated CPI gradually normalizes to the baseline over the next decade, while the shock also unexpectedly dampens real GDP growth.

Under SER, general government (GG) expenditure deviates persistently from the baseline starting in 2029, as the rule begins correcting for prior inflation forecast errors. Since CPI rises faster than the GDP deflator, a CPI-based SER accelerates expenditure growth relative to GDP—highlighting the merit of Poland's 2024 shift to a GDP-deflator-based SER[4]. Debt dynamics remain broadly stable under both the SER and no-SER frameworks, although the more restrictive expenditure policy implies a lower debt trajectory under SER.

Crucially, this scenario exposes a limitation of the vintage SER: it lacked a mechanism to correct for GDP growth forecast errors. As seen in 2028–2030, such errors can have lasting effects on expenditure and balance paths. While neutral in the long run if errors average out, persistent optimism in growth forecasts can lead to upward pressure on deficits and debt, justifying the 2024 amendment to address this vulnerability.[5]

Scenario 3 of a **surprise GG balance deterioration** on the revenue side**.** The scenario considers a temporary (one-year) deterioration of primary balance owing to surprisingly low revenue side performance. The primary balance negative surprise results from an unanticipated drop in PIT revenues caused by a reduction of the effective PIT rate by 75 percent in each quarter of 2028 (Fig. 5) can be regarded either as a sudden decline in tax enforcement (not caused by discretional government intervention) or an unplanned revenue-side fiscal stimulus due to some unanticipated developments, although the latter are relatively unlikely to occur in isolation, without initial macroeconomic deterioration.

Whether or not the SER is the prevalent policy regime, the consequences of such a shock depend on its magnitude and the initial position. The scenario is calibrated so as to trigger a one-off, 1 percent of GDP deterioration in the fiscal balance. The original buffer is wide enough to avoid triggering corrections that there is no need for fiscal adjustment and expenditure as a result is stable under both policy types (SER and NO SER). If the shock was stronger, or more protracted, SER would have ultimately triggered a correction (with no 'bad times' clause applicable), whereas the NO SER policy would imply deeper spending cuts due to lack of initial buffers.

Scenario 4 – SER coverage (expenditure-side fiscal shock). The scenario replicates a situation of a discretionary surge of expenditure for a given period of time.

This is assumed to take place through the expenditure outside of the coverage of the SER limit (eq. (1)). The rule currently applies to the central government, Social Insurance Fund, Bridging Pension Fund, local governments, and funds such as the National Health Fund and Bank Guarantee Fund. Prior to the 2024 amendments, it excluded some fiscal activities—such as below-the-line operations—from its scope. On average, the SER has covered about 90 percent of general government spending (with its legally-binding limit which excludes autonomous entities, covering 70 percent of GG expenditure). The 2024 Public Finance Act amendments expanded coverage to include spending by the strategic reserves' agency, the social security institution, and some below-the-line transactions (e.g., treasury bond transfers to public entities).

Under Scenario 4, this amount outside the binding component of the SER increases exogenously by 3% of GDP. The impulse spans 5 consecutive years. The resulting substantial shift in GG deficit triggers the SER

[4] While the simulations have been conducted with the SER version as of late 2023, in June 2024 SER was modified. One of the amendments replaced CPI with GDP deflator as Π_t in eqs (1) and (3).

[5] Another amendment introduced in 2024 modified eq. (2) into a form similar to eq. (3), that is, multiplying the indicator of real growth I_t^Y to correct for the ex post forecast error in year t-2 and forecast update for year t-1 (when drafting the budget for year t at year t-1).

correction (eq. (4)) that the SER-covered GG expenditures need to accommodate. While initially supportive to GDP dynamics, the shock has ultimately a negative effect after two years after. First, the reduced public investment is a drag on GDP both in the short and in the long run. Second, the surge in GG debt increases the interest payments that also crowd out government consumption and investment. Under the NO SER regime, there is no coverage issue, since—unlike under SER—there is no bottom-up expenditure limit. The only constraints on fiscal policy stem from the deficit and debt limits, which are not affected by these coverage considerations.

Scenario 5 – tightening of global financing conditions (interest rate shock). The scenario envisages an increase in interest rates, translating into a higher cost of debt servicing. The scenario considers a permanent 1 pp increase in domestic long-term and short-term interest rates since 2029 as compared to the baseline. As a result, the debt servicing cost grows by a rather limited margin of 0.2%-0.3% GDP, which is based on the estimated historical elasticity.

The general fiscal impact and mid-term developments depend on the policy variant under consideration. Under SER, the pressure is partly accommodated by a decrease in public investment. Therefore, the negative impact of 0.1%-0.2% GDP on the government balance is driven predominantly by the expenditure developments. Without SER, the reduction in aggregate investment and consumption due to high interest rates drags on the tax base and hence tax revenues. As soon as the government balance hits the lower bound of -3% GDP, the decreasing revenues force a parallel reduction in expenditure, not least public investment, which is even more detrimental to GDP.

Across the scenarios, complying with the SER generally strengthen debt dynamics compared to only SGP compliance. The GG debt to GDP ratio is generally lower under the policy that applies the SER as compared to the alternative policy without the SER, and trends downwards. This difference stems from the persistently lower GG deficits under the SER due to a generally lower level of GG expenditure. Fiscal policy under the SER is strongly disincentivized from operating in the proximity of the -3% GDP threshold for GG balance, since doing so exposes the policymakers to the correction (eq. (4)) being triggered in response to even relatively small shocks. Under SGP limits, in turn, the corrections would be typically smaller than those required under the SER. This means that SER – even in its original form prior to changes in 2024 (see Footnotes 4 and 5 for examples) – contributes to building fiscal buffers for bad times, a main objective of the 2024 EU fiscal rule reforms.

Figure 3: Stress Scenario 1

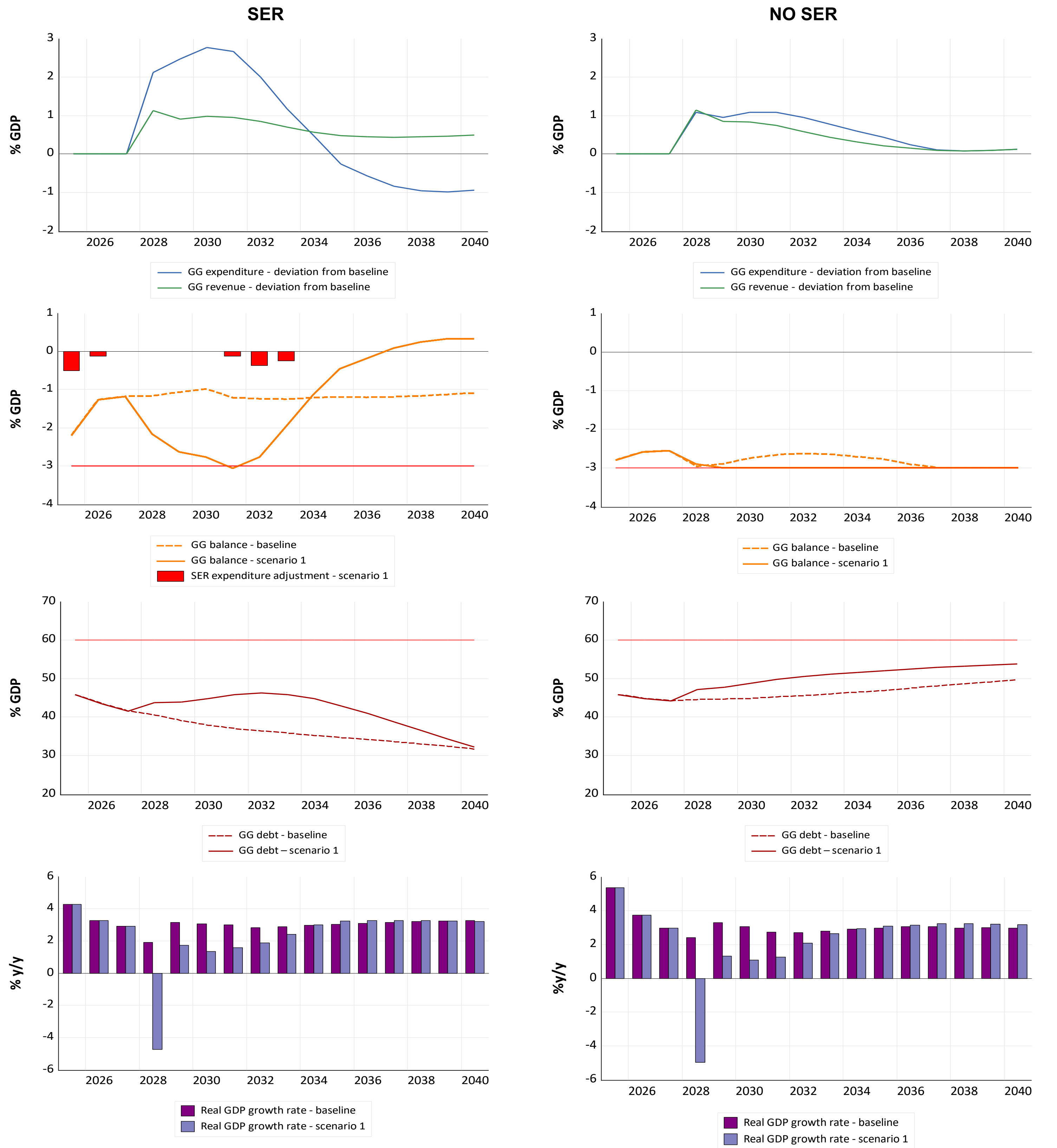


Figure 4: Stress Scenario 2

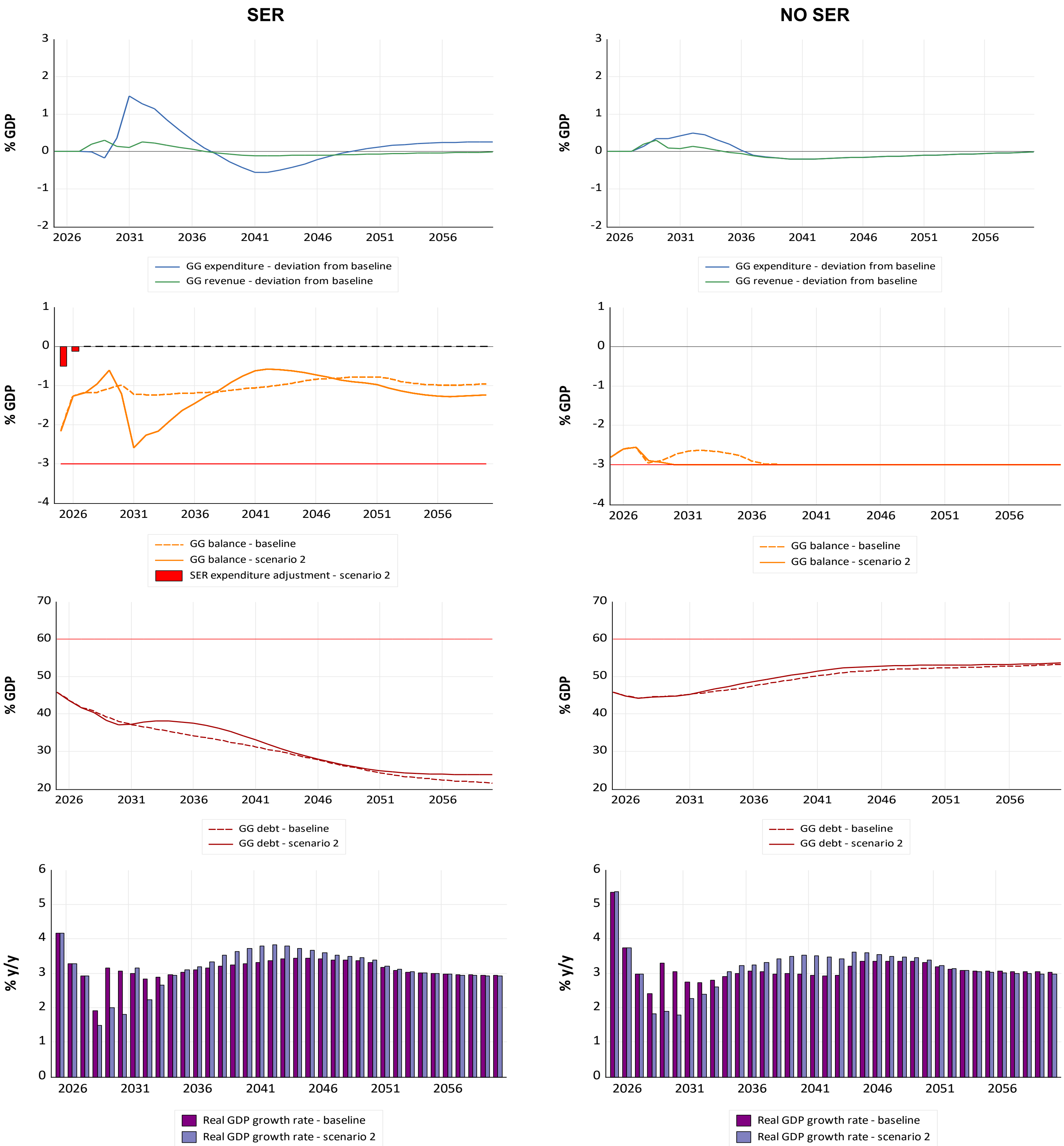


Figure 5: Stress Scenario 3

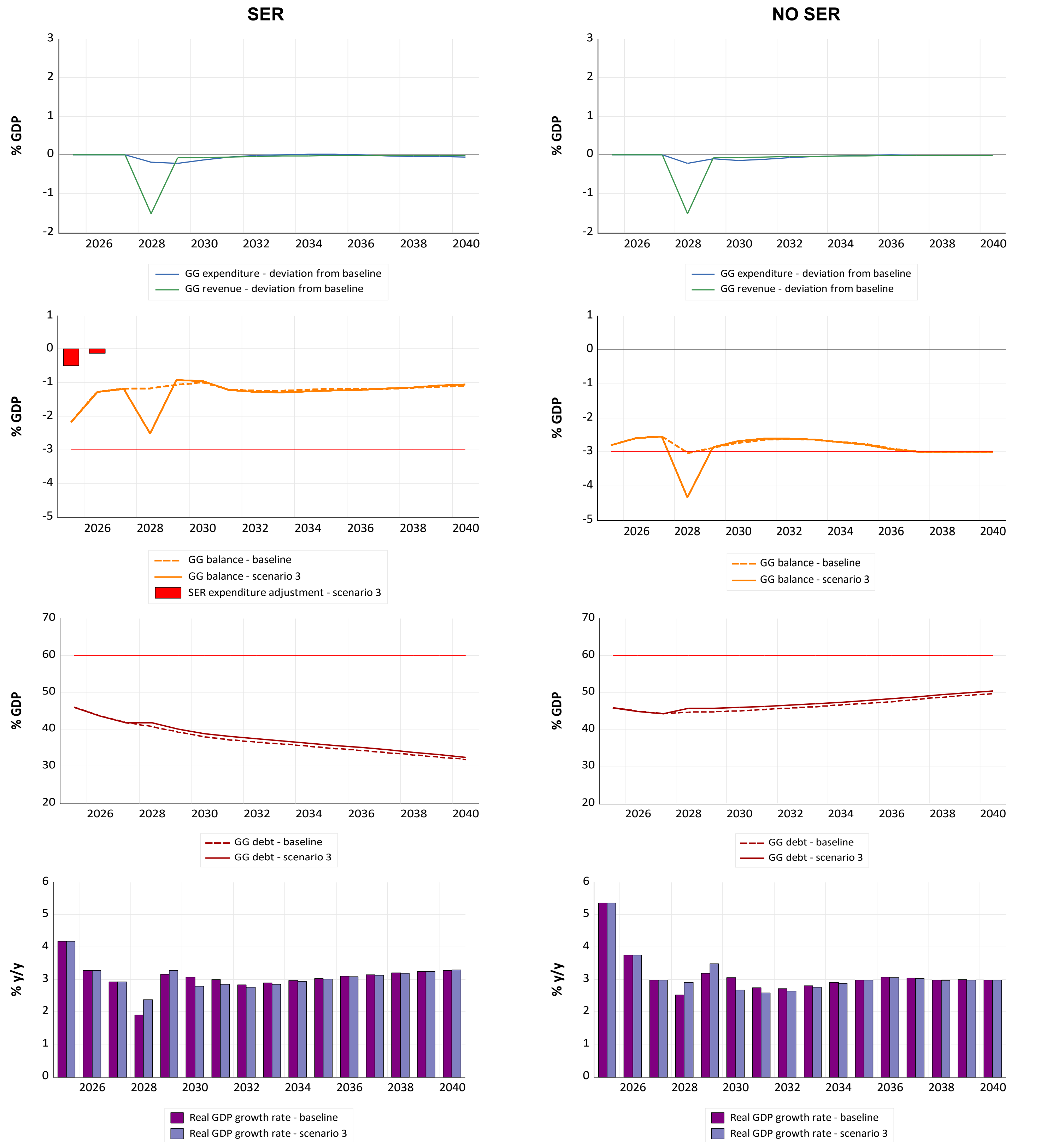


Figure 6: Stress Scenario 4

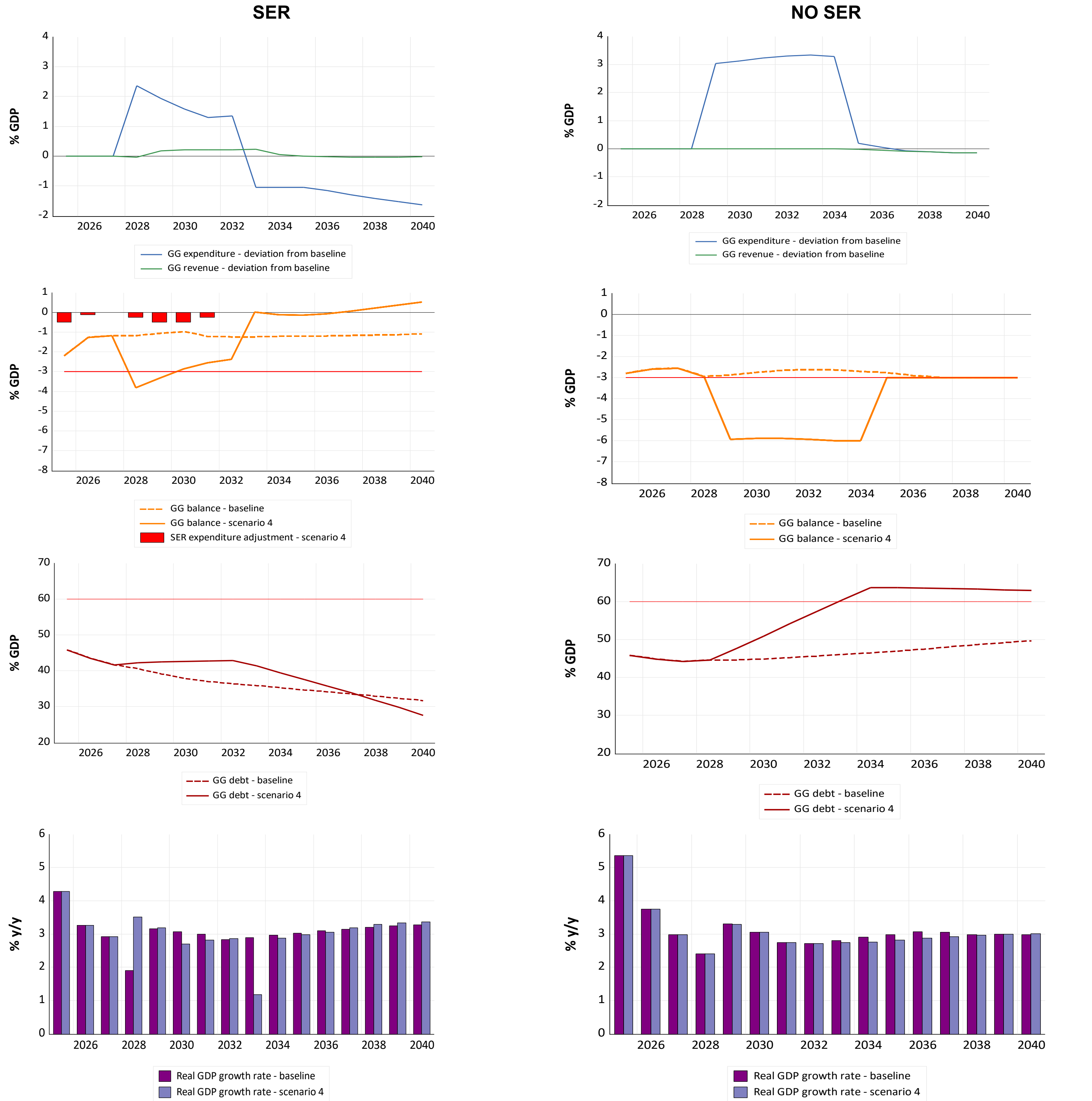


Figure 7: Stress Scenario 5

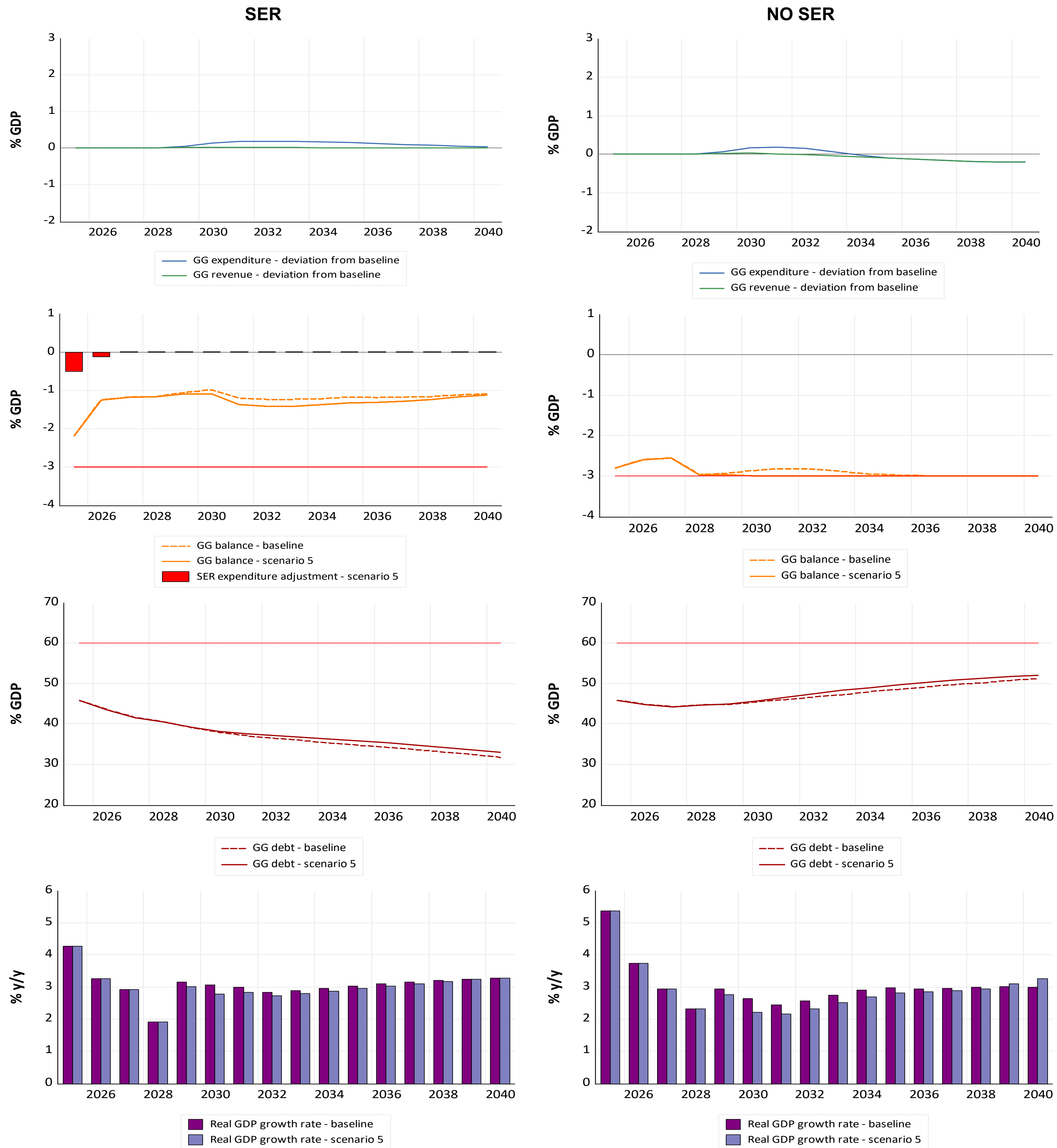
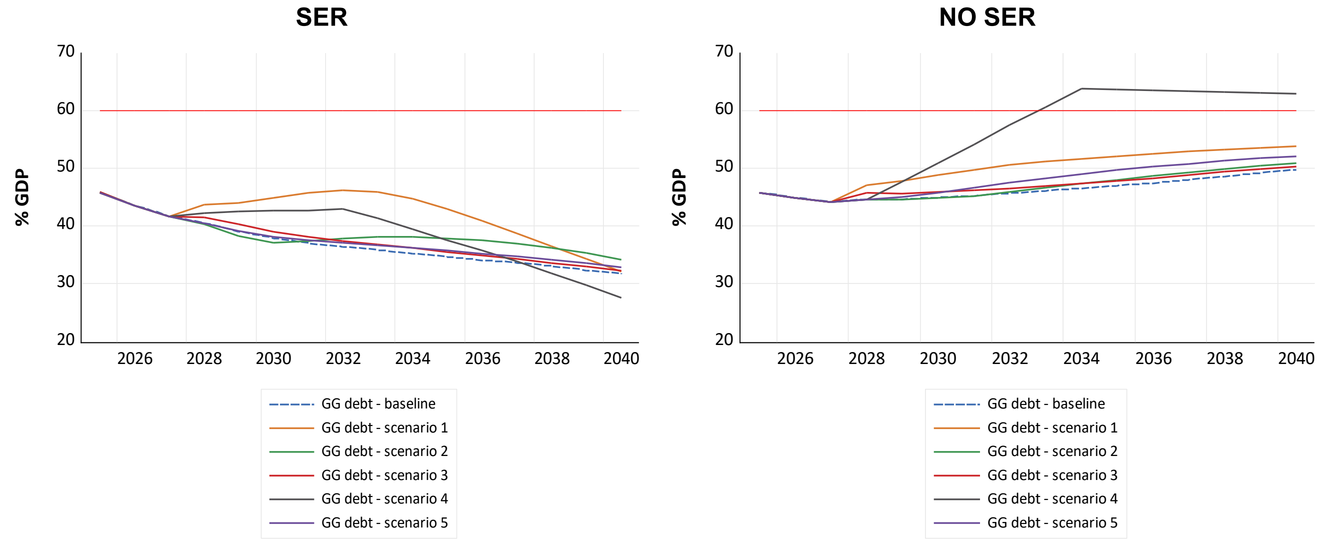


Figure 8. GG Debt in Simulated Scenarios



The simulations assume SER (or just Stability and Growth Pact deficit and debt thresholds) operating strictly since 2024, and hence may deviate from currently observed values. The comparison between baseline and other scenarios remains applicable, notwithstanding that.

V. Implications for the SER from the Simulation Results

The simulation results show that the adoption of the SER as a fiscal rule has strengthened **debt sustainability** (criterion A). Across all simulation scenarios, our results show that, under the SER policy regime, debt dynamics are more favourable relative to the counterfactual (NO SER) policy regime. The SER is sufficiently restrictive to align with the goals underpinned in EU's reformed fiscal framework (April 2024). Debt remains stable or declines over the required 14- to 17-year horizon (a 4-7-year adjustment period followed by a 10-year debt-trajectory phase) under the SER.

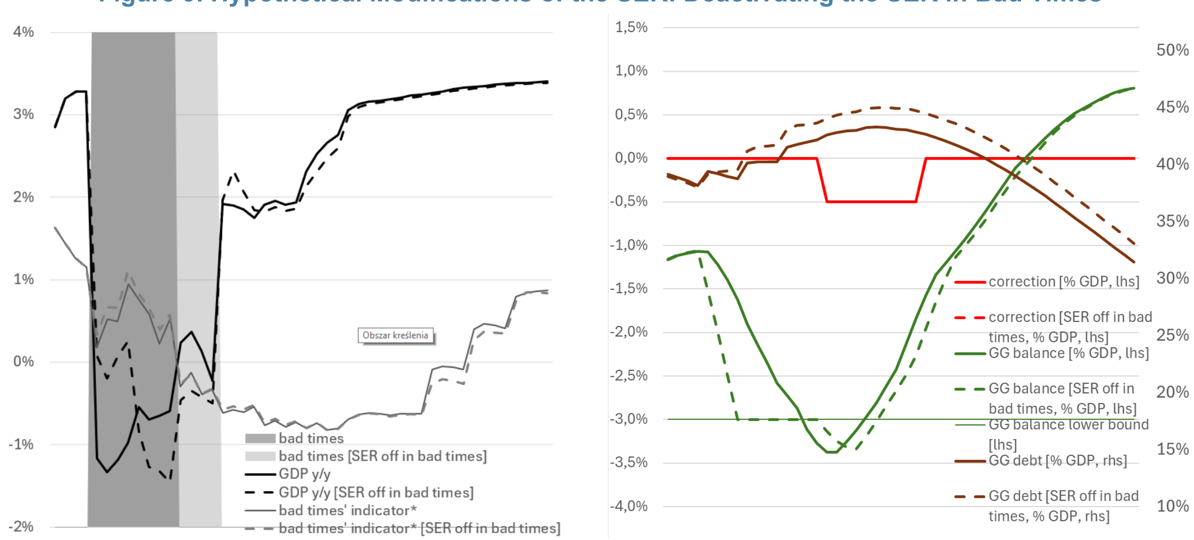
To maintain the effectiveness of the SER, its **coverage** (criterion C) should closely align with the EU's general government (GG) definition to ensure broad inclusion of key fiscal aggregates and limit the rise of uncovered expenditures (as in Scenario 4). The 2024 reforms enhanced the coverage as discussed in scenario 4, which will support effective implementation and help safeguard debt sustainability.
The SER also supports the buildup of fiscal buffers that could be used for a credible **countercyclical** response (criterion D) in face of recessionary shocks (as shown in Scenario 1) or to accommodate expansions outside of the SER coverage when fiscal space or the economic cycle permits (Scenario 3). Expenditures would remain steady in years with substantial slowdown in growth, and the correction mechanism is triggered only when growth normalizes. To strengthen the flexibility of SER in response to adverse shocks, the provision on the escape clause could have an additional trigger with reference to the unexpected event of a severe economic slowdown (as shown in scenario 2).

To assess **flexibility** (criterion B), we simulate the effects of **triggering the escape clause** under the SER in response to a shock similar to Scenario 1. The solid lines in Figure 9 show results under the standard SER—but without activation of the escape clause—while the dashed lines represent the case shown in scenario 1 above, in which the clause is triggered, temporarily suspending the SER limits during "bad times."

During this period, expenditure categories classified as flexible in Section 3 (e.g., public investment and selected social transfers) are allowed to rise above the SER-consistent path, up to a point where the fiscal deficit reaches 3 percent of GDP, thus maintaining compliance with the SGP. Until that threshold is reached, the fiscal expansion provides a countercyclical buffer that mitigates the downturn. However, because spending growth remains capped by the SGP deficit constraint, the stimulus effect on aggregate demand is bounded, leading to a postponed—rather than avoided—dip in output and a prolonged "bad-times" period.

When the economy recovers and the escape clause is lifted, the SER is reinstated with parameters recalibrated as if the rule had been applied continuously. Consequently, the long-run ratios of government expenditure and deficit to GDP remain broadly unchanged, while public debt stabilizes at a somewhat higher but still sustainable level, governed by the resumed correction mechanism. Overall, triggering the escape clause enhances the countercyclicality of fiscal policy, particularly when the deficit remains well below the SGP threshold. If the EU fiscal rules were themselves suspended, the scope for countercyclical policy under the escape clause would be correspondingly greater.

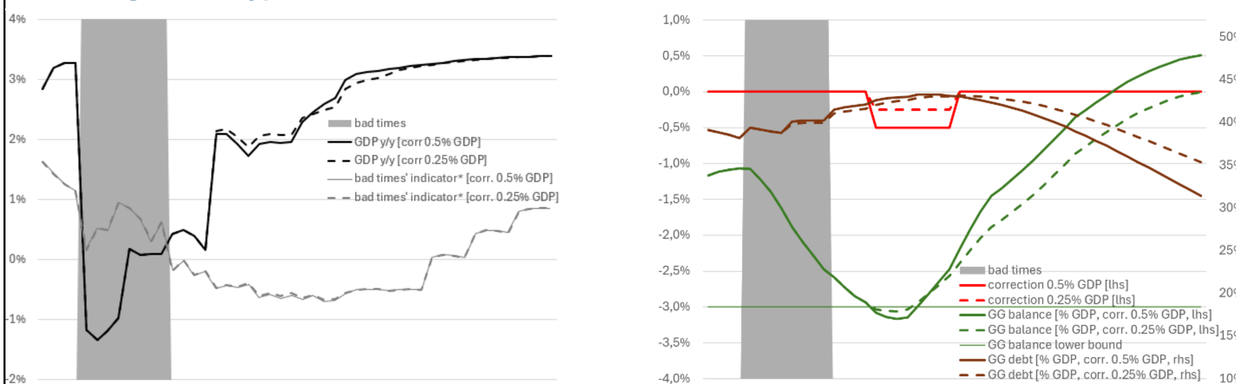
Figure 9. Hypothetical Modifications of the SER: Deactivating the SER in Bad Times



The analysis also highlights trade-offs associated with the pre-set size of the fiscal correction (equation 4) versus having more discretion, suggesting that additional flexibility may sometimes be warranted. A predetermined correction magnitude offers the advantage of clear policy guidance when fiscal rules are breached. However, this comes at the potential cost of excessive rigidity—either through an abrupt tightening of primary expenditure or, conversely, insufficient adjustment when the debt trajectory deteriorates sharply. Allowing some discretion and flexibility around the correction size could therefore help balance these risks and facilitate consistency between the national and EU fiscal frameworks.

Figure 10 illustrates how a constant correction parameter may lead to overshooting debt sustainability objectives. Consider a variant of Scenario 1 in which the general government (GG) balance falls slightly below the −3 percent of GDP threshold. Applying a more moderate correction of −0.25 percent of GDP instead of −0.5 percent (shown by the dashed lines) avoids imposing an overly restrictive expenditure stance in the medium to long term. It also produces smoother adjustment dynamics, with a shallower deterioration in the GG balance at the trough and a more gradual recovery in GDP.

Figure 10. Hypothetical Modifications of SER: Flexible Correction After Weaker Shocks



**Bad times (condition in eq. (4)) occur when the black line (GDP y/y dynamics) falls below the grey line. The period is the same in both simulations and is marked with the grey shaded area.*

In the new EU framework since 2024, the benchmark correction refers to the 0.5 percent of GDP in terms of structural (primary) balance as considered in all simulation scenarios in Section 4. At the same time, the Excessive Deficit Procedure (EDP) aims to set a fiscal path that would reduce the excessive deficit when it occurs.[6]

VI. Conclusion

The paper investigates the properties of the Stabilizing Expenditure Rule (SER) in Poland. To this end, the paper applies the NEMPF, a macro-econometric model of the Polish economy (Chmura et al., 2024) to simulate several adverse policy scenarios under various settings and examines the impact under the SER on the long-term debt sustainability, flexibility, coverage and countercyclicality, contrasting it to a counterfactual where only the SGP is binding.

Poland's SER is shown to have desirable properties in face of adverse shocks. The SER's design is consistent with fostering fiscal discipline by encouraging the buildup of buffers, while forcing corrective action when deficits or debt is too high in normal times. The corrective mechanism within the SER also limits the abrupt tightening of primary expenditures at the peak of the adverse shocks by appropriately providing exception for `bad times'. The provision of the escape clause in the SER and the prespecified adjustments in the correction mechanism further enhances the flexibility while anchoring expectations of government actions. The simulation

[6] In addition, more flexibility to the EDP recommendations was introduced through the economic governance reform in the EU, via the so-called *relevant factors* that affect the assessment of fiscal sustainability or lower fiscal adjustment in justified cases and country-specific escape clauses allowing deviation from the net expenditure path set by the EU Council in exceptional, unforeseeable events that impact public finances, provided medium-term fiscal sustainability remains intact.

results show that the SER generally helps contain GG expenditures, which in turn raises fiscal balances and strengthens the debt outlook compared to a counterfactual where only SGP thresholds are binding. The built-in nonlinear response in the correction mechanism encourages policymakers to look for a more prudent lower bound of fiscal balance than the legal boundary of a deficit of 3 percent of GDP.

The simulation approach also sheds lights on potential challenges in the SER. Extending the escape clause to include events of severe unanticipated economic slowdown would further support counter-cyclicality and flexibility. Prespecifying the magnitude of correction has the advantages of providing clear policy guidance in case thresholds are breached, but this should be weighed against the risks or cost of abrupt and procyclical tightening of primary expenditures. Finally, GDP forecast errors were not accounted for (unlike inflation forecast errors), which meant that a persistent positive bias in growth forecasts could lead to excessive expenditure growth. The revision of Public Finance Act of 2024 has made several amendments in these regards to strengthen the implementation of the SER.

Future research could explore the implications of DSA-based fiscal adjustment, now integrated into the SER, by incorporating EU fiscal rules into model simulations. This will require addressing new methodological challenges—particularly those related to the stochastic simulations outlined in the European Commission's debt sustainability guidelines. More efficient numerical solutions will also be needed to reduce reliance on initial values, especially for (i) large-scale models like NEMPF and (ii) models with strong nonlinearities, such as those with endogenous expenditure correction triggers.

Annex I. Methodology and main features of the NEMPF model

The New Econometric Model of Public Finance (NEMPF) is a hybrid model in which long-term properties are largely consistent with theoretical models, while short-term properties are estimated from the time series data. The model incorporates several concepts from the European Central Bank's AWM model (Fagan et al., 2005), particularly in the specification of the macroeconomic equations block (see below for details).

The main econometric approach used there is the cointegration analysis, which enables the identification and quantification of long-run relationships toward which the variables converge after they have been displaced from the equilibrium by shocks. We use the error correction model (ECM) framework:

$$\Delta y_t = ECT_y(y_{t-1} - \delta_1 x_{1,t-1} - \cdots - \delta_L x_{L,t-1}) + \gamma_1 \Delta x_{1,t} + \cdots + \gamma_L \Delta x_{L,t} + \varepsilon_t$$

where ECT_y is the error-correction parameter, and γ_l denote the short-run parameters; ε_t is the random component, with $\varepsilon_t \sim iid(0, \sigma^2)$. For simplicity, the above example of ECM model assumes only one lag, and other variables that may affect Δy_t in the short run are omitted. The bracketed term captures deviations from the long-run equilibrium defined by a cointegrating relationship that is stable over time:

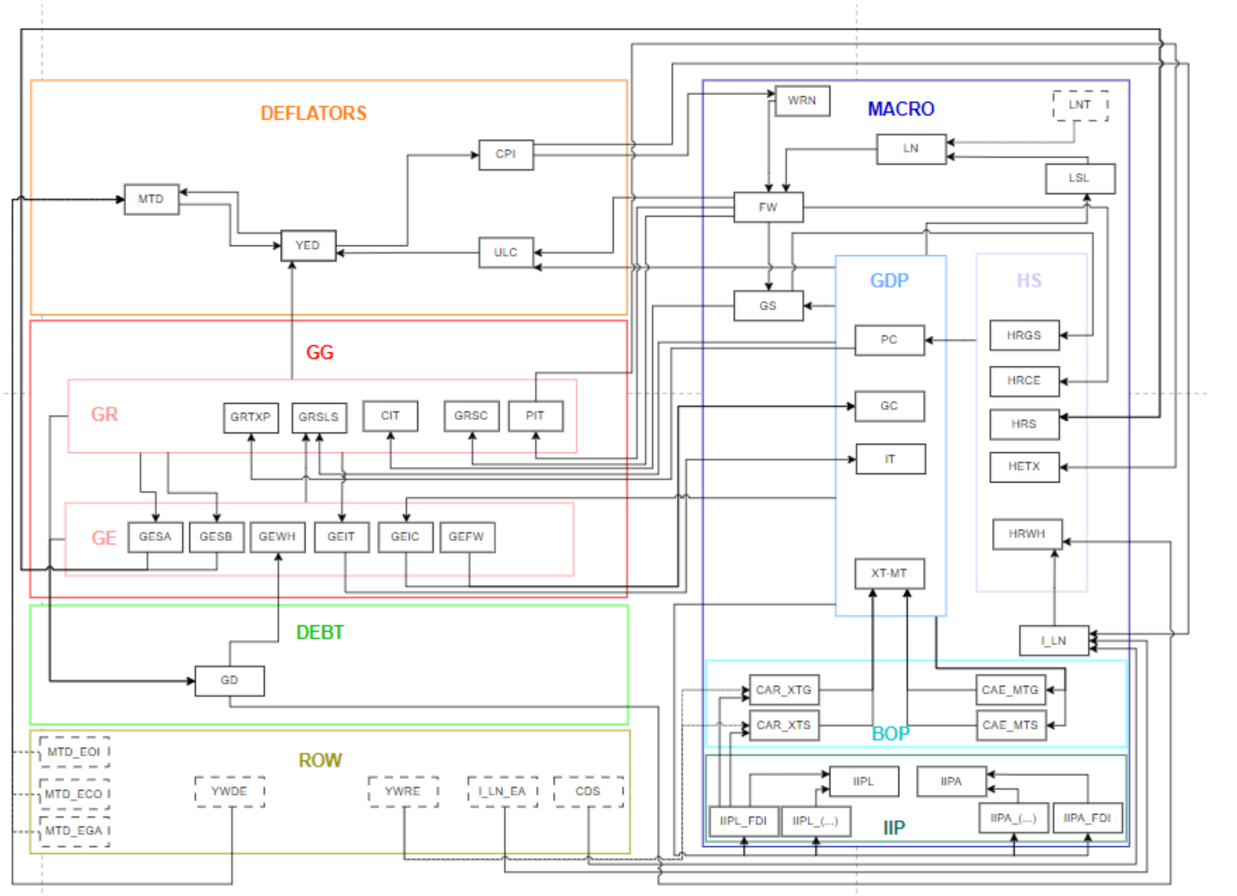
$$y = \delta_1 x_1 + \cdots + \delta_L x_L$$

where $x_1, \dots, x_L$ denote the determinants of the dependent variable y, while δ_l are the long-run parameters. Equilibrium equations are most often constructed under the assumption of long-run homogeneity (formally tested), which implies that the elasticities of the main explanatory variables sum to one.

The solution to the problem of estimating the parameters $\delta_1, \dots, \delta_L$ and $\gamma_1, \dots, \gamma_1$ is based on Johansen procedure (1988, 1995), followed by Juselius (2006) recommendation to integrate submodels into a complete system of equations. Therefore, the main approach to estimating behavioural equations is the vector error correction model (VECM).

According to the assumptions and purpose, the NEMPF is a model in which – unlike most traditional macro models – the fiscal block describing the general government (GG) sector's revenues and expenditures, as well as the sector's linkages with other spheres of the economy, is separated and expanded with a high degree of detail. The complexity of linkages between the GG sector and other sectors of the economy makes the fiscal multiplier in the NEMPF as important and detailed as the consumption multiplier and accelerator, which are usually included in similar models. A diagram illustrating the linkages between the key macroeconomic and fiscal variables in the model is presented in Figure 11.

Figure 11. The Blocks of the NEMPF Model, Main Variables and Linkages Between Them



**Framing the variable name with a dashed line distinguishes exogenous variables.*

Legend: MTD – import deflator, YED – GDP deflator, CPI – consumer price index, ULC – unit labour cost, GR – government revenues, GRTXP – taxes on production and imports, GRSLS - market output and output for own final use of the GG sector, CIT – corporate income tax, GRSC – social security contribution, PIT – personal income tax, GESA – social assistance, GESB – social benefits, GEWH - debt servicing cost, GEIT – public investment, GEIC – intermediate consumption in the GG sector, GEFW – compensation of employees in the GG sector, GD – public debt, MTD_EOI – global oil prices, ROW – rest of the world, MTD_ECO –global coal prices, EGA – global gas prices, YWDE – deflator in the EA, YWRE – GDP in the EA, I_LN_EA – long-term interest rate in the EA, CDS – credit default swaps, WRN – compensation of employees (total economy), LNT – labor supply, LSL – labor demand, LN – number of employees, FW – wage fund in the total economy, GS – gross operating surplus, PC – private consumption, GC – government consumption, IT – total investment, XT – exports, MT – imports, HS – households, HRGS – gross operating surplus (received by the HS), HRCE – compensation of employees, HRS – social assistance & benefits, HETX – income taxes paid by the HS, HRWH – property income, I_LN – long-term interest rate, BOP – balance of payments, CAR – current account (revenues), CAE – current account (expenditure), XTG/S – exports of goods/services, MTG/S – import of goods/services, IIP – international investment position.

The model accounts for GG sector revenues through separate blocks of equations describing the formation of household budgets (e.g. income and property taxes and social security contributions), corporate profits (subject to corporate income tax – CIT), and aggregate demand as well as its structure, which affect revenues from value-added tax (VAT) and excise duties.

Similarly, a precise accounting of GG sector expenditures required distinguishing not only the volume of public consumption (which depends mainly on public sector labor costs and intermediate consumption), but also taking into account social benefits and social assistance received by households, the mechanisms determining GG investment expenditures (EU and domestically funded), and debt servicing costs, including those related to the foreign debt.

Full representation of the causal feedbacks described above, and in particular the adequately detailed heterogeneous fiscal multiplier mechanism, determined the relatively large size of the model. The NEMPF consists of 267 equations forming blocks: prerecursive (57 equations), simultaneous (98 equations) and postrecursive (112 equations). This version of the model was estimated using quarterly data covering the period from Q1 1995 to Q4 2022.

In the block of simultaneous equations, 6 feedback (key endogenous) variables can be identified:

- taxes on production and imports (GRTXP),
- GG sector investment (GEIT),
- aggregate effective tax rate (R_TXP),
- value added deflator (YFD, i.e. a tax-adjusted GDP deflator),
- number of employees in the economy (LN),
- real gross domestic product (YER).

The number of feedback variables reflects the complexity of the system, and their features confirm the interaction of the consumption multiplier, the accelerator, the fiscal multiplier and the wage-price spiral. From an economic perspective, the NEMPF can be distinguished by blocks of equations describing:

- aggregate supply, capital formation mechanism and labor market,
- demand, broken down into its main components,
- household budgets,
- prices and wages,
- exchange rates and interest rates,
- the balance of payments and net foreign assets,
- GG sector revenues,
- GG sector expenditures,
- GG sector balance and debt.

The exogenous variables (external assumptions) in the NEMPF mainly relate to:

- demographics (population, labor supply),
- foreign markets (GDP and prices developments in the euro area and the US, foreign interest rates, and financial instruments such as CDS),
- commodity prices (oil, natural gas, coal) and imported food prices,
- minor fiscal components (e.g. small revenues with short time-series).

These assumptions mainly affect variables linked to prices, the labor market and the components of the balance of payments. A detailed discussion of the specification and estimation results of the parameters of all equations that make up the highlighted blocks is presented in the documentation of the model available on the website of Poland’s Ministry of Finance (Chmura et al., 2024).

The properties and validity of the NEMPF were evaluated using standard procedures: an *ex-post* dynamic forecast (analysis period: 2015 Q1-2022 Q4, i.e. 32 quarters) and simulation of external shocks applied to exogenous and selected endogenous variables. The results of these analyses are also included in the documentation of the model (pp. 89-106). Conclusions from the evaluation, the accuracy of the ex-post forecast and the shape of IRFs to external shocks, confirmed the acceptable properties of the NEMPF.

Annex II. Adjustment of annual SER to quarterly NEMPF model and solution

This Annex expands on technical issues related to SER implementation in the NEMPF model, mentioned in Section 3 and using notation established in there.

SER determines annual GG expenditure, whereas the NEMPF model is specified at quarterly frequency. Hence, eqns. (1)-(4) – stipulated in the Polish Public Finance Act with the annual frequency as the budgetary process – has been implemented in NEMPF as:

$$G_t = 0.25(0.5G_{t-6} + G_{t-5} + G_{t-4} + G_{t-3} + 0.5G_{t-2}) \cdot I_t^{\Pi} \cdot I_t^{Y} + 0.25(\tilde{G}_t + \tilde{G}_{t-1} + \tilde{G}_{t-2} + \tilde{G}_{t-3}) \quad (5)$$

$$I_t^{\Pi} = \frac{\Pi_{t-8}}{E_{t-8}[\Pi_{t-8}]} \cdot \frac{E_{t-4}[\widetilde{\Pi}_{t-4}]}{E_{t-8}[\widetilde{\Pi}_{t-4}]} \cdot E_{t-4}[\widetilde{\Pi}_t], \text{ where } \widetilde{\Pi}_t = min\{0.25 \cdot \textstyle\sum_{i=0}^{3}(\Pi_{t-i})\,;0\} \quad (6)$$

$$I_t^{Y} = \sqrt[8]{\frac{Y_{t-8}}{Y_{t-32}} \cdot E_{t-4}\left[\frac{Y_{t-4}}{Y_{t-8}}\right] \cdot E_{t-4}\left[\frac{Y_t}{Y_{t-4}}\right]} \quad (7)$$

$$\tilde{G}_t = \begin{cases} -0.005 \cdot Y_t \cdot P_t^Y & E_{t-4}\left[\frac{Y_t}{Y_{t-4}}\right] \geq I_t^Y - 0.02 \wedge \left(E_{t-4}\left[\frac{debt_t^{GG}}{Y_t \cdot P_t^Y}\right] > 0.6 \vee E_{t-4}\left[\frac{\sum_{i=0}^{3} def_{t-i}^{GG}}{\sum_{i=0}^{3}(Y_{t-i} \cdot P_{t-i}^Y)}\right] > 0.03 \vee \right. \\ & \left. E_{t-4}\left[\frac{debt_{t-4}^{GG}}{Y_{t-4} \cdot P_{t-4}^Y}\right] > 0.6 \vee E_{t-4}\left[\frac{\sum_{i=4}^{7} def_{t-i}^{GG}}{\sum_{i=4}^{7}(Y_{t-i} \cdot P_{t-i}^Y)}\right] > 0.03 \right) \\ 0 & otherwise \end{cases}$$

(8)

The above modelling choices are intended to (i) avoid seasonal fluctuations in simulation caused by the initial conditions, i.e. the variation of expenditure between quarters in the first year of the simulation and (ii) preserve the staggered properties of budget planning with one year ahead horizon. For the first purpose, we use as the past reference expenditure level in (5) the annual average of G centered at *t-4*, rather than G_{t-4}.

For the second one, we assume away the possibility introducing a full correction $\tilde{G}_t$ at the quarter when an adverse shock occurs, replacing it with the moving average from t to $t-3$. As a consequence, the target size of correction (if sustained) is achieved after 4 quarters, which can be regarded as an expected value of four scenarios of the quarterly shock incidence, each of them at a different stage of the budgeting process. In formula (6), we also preserve the property of full ex post forecast error correction in CPI being effected in budget planning two years later, although it might be argued that the respective final CPI readings can take place sooner than with a 4-quarter lag. Once again, this is intended to preserve the average lags incorporated into the annual planning process when mapping into the quarterly framework.

References

Ardanaz, M., Cavallo, E., Izquierdo, A., & Puig, J. (2021). Growth-friendly fiscal rules? Safeguarding public investment from budget cuts through fiscal rule design. *Journal of International Money and Finance*, *111*, 102319.

Badinger, H., & Reuter, W. H. (2017). The case for fiscal rules. *Economic Modelling*, *60*, 334-343.

Basdevant, O., Chaponda, T., Gonguet, F., Honda, J., & Thomas, S. (2020). Designing fiscal rules to protect investment. *Well spent: How strong infrastructure governance can end waste in public investment*, International Monetary Fund, 106-124.

Brzozowski, M., & Siwińska-Gorzelak, J. (2010). The impact of fiscal rules on fiscal policy volatility. *Journal of Applied Economics*, *13(2)*, 205-231.

Chmura, R. (2023a). Determinants of Public Investments in the EU Countries. Role and Importance of Fiscal Rules. Finance a Uver: Czech Journal of Economics & Finance, 73(4).

Chmura, R. (2023b). Stabilizing, neutral or destabilizing? The impact of fiscal rules on the GDP volatility in the EU countries. *Bank i Kredyt*, *54*(5), 475-498.

Chmura, R., Kelm, R., Kębłowski, P., Sobiech Pellegrini, I., Wesołowska, M., & Fabiański, Sz. (2024), Nowy Ekonometryczny Model Finansów Publicznych (NEMPF), MF Opracowania i Analizy, Ministerstwo Finansów,

Combes, J. L., Minea, A., & Sow, M. (2017). Is fiscal policy always counter-(pro-) cyclical? The role of public debt and fiscal rules. *Economic Modelling*, *65*, 138-146.

Council of European Union (1997a): Council Regulation No 1466/97 of 7 July 1997 on the Strengthening of the Surveillance of Budgetary Positions and the Surveillance and Coordination of Economic Policies.

http://data.europa.eu/eli/reg/1997/1466/oj

Council of European Union (1997b): Council Regulation no 1467/97 of 7 July 1997 on Speeding Up and Clarifying the Implementation of the Excessive Deficit Procedure.

http://eurlex.europa.eu/eli/reg/1997/1467/oj

Council of European Union (2011): Council Directive 2011/85/EU of 8 November 2011 on Requirements for Budgetary Frameworks of the Member States.

http://data.europa.eu/eli/dir/2011/85/oj

Council of European Union (2024): Regulation No 2024/1263 of the European Parliament and of the Council of 29 April 2024 on the effective coordination of economic policies and on multilateral budgetary surveillance and repealing Council Regulation (EC) No 1466/97

https://eur-lex.europa.eu/eli/reg/2024/1263/oj

Caselli, F., & Reynaud, J. (2020). Do fiscal rules cause better fiscal balances? A new instrumental variable strategy. *European Journal of Political Economy*, *63*, 101873.

De Biase, P., & Dougherty, S. (2022). The past and future of subnational fiscal rules: An analysis of fiscal rules over time. *OECD Working Papers on Fiscal Federalism*, (41), 1-51.

Debrun, X., Moulin, L., Turrini, A., Ayuso-i-Casals, J., & Kumar, M. S. (2008). Tied to the mast? National fiscal rules in the European Union. *Economic Policy*, *23*(54), 298-362.

Delgado-Téllez, M., Gordo, E., Kataryniuk, I., & Pérez, J. J. (2022). The decline in public investment:``social dominance’’or too-rigid fiscal rules?. *Applied Economics*, *54*(10), 1123-1136.

Eyraud, Luc, Xavier Debrun, Andrew Hodge, Victor Lledó, and Catherine Pattillo. 2018. *“Second-Generation Fiscal Rules: Balancing Flexibility, Simplicity, and Enforceability.”* IMF Staff Discussion Note SDN/18/04. Washington, DC: International Monetary Fund.

Fagan, G., Henry, J., & Mestre, R. (2005). An area-wide model for the euro area*, Economic Modelling*, 22(1), 39-59.

Fatás, A., & Mihov, I. (2006). The macroeconomic effects of fiscal rules in the US states. *Journal of Public Economics*, *90*(1-2), 101-117.

Guerrieri, L., Iacoviello, M. (2015), OccBin: A toolkit for solving dynamic models with occasionally binding constraints easily, Journal of Monetary Economics, 70, pp. 22-38,

Heinemann, F., Moessinger, M. D., & Yeter, M. (2018). Do fiscal rules constrain fiscal policy? A meta-regression-analysis. *European Journal of Political Economy*, *51*, 69-92.

Herranz, M.M., & Turino, F. (2023), Tax evasion, fiscal policy and public debt: Evidence from Spain, Economic Systems, 47(3), pp. 1011-21.

Honjo, K. (2007), The Golden Rule and the Economic Cycles. IMF Working Paper No. 07/199.

International Monetary Fund. 2018. *Fiscal Monitor: Capitalizing on Good Times.* Washington, DC, April.

International Monetary Fund. 2021. *Fiscal Monitor: A Fair Shot.* Washington, DC, April.

Johansen, S. (1988). Statistical Analysis of Cointegration Vectors, *Journal of Economic Dynamics and Control*, vol. 12, 231-254.

Johansen, S. (1995). Likelihood-Based Inference in Cointegrated Vector Auto-Regressive Models, Oxford University Press, New York.

Juselius, K. (2006). The Cointegrated VAR Model, Oxford University Press, New York.

Kelm, R., Fabiański, Sz. (2024), Wpływ regulacji prawnych na dochody z VAT w Polsce: analiza empiryczna 2005-2022, Studia Prawno-Ekonomiczne, 130(5), s. 97-126.

Kelm, R., Sobiech Pellegrini, I. (2023), Imported Inflation and the Wage-Proce Nexus in Poland, Gospodarka Narodowa. The Polish Journal of Economics, 3(315), pp. 48-70.

Kliem, M. & Kriwoluzky, A. (2014), Toward a Taylor rule for fiscal policy, Review of Economic Dynamics, 17(2), pp. 294-302.

Kopits, M. G., & Symansky, M. S. A. (1998). *Fiscal policy rules*. International Monetary Fund.

Levinson, A. (1998). Balanced budgets and business cycles: Evidence from the states. *National Tax Journal*, *51*(4), 715-732.

Maltritz, D., & Wüste, S. (2015). Determinants of budget deficits in Europe: The role and relations of fiscal rules, fiscal councils, creative accounting and the Euro. *Economic Modelling*, *48*, 222-236.

Muth, J.F. (1961), Rational Expectations and the Theory of Price Movements, Econometrica, 29(3), pp. 315-335.

Nerlich, C., & Reuter, W. H. (2013). The design of national fiscal frameworks and their budgetary impact. Working Paper Series 1588, European Central Bank.

Orsi, R., Raggi, D. and Turino, F. (2014), Size, trend, and policy implications of the underground economy, Review of Economic Dynamics, 17, pp. 417-436.

Ramey, V. (2019), Ten Years After the Financial Crisis: What Have We Learned from the Renaissance in Fiscal Research?, Journal of Economic Perspectives, 33(2), pp. 89-114.

Schaechter, M. A., Kinda, M. T., Budina, M. N., & Weber, A. (2012). Fiscal Rules in Response to the Crisis: Toward the" Next-Generation" Rules: A New Dataset. International Monetary Fund.

Thygesen, N., Beetsma, R., Bordignon, M., Duchêne, S., & Szczurek, M. (2019). Assessment of EU fiscal rules with a focus on the six and two-pack legislation. *European Fiscal Board Report*.

Wyplosz C. (2002). Fiscal Discipline in EMU: Rules or Institutions? Paper prepared for the April 16, 2002 meeting of the Group of Economic Analysis of the European Commission.