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The effects of austerity on fiscal prudence: the role of private indebtedness and private investment

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The effects of austerity on fiscal prudence: the role of private indebtedness and private investment•

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Abstract

Using a newly constructed narrative dataset of fiscal adjustments for 17 advanced and 12 developing economies from 1980 to 2020, this paper investigates the effectiveness of fiscal consolidations in reducing public debt and how their outcomes depend on the level of private indebtedness and private investment, using state-dependent local projection methods. I find that a 1% of GDP fiscal adjustment translates to a reduction in public debt by 2.76% over the medium term, with the effects varying across economic contexts. Consolidations are more effective in economies with low private debt or high private investment, whereas high private indebtedness or weak investment conditions limit or even reverse the effect. Initial fiscal positions, sovereign default risk, and central bank independence further shape outcomes, with stronger debt reductions observed in low-debt, high-risk, and high-independence states. The composition of fiscal adjustments also matters, as spending-based adjustments reduce public debt more effectively than tax-based adjustments. These results underscore the importance of accounting for private sector dynamics and institutional factors when designing fiscal consolidation strategies.

JEL: E62; H60; H63

Keywords: Fiscal policy; Public debt; Fiscal adjustment; Private debt; Private investment

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Οι επιπτώσεις της λιτότητας στη δημοσιονομική σύνεση: ο ρόλος της ιδιωτικής υπερχρέωσης και των ιδιωτικών επενδύσεων

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Περίληψη

Χρησιμοποιώντας ένα νέο αφηγηματικό σύνολο δεδομένων δημοσιονομικών προσαρμογών για 17 ανεπτυγμένες και 12 αναπτυσσόμενες οικονομίες κατά την περίοδο 1980–2020, το άρθρο διερευνά την αποτελεσματικότητα των δημοσιονομικών προσαρμογών στη μείωση του δημόσιου χρέους και εξετάζει πώς τα αποτελέσματά τους εξαρτώνται από το επίπεδο της ιδιωτικής υπερχρέωσης και των ιδιωτικών επενδύσεων, αξιοποιώντας μεθόδους τοπικών προβολών εξαρτώμενων από την κατάσταση της οικονομίας. Βρίσκω ότι μια δημοσιονομική προσαρμογή της τάξεως του 1% του ΑΕΠ οδηγεί, σε μείωση του δημόσιου χρέους κατά 2,76% σε μεσοπρόθεσμο ορίζοντα, με την ένταση της επίδρασης να διαφοροποιείται ανάλογα με το οικονομικό περιβάλλον. Οι δημοσιονομικές προσαρμογές αποδεικνύονται περισσότερο αποτελεσματικές σε οικονομίες που χαρακτηρίζονται από χαμηλά επίπεδα ιδιωτικού χρέους ή υψηλή ιδιωτική επενδυτική δραστηριότητα, ενώ η υψηλή ιδιωτική υπερχρέωση ή οι ασθενείς επενδυτικές συνθήκες περιορίζουν ή ακόμη και αντιστρέφουν την επίδρασή τους στη μείωση του δημόσιου χρέους. Οι αρχικές δημοσιονομικές συνθήκες, ο κίνδυνος κρατικής αθέτησης και ο βαθμός ανεξαρτησίας της κεντρικής τράπεζας διαμορφώνουν περαιτέρω τα αποτελέσματα των προσαρμογών. Ισχυρότερες μειώσεις του δημόσιου χρέους παρατηρούνται σε οικονομίες με χαμηλότερα αρχικά επίπεδα χρέους, υψηλότερο αντιλαμβανόμενο κίνδυνο κρατικής χρεοκοπίας και μεγαλύτερο βαθμό ανεξαρτησίας της κεντρικής τράπεζας. Η σύνθεση των δημοσιονομικών προσαρμογών αποδεικνύεται επίσης κρίσιμη, καθώς οι προσαρμογές που βασίζονται κυρίως στη μείωση των δαπανών μειώνουν το δημόσιο χρέος αποτελεσματικότερα σε σύγκριση με εκείνες που στηρίζονται κυρίως σε φορολογικά μέτρα. Συνολικά, τα αποτελέσματα υπογραμμίζουν τη σημασία της συνεκτίμησης των δυναμικών του ιδιωτικού τομέα και των θεσμικών παραγόντων κατά τον σχεδιασμό και την εφαρμογή στρατηγικών δημοσιονομικής προσαρμογής.

Λέξεις κλειδιά: Δημοσιονομική πολιτική, Δημόσιο χρέος, Δημοσιονομική προσαρμογή; Ιδιωτικό χρέος; Ιδιωτικές επενδύσεις

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1 Introduction

The COVID-19 pandemic triggered an unprecedented global fiscal expansion as governments sought to cushion households and firms from its economic fallout. Consequently, public debt ratios surged across advanced and emerging economies, raising concerns about fiscal sustainability. In addition, the subsequent Russian invasion of Ukraine in early 2022 disrupted the post-pandemic recovery and unleashed a severe energy crisis, further fueling inflationary pressures. To mitigate the impact of soaring prices on businesses and households, many governments introduced additional fiscal support measures, which again amplified fiscal risks. Against this backdrop, and amid mounting debt sustainability challenges, many countries will, sooner or later, need to implement austerity measures to correct their fiscal positions and place public debt ratios on a sustainable downward trajectory.

In addition, demographic ageing and climate change have also moved to the forefront of policy agenda. Both developments are expected to exert additional and persistent pressure on public finances, posing significant risks to debt sustainability if no timely and well-designed measures are adopted (see e.g., Rogoff, 2022; IMF, 2023; Koutsogeorgopoulou and Morgavi, 2025). The fiscal consequences stem not only from the need to strengthen pension and healthcare systems in ageing societies, but also from the increasing frequency and intensity of climate-related disasters, which will require substantial emergency spending and long-term investment in resilience and adaptation (European Commission, 2024).

The motivation for this paper comes from three related strands of research. First, I extend the existing empirical literature on the macroeconomic impact and the drivers of public debt in the weak of fiscal adjustments (Alesina and Perotti, 1997; Baldacci et al., 2012; Guajardo et al., 2014; Alesina et al., 2015; Beetsma et al., 2015; Jordà and

Taylor, 2016; Carrière-Swallow et al., 2021; Ando et al., 2025; Patel and Peralta-Alva, 2025). While much of the literature on sovereign debt focuses on drivers derived from mechanical decompositions of debt-to-GDP changes, such as interest expenditures, the primary balance, and GDP growth (see e.g., Hall and Sargent, 2011; Cochrane, 2019), they also shed little light on the fundamental shocks or causal mechanisms underlying debt dynamics. Furthermore, this strand complements strategies for debt-reduction (see e.g., Reinhart et al., 2015; Eichengreen et al., 2019; Kose et al., 2022a), which has examined both conventional approaches, such as growth and fiscal consolidation, and more other mechanisms, including debt restructuring, unexpected inflation, or financial repression, by offering systematic evidence on the role of fiscal policy and the circumstances in which it is most effective.

Second, this paper contributes to the literature that highlights the crucial role of private indebtedness in shaping the transmission of fiscal policy. Theoretical studies (see e.g., Eggertsson and Krugman, 2012; Kaplan and Violante, 2014) found that the effectiveness of fiscal interventions is amplified when households face high levels of debt, a prediction that is supported by empirical evidence showing that the impact of fiscal adjustments is stronger in periods characterized by private-debt overhang (see e.g., Klein, 2017). These studies build on the seminal work of Mian and Sufi (2011), who found that U.S. counties with the large pre-crisis increases in housing leverage experienced the steepest declines in demand and employment, while Jordà et al. (2016) found that private credit booms, rather than excessive public borrowing or the level of public debt, are the primary predictors of financial instability.

Third, I contribute to the existing literature by examining the effects of fiscal policy on debt dynamics, with particular focus on private investment as a key channel through which fiscal interventions operate. Contrary to earlier studies that primarily examine

the effects of fiscal policy on consumption (see e.g., Sutherland, 1997; Perotti, 1999, Tagkalakis, 2008). Alesina et al. (2002) in their seminal work, stress out the importance of analyzing the effects of fiscal policy on business investment. They found that fiscal policy changes significantly influence private investment, especially through primary government spending, which affects wages, profits, and investment. These responses help explain expansionary fiscal contractions and underscore the role of expected profits and the credibility of austerity measures.

The closest studies to this article are the studies of Klein (2017), Ando et al. (2025) and Patel and Peralta-Alva (2025). However, my paper departs from these studies in two main dimensions. First, building on a newly narrative dataset of fiscal consolidations as constructed by Adler et al. (2024) to better identify exogenous changes in fiscal policy, I examine to what extent does fiscal consolidation and its composition succeed in achieving persistent reductions in debt-to-GDP ratios. Second, I examine the role of private indebtedness and private investment in shaping the effects of austerity measures and their composition on public debt. In particular, I investigate whether the degree of private leverage and the dynamics of investment influence the effectiveness of fiscal consolidation in achieving a durable reduction in the public debt-to-GDP ratio.

To examine how the effects of fiscal adjustments vary across different economic conditions, I estimate state-dependent impulse responses to exogenous changes in the government budget deficit using a newly constructed narrative data set by Adler et al. (2024) to address potential endogeneity and reverse causality issues related to the definition of fiscal adjustments. This dataset, covering the period 1980–2020 for 17 advanced and 12 developing economies, identifies fiscal policy changes motivated by the aim of reducing the budget deficit rather than by contemporaneous or anticipated

economic developments. The analysis is conducted through the dynamic difference-in-differences local projection (LP) method, as pioneered by Jordà (2005).

I find that a 1% of GDP fiscal adjustment depresses public debt by 2.76% over the medium term. Consolidations are more effective in economies with low private debt or high private investment, while high private indebtedness or weak investment conditions limit or even reverse these effects. Initial fiscal positions also matter, since countries with lower debt ratios experience stronger debt reductions, whereas high-debt economies see muted effects. Sovereign default risk and central bank independence further shape outcomes, with high-risk states and countries with independent central banks exhibiting more pronounced debt reductions. Finally, the composition of fiscal adjustments is relevant, as spending-based consolidations tend to reduce debt more effectively than tax-based measures.

The remainder of the paper is structured as follows: Section 2 discusses the theoretical framework. Section 3 presents the data and methodology. Section 4 reports the baseline findings, various robustness checks and discusses whether the results depend on the composition of fiscal adjustments. Section 5 provides additional channels that influence the baseline findings, while Section 6 concludes.

2 Theoretical framework

In this section I present how fiscal consolidations affect debt-to-GDP ratios. To keep the analysis simple, I adopt several simplifying assumptions, such as treating the stock of debt as having a one-year maturity and I assume that debt dynamics are driven solely by the interest rate and the primary balance. The starting point could be described from the debt dynamics equation:

$$d_t = (1 + r_t)_t * d_{t-1} - pb_t + sfa_t \ (1)$$

Where d_t represent the stock of debt in nominal terms, pb_t the primary balance in nominal terms, sfa_t the stock-flow adjustments (which account, for below-the-line operations, valuation effects from exchange rate fluctuations and other accounting adjustments), i.e., the part of debt change that not explained by the "flow" of the primary balance and interest payments. In addition, y_t is nominal GDP, and r_t is the nominal effective interest rate, we can derive the following expression for the evolution of public debt:

$$\Delta \ln(d_t) \approx r_t - \frac{pb_t}{d_{t-1}} \ (2)$$

Using the definition of the fiscal multiplier ($m_y > 0$), we can express GDP growth as a function of changes in the primary balance:

$$\Delta \ln(y_t) \approx - m_y * \frac{\Delta\, pb_t}{y_{t-1}} \ (3)$$

From equations (2) and (3), we obtain:

$$\Delta \ln\left(\frac{d_t}{y_t}\right) = \Delta\, lnd_t - \Delta\, lny_t = r_t - \frac{pb_{t-1}}{d_{t-1}} + \frac{\Delta\, pb_t}{y_{t-1}} * \left(m_y - \frac{y_{t-1}}{d_{t-1}}\right) (4)$$

Equation (4) indicates that the debt ratio declines as a result of a fiscal adjustment episode ($\frac{\Delta\, pb_t}{y_{t-1}}$) whenever the following condition is satisfied:

$$m_y * \frac{d_{t-1}}{y_{t-1}} < 1 \quad (5)$$

From this condition, two important implications arise. First, the magnitude of the fiscal multiplier is a crucial factor in determining whether fiscal consolidations succeed in lowering debt-to-GDP ratios. Specifically, larger multipliers reduce the likelihood that a consolidation will decrease the debt ratio, due to the denominator effect. Second, higher initial debt ratios, "*ceteris paribus"*, tend to weaken the debt-reducing effectiveness of consolidations. This mainly reflects stronger denominator effects and less favorable debt dynamics, rather than a mechanically smaller impact of a given primary balance adjustment on the level of debt.

3 Data and Methodology

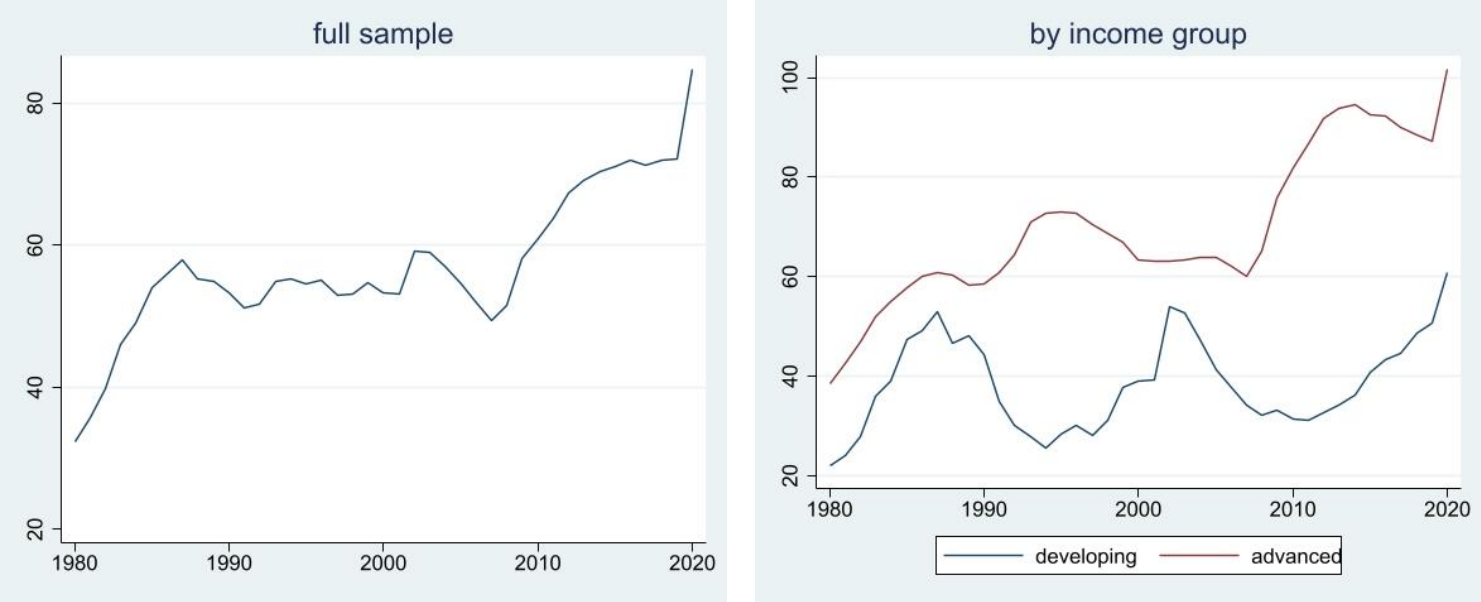
3.1 Data

The implications of the theoretical discussion are examined using an unbalanced panel of yearly data of 29 countries,17 advanced and 12 developing economies, from 1980 to 2020.[1] The macroeconomic variables are taken from the IMF WEO database, the "*Public Finances in Modern History*" database compiled by Mauro et al. (2015), the IMF Fiscal Monitor database and the World Bank. The main explanatory variable is the debt-to-GDP ratio, which provides a comprehensive measure of a country's fiscal position and long-term sustainability.

[1] **Advanced economies:** Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Italy, Japan, Netherlands, Portugal, Spain, Sweden, United Kingdom and United States.
Developing economies: Argentina, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, Guatemala, Mexico, Paraguay, Peru and Uruguay.

Figure 1 presents the evolution of debt-to-GDP ratio. This recent period of debt hikes reflects a recurring historical pattern. In the 1980s, public debt ratios rose sharply, driven largely by policy-induced welfare expansions, tax reforms, and fiscal stimulus measures. The 1990s, in contrast, witnessed a decline in debt ratios, supported by targeted fiscal reforms and favorable macroeconomic conditions. The global financial crisis of 2008-2009 triggered yet another surge, underscoring the ongoing tension between the pursuit of fiscal stimulus and the maintenance of debt sustainability.

Figure 1. Evolution of public debt ratio.



Notes: IMF World Economic Outlook Database.

As regards the variable of interest, a key contribution of this paper is the use of the newly constructed narrative dataset of fiscal adjustment episodes compiled by Adler et al. (2024) to analyze policymakers' efforts to reduce budget deficits. The use of this narrative database is driven by concerns that conventional statistical approaches to identify fiscal consolidations may understate their contractionary effects. Traditional measures, such as the cyclically adjusted primary balance (CAPB), include shifts in fiscal variables unrelated to governments decisions, including swings in asset or

commodity prices, or discretionary responses to current macroeconomic conditions, potentially biasing estimates. Another limitation is that fluctuations in the CAPB may capture deliberate policy reactions to prevailing macroeconomic conditions, for instance, fiscal easing in response to an emerging recession (Adler et al., 2024). As Romer and Romer (2010) note, this can bias estimates downward, leading to an understatement of the true causal effects of fiscal policy changes. In addition, structural vector autoregression (SVAR) models, while attempting to isolate discretionary fiscal shocks, similarly assume that, after controlling for output lags, changes in fiscal variables are uncorrelated with other short-term developments, overlooking nonpolicy influences and forward-looking policy responses.

Hence, this dataset contains 309 fiscal adjustment episodes for 17 advanced and 12 developing economies over the period 1980 to 2020. Another important element for this dataset is that it contains information regarding the composition of fiscal actions, i.e. reports the changes in the government budget deficit based on discretionary changes in taxes and public spending. Hence, from 309 fiscal consolidation episodes, 130 are categorized as tax-based and 179 are classified as spending-based fiscal adjustment. Adler et al. (2024) report that the construction of this dataset is an extension of earlier works (such as Romer and Romer, 2010; Leigh et al., 2011; Ramey, 2011; Alesina et al., 2018), by identifying fiscal measures aimed primarily at deficit reduction, based on policymakers' intentions documented in contemporaneous policy documents.[2] Such measures respond to past decisions and economic conditions, making them largely

[2] Policy documents include budget reports, central bank publications, Convergence and Stability Programmes, IMF reports, and OECD Economic Surveys, which document both policymakers' motives and the budgetary impact of measures.

exogenous to short-term output fluctuations and suitable for estimating fiscal consolidation effects.

Regarding the remaining control variables, following previous studies (see e.g., Carrière-Swallow et al., 2021; Ando et al., 2025; Patel and Peralta-Alva, 2025), I use the real GDP growth, the inflation rate (based on GDP deflator, the primary balance as a % of GDP, the real long-term interest rates and the trade openness. Table 1 presents the summary statistics of the variables used in the analysis.

Table 1. Summary statistics

VARIABLES	(1) N	(2) mean	(3) sd	(4) min	(5) max
Private investment	1,140	17.53	3.584	4.851	43.32
Fiscal adjustment	1,189	0.265	0.683	-0.900	5.230
Tax-based adjustment	1,189	0.113	0.376	-1	3.100
Spending-based adjustment	1,189	0.152	0.438	-0.500	3.755
Real GDP growth	1,188	2.451	3.337	-13.59	24.62
Private debt	1,141	107.4	70.97	8.407	349.3
Primary balance	1,150	-0.0397	3.267	-29.92	13.09
Public debt	1,158	57.26	35.09	3.901	258.4
Real long-term interest rate	1,027	5.470	8.664	-62.77	93.92
Trade openness	1,189	61.39	34.05	11.55	250.1
Inflation	1,137	9.061	28.21	-34.00	394.5

Notes: This table reports the summary statistics of the variables employed in the analysis.

3.2 Methodology

To examine the effects of fiscal adjustments on public debt depending on the state of the economy, I follow Auerbach and Gorodnichenko (2013), Owyang et al. (2013), Klein (2017), Carrière-Swallow et al., (2021) and Chrysanthakopoulos and Tagkalakis (2024) in estimating state-dependent impulse responses to exogenous innovations in the public budget deficit by means of the LP method of Jordà (2005). In recent years, this approach has gained prominence as a tool for estimating nonlinear effects in applied macroeconomics. Compared with Vector Autoregressions (VARs) models, LPs offer

several advantages, since they can be estimated using simple regression techniques, display greater robustness to model misspecification, facilitate both pointwise and joint analytical inference, and provide a simple framework to capture state-dependent effects. Consequently, LPs serve as a natural and flexible alternative to VARs for deriving impulse responses (see Klein, 2017; Ramey and Zubairy, 2018; Jordà and Taylor, 2025).

In order to examine how the effects of fiscal adjustments on public debt vary across different economic conditions and more specifically based on private debt and investment. Hence, I classify country-year observations as being in a high private debt state when they are above the sample median of the private debt ratio (107.37%), and as being in a low public debt state when they are below the sample median. In addition, I classify country-year observations as being in a high private investment country when they are above the sample median of the private investment to GDP ratio (17.60%), and as being in a low private investment country when they are below the sample median.[3]

To this end, the starting point of the analysis is to estimate the effects of fiscal consolidation on public debt. Therefore, I estimate a baseline specification of the form:[4]

$$debt_{it+h} - debt_{it-1} = \psi_{Ah}(L)[a^h + a_1^h X_{it-1}] + a_2^h shock_{it} + \eta_i^h + \lambda_t^h + \varepsilon_{it}^h \quad (6)$$

Where η_i^h and λ_t^h are country and time fixed effects to control for unobserved heterogeneity and global shocks respectively, ε_{it}^h is the error term and $\psi_{Ah}(L)$ is a polynomial in the lag operator. The dependent variable, i.e. $debt_{it+h} - debt_{it-1}$ signify the cumulative change in the debt-to-GDP ratio for forecast horizons h taking

[3] Private debt to GDP ratio is taken from the IMF "*Global Debt dataset*", while private investment to GDP ratio is taken from the IMF "*Investment and Capital Stock Dataset*".
[4] For the sake of simplicity, I assume that the stock-flow adjustment is zero (as in Chrysanthakopoulos and Tagkalakis, 2024).

values 0 up to 5 years ahead (h = 0 is the year of the exogenous shock of a fiscal consolidation episode). Equation (6) also includes a vector of control variables, i.e., X_{it-1}, which includes the first lag of the dependent variable, the first lag of the inflation rate, the first lag of the trade openness, the first lag of the real GDP growth, the first lag of the real long-term interest rates and the first lag of the primary balance. a^h is a vector of constants. $shock_{it}$ are the narrative fiscal adjustment episodes, i.e. changes in the government budget deficit.

To examine the effects of fiscal adjustments on public debt depending on private debt and private investment, I extend equation (6) which takes the form:

$$
\begin{aligned}
debt_{it+h} - debt_{it-1} \\
&= I_{it-1}\left[\psi_{Ah}(L)\left[a^h + a^h_{1A}X_{it-1}\right] + a^h_{2A}shock_{it}\right] \\
&+ (1 - I_{it-1})\left[\psi_{Bh}(L)\left[a^h + a^h_{1B}X_{it-1}\right] + a^h_{2B}shock_{it}\right] + \eta^h_i + \lambda^h_t \\
&+ \varepsilon^h_{it} \quad (7)
\end{aligned}
$$

Where equation (7) includes the first lag of the transition variable I_{it-1}, in order to minimize the correlation between the series of exogenous shocks (i.e., fiscal adjustments) and changes in the indicator variable, thus, producing robust impulse responses. The coefficients a^h_{2A} and a^h_{2B} provide the state-dependent responses of the variable $debt_{it+h} - debt_{it-1}$.

Equations (6) and (7) are estimated by means of OLS estimator with country and time fixed effects with standard errors clustered at country level to account for potential heteroskedasticity and within-country correlation of observations.

4 Empirical findings

Before I proceed with the baseline findings, I will examine whether the narrative approach of fiscal policy changes is orthogonal to output movements as in Alesina et al. (2018) and Carrière-Swallow et al. (2021). To this end, I construct a measure of economic news based on real-time revisions to forecasts of real GDP published in vintages of the IMF's WEO macroeconomic forecasts. This variable is defined as the revision to the forecast for current year GDP made in the fall of year t relative to the forecast made in the fall of the previous year (t−1), as it follows:

$$news_{i,t} = forecast\_gdp_{i,t,t}^{fall} - forecast\_gdp_{i,t,t-1}^{fall}$$

Next, I estimate an equation between the narrative fiscal shocks and unexpected movements in output, of the form:

$$narrative\ fiscal\ shock_{i,t} = +a * news_{it} + \eta_i + \lambda_t + \varepsilon_{i,t} \quad (8)$$

Table 2 reports the results. As shown in Table 1, the narrative fiscal policy changes do not appear to be significantly associated with unanticipated movements in economic activity. The coefficient on the news variable is close to zero and is statistical insignificant which is in line with Carrière-Swallow et al. (2021), validating its exogeneity.[5]

Table 2. Orthogonality checks of fiscal policy shocks to economic news.

	$\hat{a}$	R-squared
Full sample	0.00247	0.126
	(0.0132)	
High private debt	0.0223	0.279
	(0.0262)	
Low private debt	0.00683	0.091

[5] It should be noted that while narrative fiscal shocks are independent of present economic fluctuations, they may still be related to past conditions. Given that the identified fiscal consolidations are intended to correct budget deficits, a degree of correlation with historical trends is plausible.

	(0.0155)	
High private investment	0.000290	0.160
	(0.0394)	
Low private investment	-0.0183	0.150
	(0.0282)	

Notes: Standard errors clustered at country level. Country and time fixed effects are included. *** p<0.01, ** p<0.05, * p<0.1

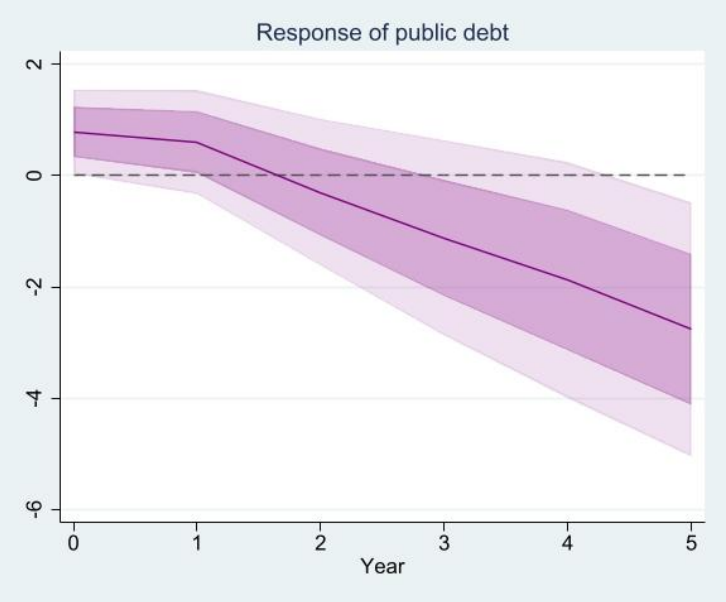
4.1 Baseline results

Figures 2 and 3 report the results based on equations (6) and 7 respectively. The solid line depicts the cumulative response of public debt from year t=0 to year t+5, in response to exogenous changes in the government budget deficit (i.e. fiscal consolidation) at t=0. The lighter, purple-shaded area corresponds to the 90% confidence bands, and the darker, purple-shaded area corresponds to the 68% confidence bands.

I find that a 1% reduction in the government budget deficit leads to a 2.76% decline in public debt 5 years after the fiscal consolidation shock (see Figure 2). This result contrasts with the findings of Ando et al. (2025), who report that fiscal adjustments exert only a minimal impact on debt-to-GDP ratios. When private debt is low, the reduction in public debt remains modest and statistically insignificant, amounting to approximately 1.31% 5 years after the implementation of fiscal adjustment measures. In contrast, consolidations undertaken during periods of high private indebtedness yield an even smaller and insignificant decline in public debt, accumulating to less than 1% at the end of the forecast horizon (see Figure 3, left panel). Regarding private investment, the results suggest that in economies with low private investment, fiscal consolidation does not lead to a medium-term reduction in public debt. Conversely, in countries characterized by high levels of private investment, public debt declines substantially by 2.99% 5 years after the fiscal adjustment (see Figure 3, right panel).

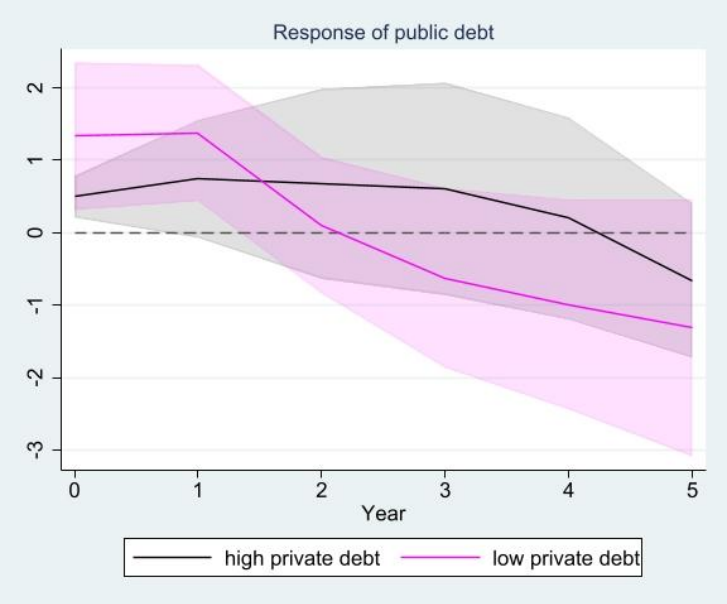
These findings suggest that the effectiveness of fiscal consolidations in reducing public debt critically depends on the broader macro-financial environment, particularly the state of private investment activity. The limited impact of consolidation during periods of high private indebtedness implies that private-sector balance sheet stress may hinder the transmission of fiscal policy, as households and firms prioritize deleveraging over investment and consumption (Eggertsson and Krugman, 2012; Mian and Sufi, 2022). This debt overhang effect weakens aggregate demand, thereby reducing the fiscal multiplier and slowing the pace of debt reduction. Conversely, when private investment is strong, fiscal consolidations appear more effective in lowering public debt, possibly due to higher private-sector confidence and improved growth prospects that support revenue generation (Alesina et al., 2015; Beetsma et al., 2015). The results thus highlight the importance of considering financial conditions and investment dynamics when designing strategies, as fiscal adjustments undertaken in adverse balance-sheet environments may prove largely self-defeating in achieving debt sustainability.

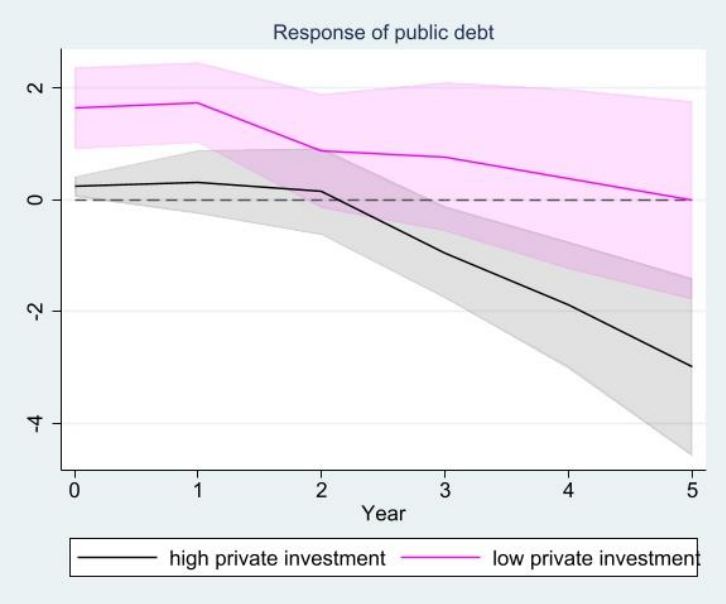
Figure 2. Response of debt-to-GDP ratio to 1% GDP shock of fiscal consolidation.



Notes: Shaded areas indicate the 68% (darker – purple colour) and 90% (lighter – purple colour) confidence bands.

Figure 3. Response of debt-to-GDP ratio to 1% shock of fiscal consolidation based on private debt and investment.





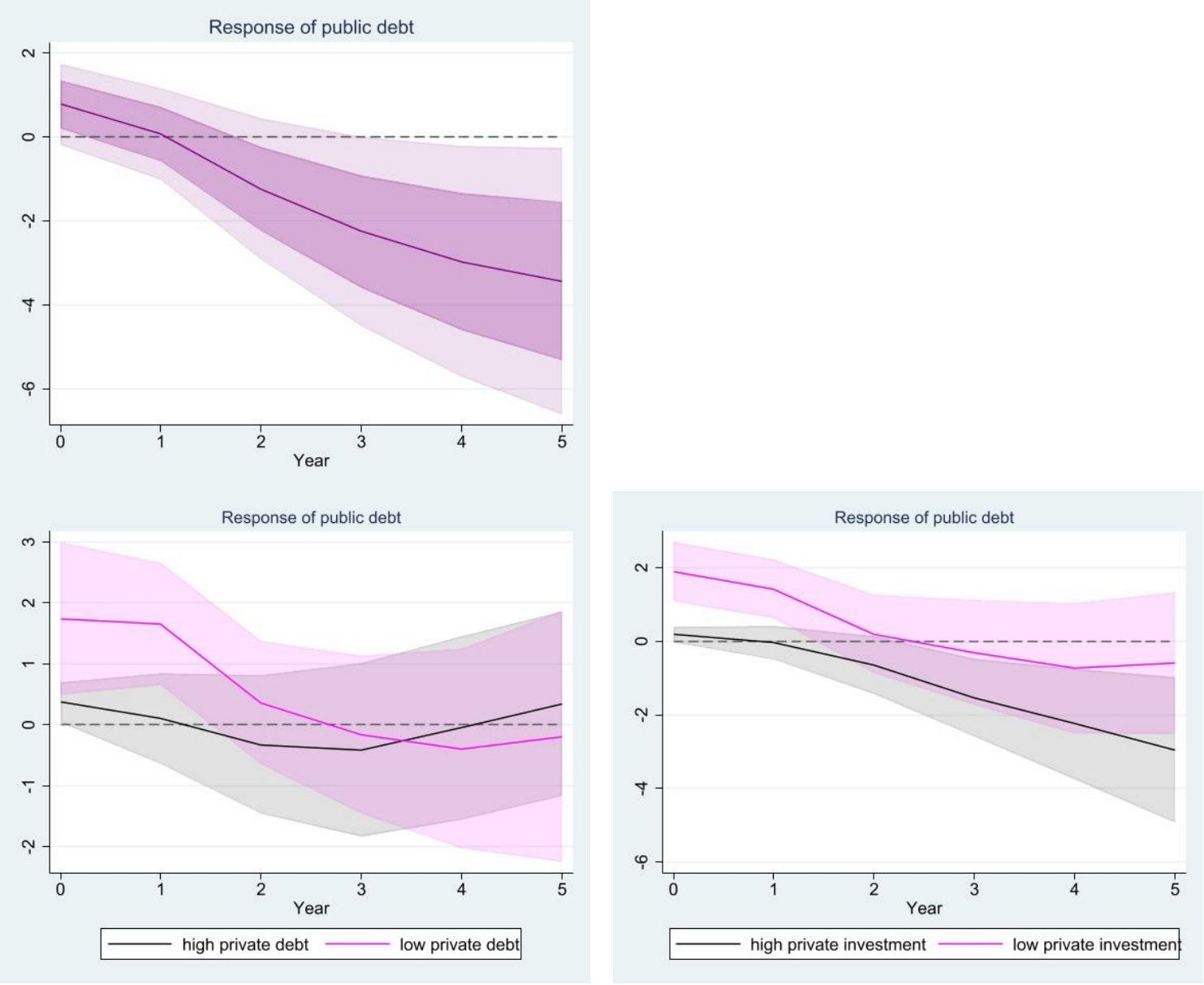
Notes: Shaded areas indicate the 90% confidence bands.

4.2 Robustness checks

4.2.1 Excluding outliers

As a first robustness check to assess the validity of the baseline findings, I check to what extent the results are influenced by the presence of outliers. While episodes of particularly large or small fiscal adjustments are of interest, it is important to assess the extent to which they influence the findings reported in Figures 2 and 3. To this end, I re-estimate the baseline specifications after excluding the top and bottom 1% of austerity measures. As shown in Figure 4, the results from this trimmed sample closely align with those reported earlier, indicating that the baseline evidence reported in sub-section 4.1 is not driven by extreme observations.

Figure 4. Response of debt-to-GDP ratio to 1% GDP shock of fiscal consolidation.



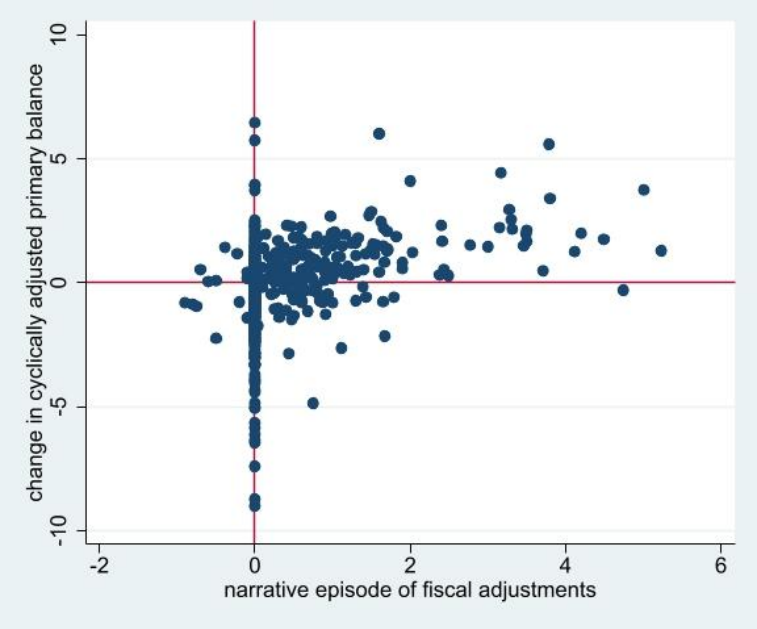
Notes: Shaded areas indicate the 90% confidence bands. Top row: full sample; Bottom row: left panel based on private debt and right panel based on private investment.

4.2.2 Alternative identification with IV instruments

Next, I follow the methodology proposed by Ramey and Zubairy (2018) and the narrative fiscal shocks are used as instruments for changes in the CAPB, which is the standard measure of the discretionary fiscal policy stance. The instrumental variable approach is particularly appealing, as it allows not only to address potential measurement errors but also to rigorously assess the strength of the instrument in

capturing exogenous shifts in fiscal policy. This approach also mirrors Mertens and Ravn (2014), who treat narrative fiscal changes as "*proxy measures*" for structural fiscal shocks, thereby providing a transparent and economically meaningful way to isolate the causal effects of fiscal interventions. Figure 5 plots the narrative fiscal adjustment episodes and the changes in the CAPB. The two variables are strongly correlated. However, some observations show discrepancies between the CAPB-based and narrative measures regarding both the presence and size of fiscal adjustments. This suggests that the narrative approach more accurately captures deficit-driven consolidations, with differences mainly reflecting economic or budgetary factors that cause the CAPB measure to misestimate their true magnitude.

Figure 5. Two measures of fiscal consolidation: Change in CAPB (% of potential GDP) versus narrative fiscal shocks (% of GDP).



Notes: Own construction.

Hence, equations (6) and (7) are estimated by means of 2SLS estimator with instrumental variables technique, where the change in CAPB is instrumented by the narrative fiscal consolidations variable at time t.

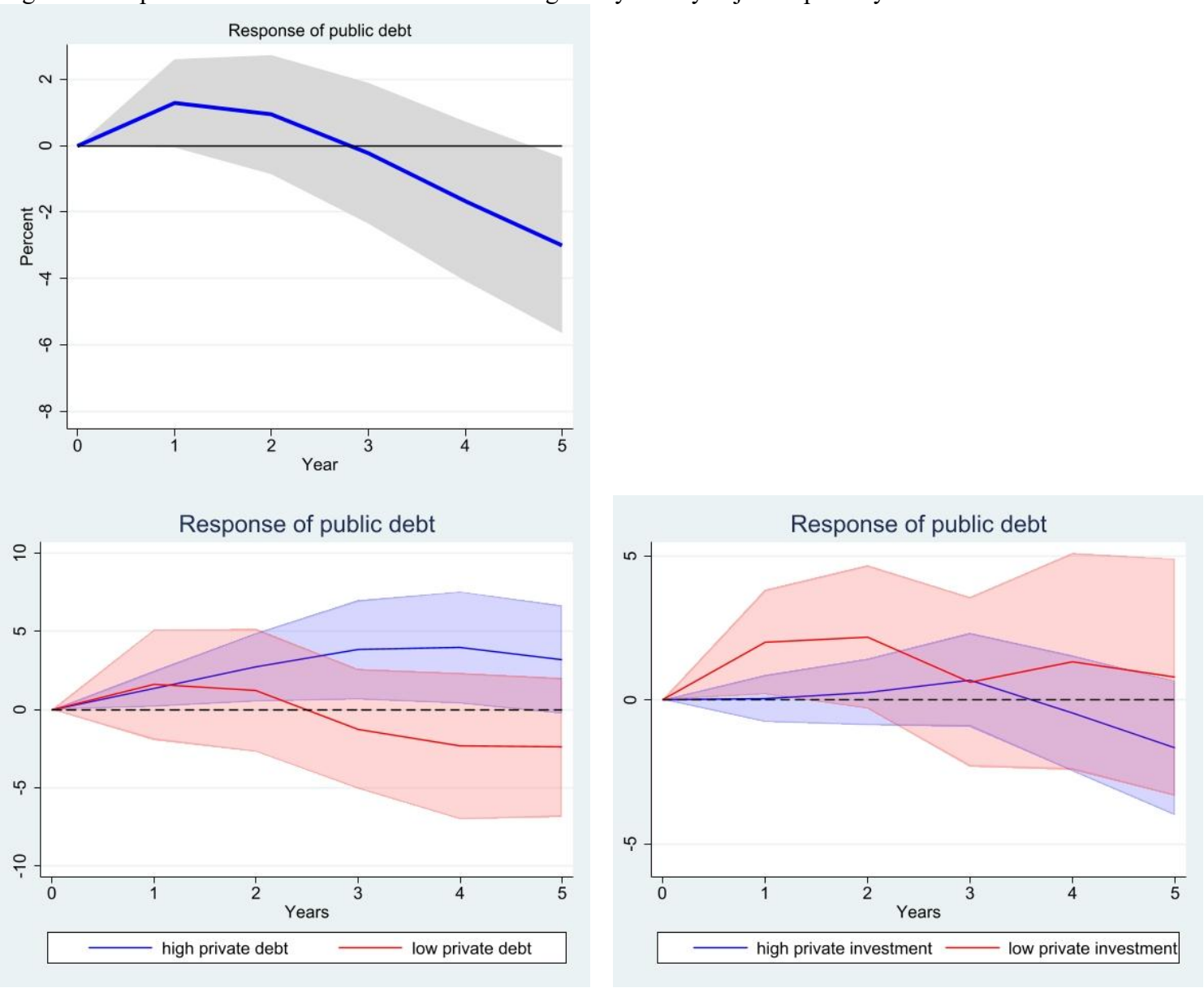
Table 3 reports the relevant diagnostic statistics of the first-stage regressions to assess the validity of the chosen instruments. The high values of the Cragg-Donald F-statistics confirm the strength and validity of the narrative fiscal adjustments as instruments, while the rejection of the null hypothesis of the Kleibergen-Paap rk LM statistic suggests that the instruments are not redundant, thereby confirming their validity. The baseline findings remain qualitatively unchanged; although the magnitude of the estimated effect shifts slightly, its direction and interpretation are fully consistent with the patterns reported in Figures 2 and 3 (see Figure 6).

Table 3. Diagnostic results.

VARIABLES	(1) Year 0	(2) Year 1	(3) Year 2	(4) Year 3	(5) Year 4	(6) Year 5
			full sample			
R-squared	0.456	0.537	0.571	0.574	0.527	0.496
Kleibergen-Paap rk LM statistic	29.688	30.400	29.895	28.662	28.543	27.201
Cragg-Donald Wald F statistic	59.258	73.345	73.780	69.684	66.281	64.140
			high private debt			
R-squared	0.607	0.574	0.556	0.599	0.685	0.773
Kleibergen-Paap rk LM statistic	12.349	13.510	13.527	13.799	13.602	14.594
Cragg-Donald Wald F statistic	21.239	27.825	28.188	28.191	25.752	27.973
			low private debt			
R-squared	0.377	0.560	0.627	0.622	0.540	0.567
Kleibergen-Paap rk LM statistic	9.984	9.426	9.357	8.128	8.148	6.703
Cragg-Donald Wald F statistic	22.798	25.326	24.415	20.831	20.122	16.399
			high private investment			
R-squared	0.660	0.710	0.694	0.712	0.729	0.731
Kleibergen-Paap rk LM statistic	12.254	13.056	13.251	12.790	12.378	11.175
Cragg-Donald Wald F statistic	25.233	32.507	35.191	33.571	32.097	31.937
			low private investment			
R-squared	0.345	0.483	0.583	0.599	0.541	0.553
Kleibergen-Paap rk LM statistic	18.922	21.037	19.918	19.564	18.312	17.214
Cragg-Donald Wald F statistic	25.709	35.381	33.050	31.212	26.477	25.828

Notes: Instrumented variable: change in cyclically adjusted primary balance. Instruments: 1% of GDP fiscal consolidation at time t. Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Figure 6. Response of debt-to-GDP ratio to 1% change in cyclically adjusted primary balance.



Notes: Shaded areas indicate the 90% confidence bands. Top row: full sample; Bottom row: left panel based on private debt and right panel based on private investment. Instrumented variable: change in CAPB. Instrument used: the narrative fiscal consolidation variable at time t.

4.3 Spending versus tax-based adjustment

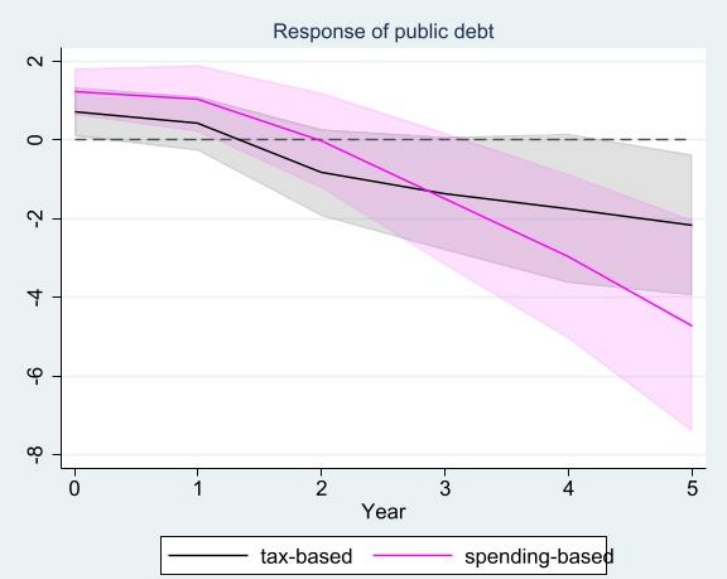
Many earlier studies suggest that fiscal consolidations produce smaller output losses when they rely mainly on cuts to government spending rather than on tax increases. For

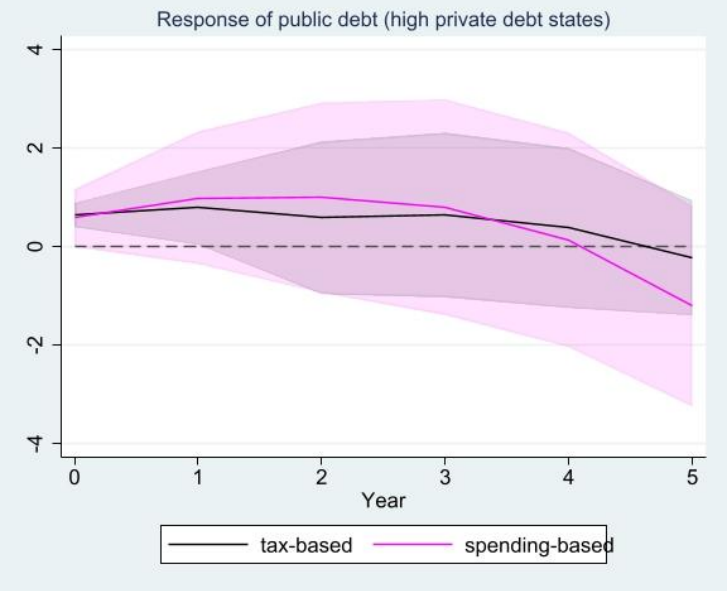
example, Alesina et al. (2015) found that spending-based consolidations tend to be much less contractionary than tax-based ones. More specifically, they found that spending cuts often trigger only mild, short-lived recessions, whereas tax increases are followed by deeper and more persistent downturns. The reason seems to lie not in monetary policy, but in how private agents respond: business confidence and private investment react more positively after expenditure cuts than after tax hikes. However, less is known about how the composition of fiscal adjustments affects public debt, with the notable exception of Alesina et al. (2019), who provided evidence that the impact of spending-based versus tax-based austerity measures on public debt depends on the initial level of debt and its associated cost. To assess how the effects of fiscal adjustments vary with their composition, I re-estimate equations (6) and (7), replacing changes in the government budget deficit with the discretionary changes in public spending and taxes as the shock variables.

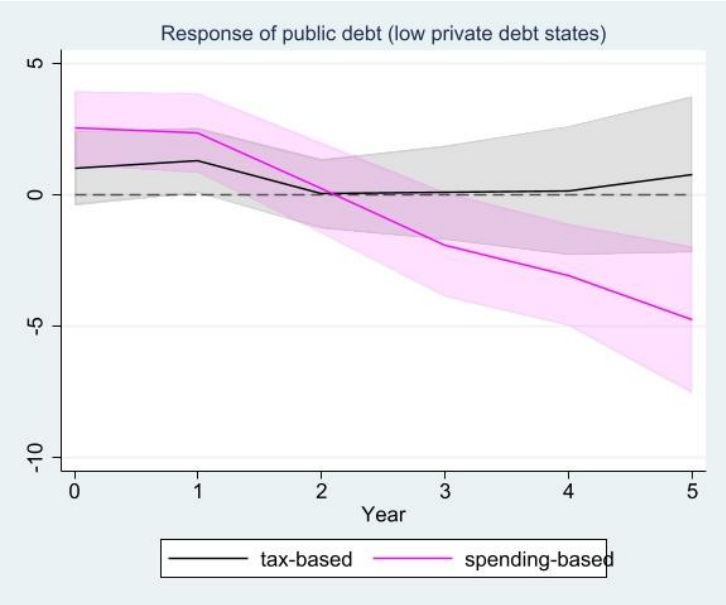
Figure 7 shows the estimates for spending-based and tax-based adjustments. Overall, the results coincide with the baseline findings. In more detail, public debt declines in the medium term, as shown in Figure 6 (first line), with the effects being more pronounced for spending-based adjustments (-4.71%) compared to tax-based adjustments (-2.15%). This effect is particularly observed in countries with high levels of private investment (see Figure 6, third row, left panel). Furthermore, regardless of the composition of fiscal adjustments, public debt does not change significantly when austerity measures are implemented in a high private debt environment (see Figure 6, middle row, left panel). On the contrary, public debt is depressed significantly by spending-based consolidations when private debt is low (see Figure 6, middle row, right panel). Interestingly, in a low private investment environment, tax-based fiscal adjustments lead to a gradual decline in public debt, whereas spending-based

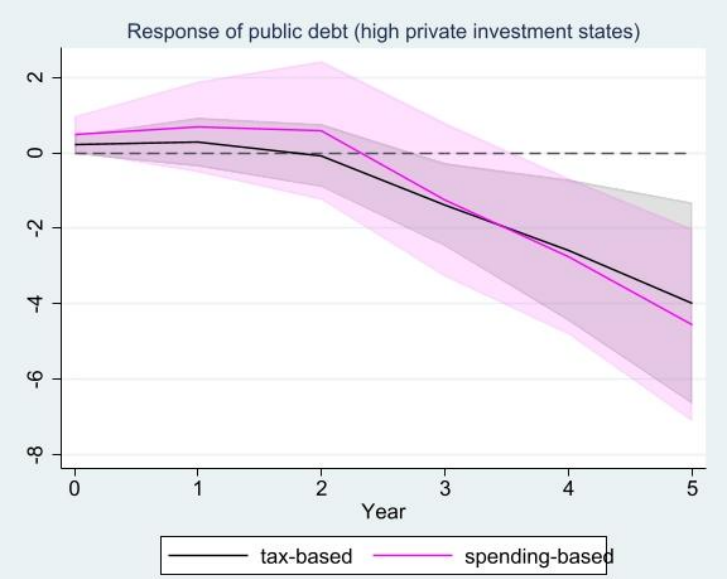
adjustments initially increase public debt in the first few years before converging to zero over the forecast horizon (see Figure 6, third row, right panel).

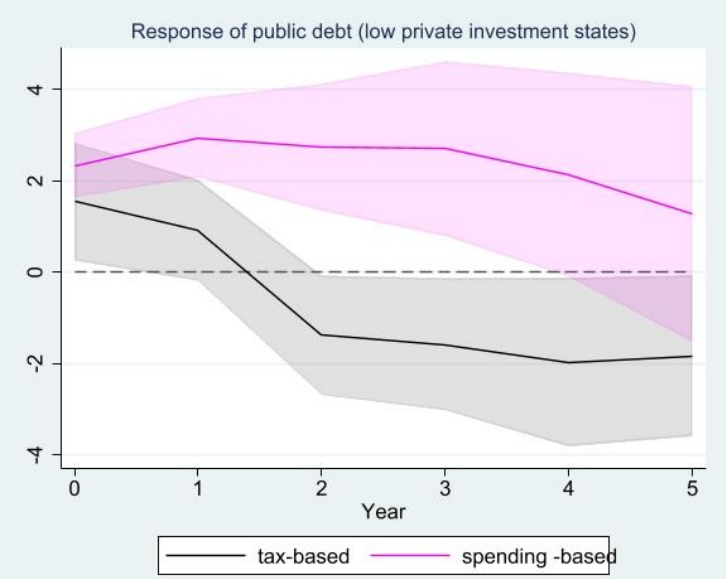
Figure 7. Response of debt-to-GDP ratio to 1% change in cyclically adjusted primary balance.











Notes: Shaded areas indicate the 90% confidence bands. Top row: full sample; middle row: left panel based on high private debt and right panel based on low private debt; bottom row: left panel based on high private investment and right panel based on low private investment.

5 Additional transmission channels

When we examine the effectiveness of fiscal policy, it is crucial to consider various factors, rather than focusing solely on short-term outcomes. As Chrysanthakopoulos and Tagkalakis (2024) highlight, the public debt ratio plays a pivotal role in shaping how fiscal shocks are transmitted throughout the economy. Beyond this, sovereign default risk and central bank independence can influence policy outcomes. High default risk raises borrowing costs and can constrain a government's fiscal maneuverability (Corsetti et al., 2013). Meanwhile, central bank independence (CBI) has been shown to foster monetary credibility and lower inflation risk, allowing fiscal adjustments to operate more effectively (Alesina and Summers, 1993).

To address these concerns, I re-estimate equation (7) by splitting the country-year observations into high- and low-debt states using the sample median, which is 50.3%. In addition, I split the sample into high- and low-default risk states. To do so, I use the

sovereign debt rating variable constructed by Kose et al. (2022b) and I define a country as being at high default risk when its rating falls below the sample median of 18.7. Finally, I split the sample into high- and low-central bank independence states, using the sample median value of 0.62.[6] Figure 8 reports these results.

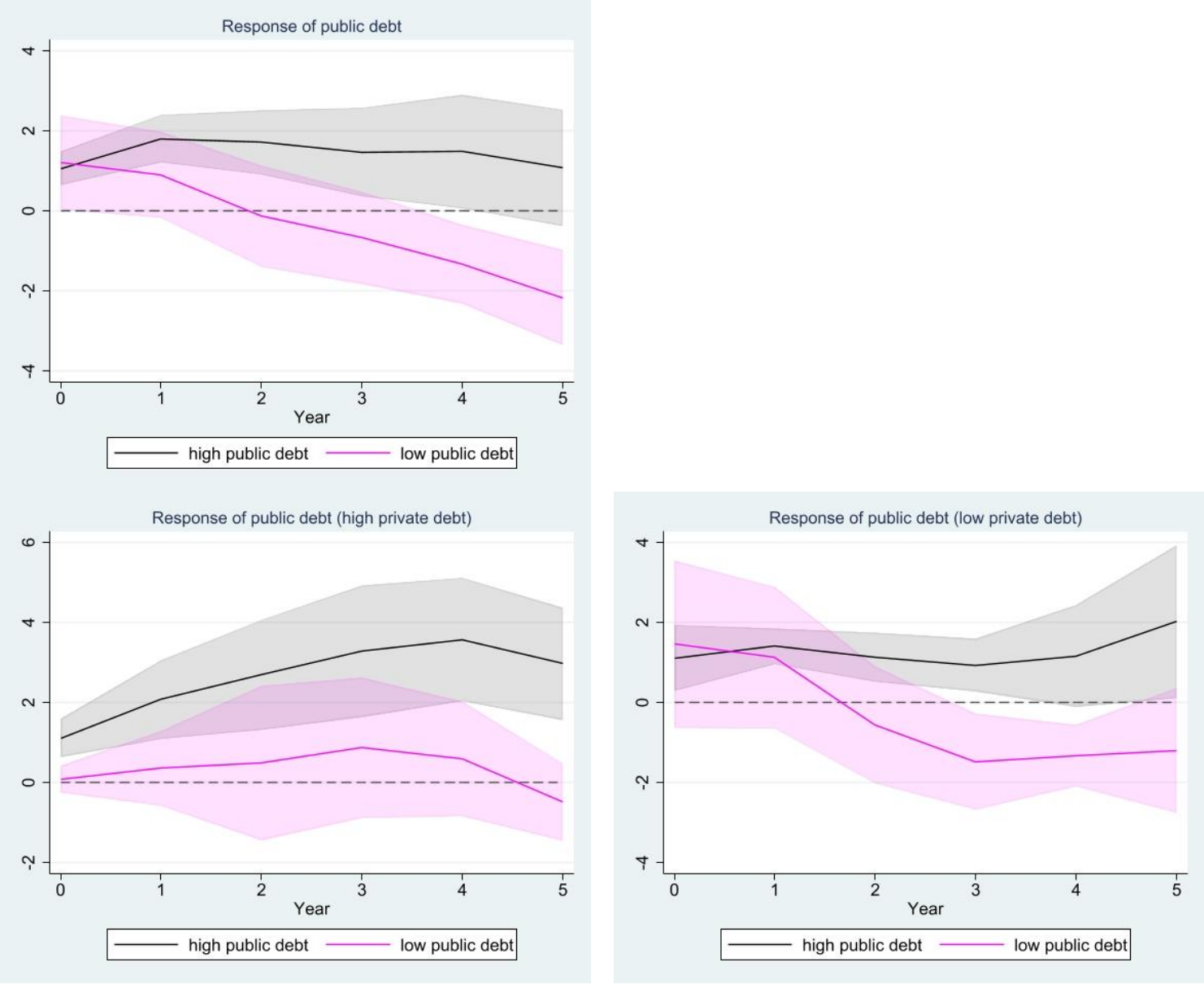
Public debt depresses more strongly to fiscal adjustments during periods characterized by stronger initial fiscal positions, as indicated by lower public debt ratios. This effect is largely driven by environments with low private debt and high levels of private investment. Conversely, in contexts of high private debt and weaker initial fiscal positions, as reflected by higher public debt ratios, a 1% of GDP fiscal consolidation tends to increase public debt over the medium term. As expected, public debt also responds to fiscal adjustments under both high and low sovereign default risk conditions, with the effects being more pronounced in high-risk states. This pattern is primarily associated with environments of low private debt and investment. Finally, in countries exhibiting higher central bank independence, fiscal adjustments lead to a more pronounced reduction in public debt, with the impact operating more strongly through the private debt channel than through the private investment channel.

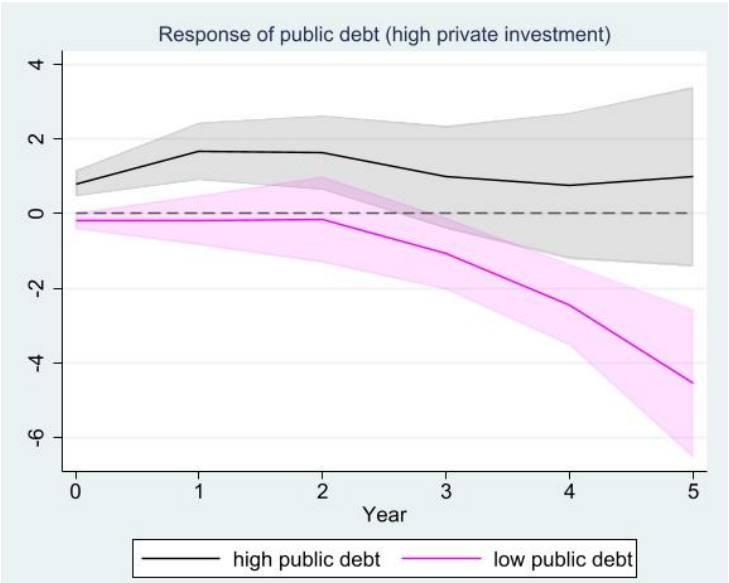
In countries where initial public debt is low and private debt is manageable, fiscal consolidation tends to generate stronger multipliers and more robust growth. Conversely, in high private-debt environments, consolidation may suppress demand more sharply, slowing growth and even raising the public debt ratio over the medium term, because of constrained private spending and deleveraging. High sovereign default risk exacerbates this process: markets demand higher yields, increasing debt servicing costs and eroding the gains from fiscal adjustment. Finally, strong central bank

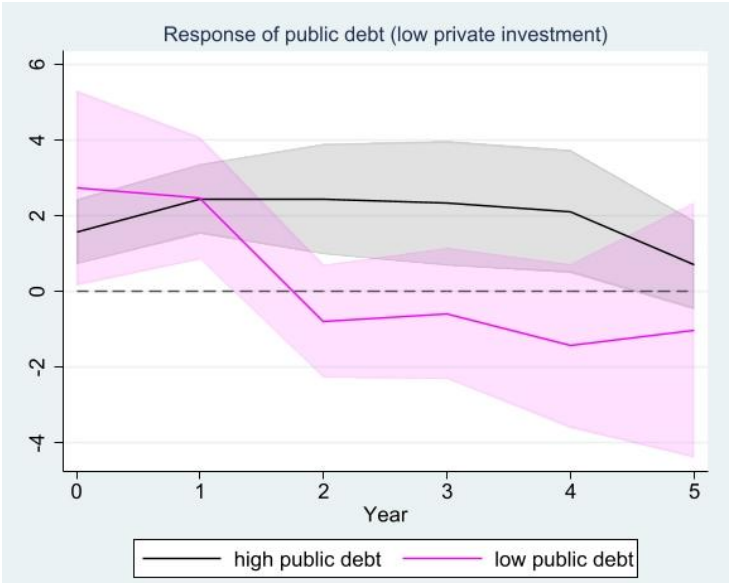
[6] Data for CBI are taken from Romelli (2022).

independence enhances credibility and lowers risk premia, which reduces borrowing costs and magnifies the effectiveness of consolidation, particularly through the private-debt channel, because tighter monetary credibility supports both growth and market confidence.

Figure 8. Response of debt-to-GDP ratio under different states of nature.




Response of public debt (high private investment)
4
2
0
-2
-4
-6
0
1
2
3
4
5
Year
high public debt
low public debt


Response of public debt (low private investment)
6
4
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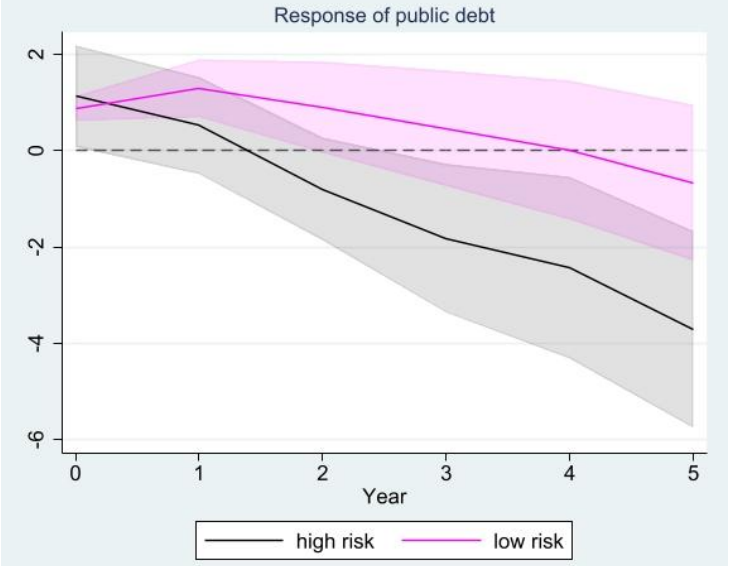
0
-2
-4
0
1
2
3
4
5
Year
high public debt
low public debt


Response of public debt
2
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-6
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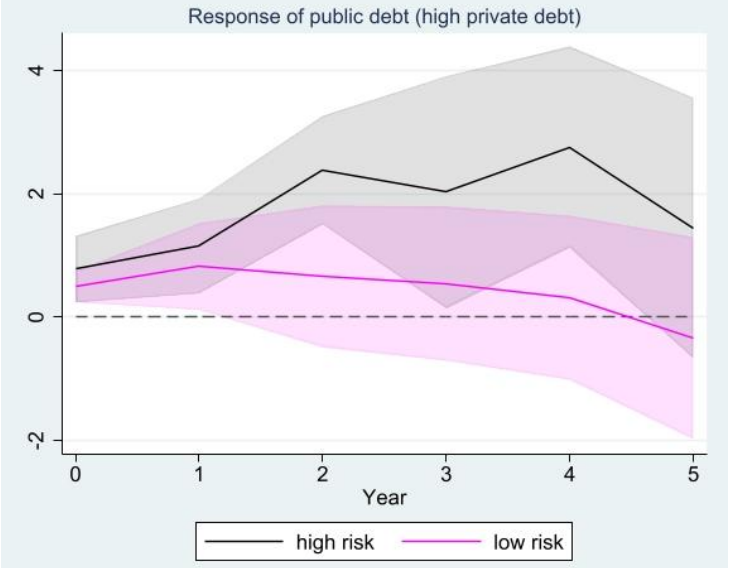
Year
high risk
low risk


Response of public debt (high private debt)
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-2
0
1
2
3
4
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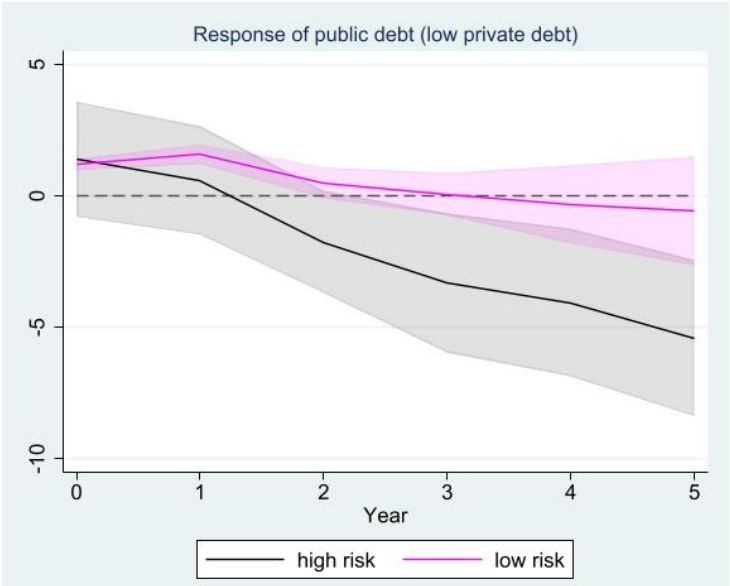
Year
high risk
low risk


Response of public debt (low private debt)
5
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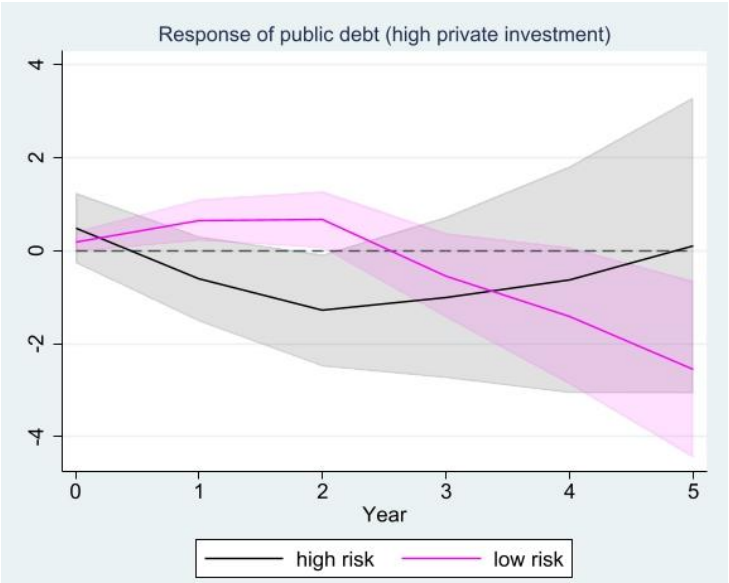
Year
high risk
low risk


Response of public debt (high private investment)
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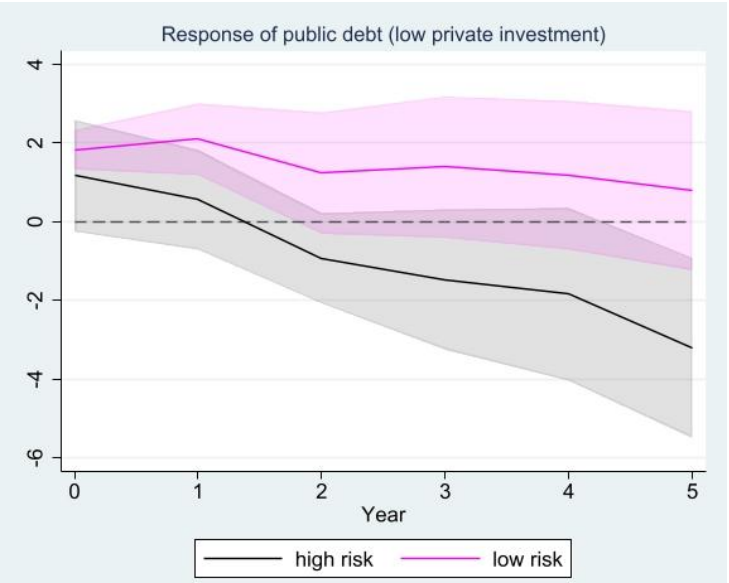
Year
high risk
low risk


Response of public debt (low private investment)
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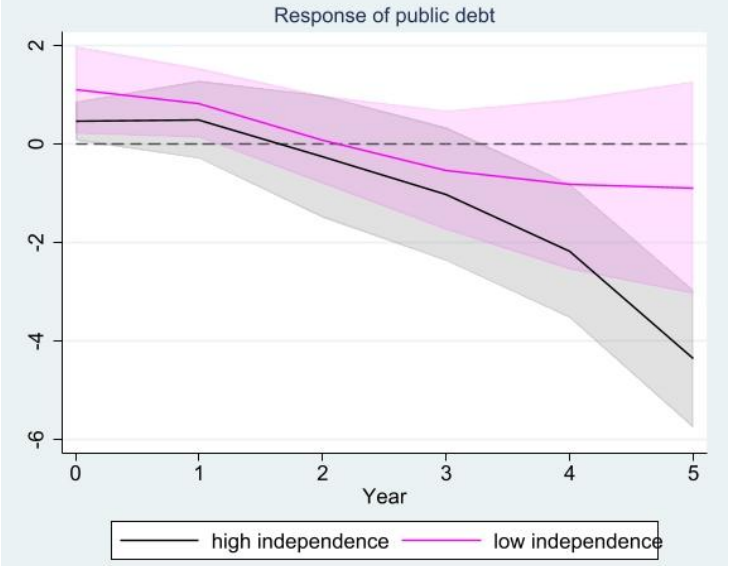
Year
high risk
low risk


Response of public debt
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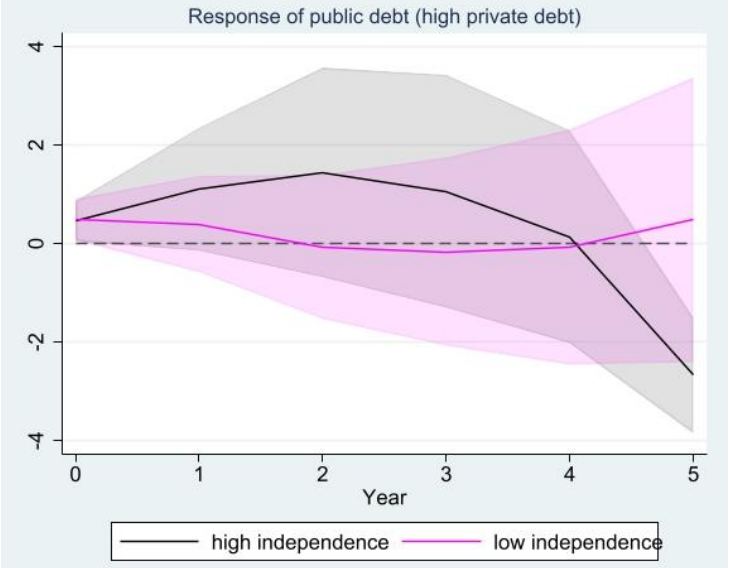
Year
high independence
low independence


Response of public debt (high private debt)
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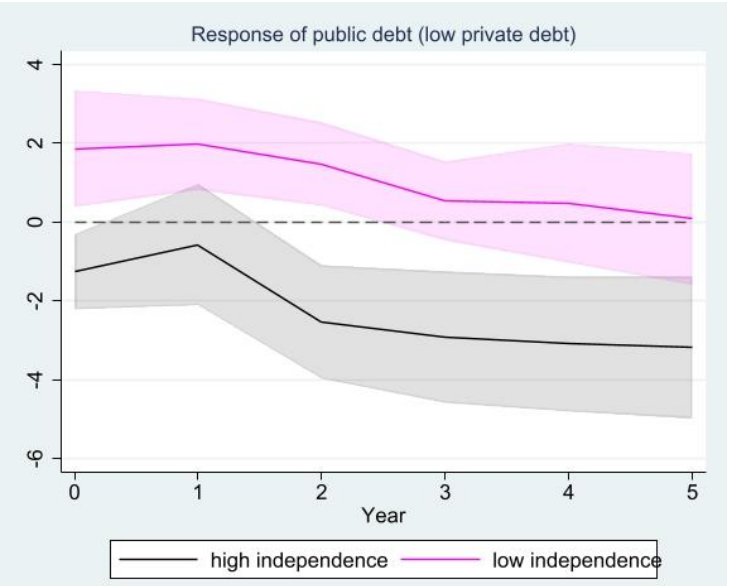
Year
high independence
low independence


Response of public debt (low private debt)
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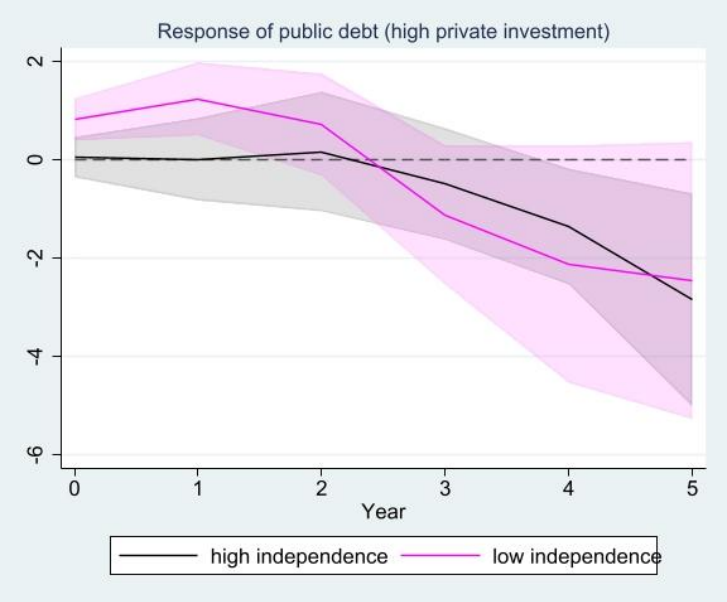
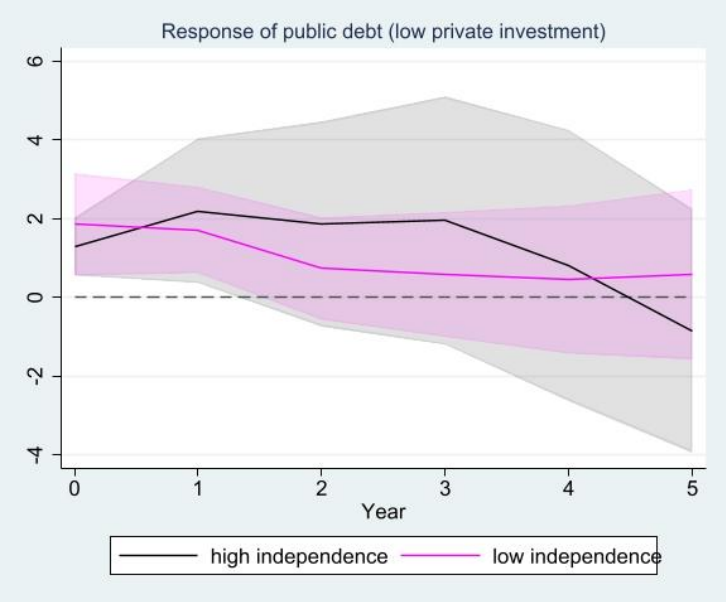
-2
-4
-6
0
1
2
3
4
5
Year
high independence
low independence





Notes: Shaded areas indicate the 90% confidence bands.

6 Conclusions

Motivated by the fiscal pressures arising from recent global events, this study highlights that the COVID-19 pandemic prompted massive fiscal expansion, as governments sought to protect households and firms from economic disruption, leading to a surge in public debt ratios and raising concerns about long-term fiscal sustainability. In addition, structural factors such as demographic ageing and climate change are expected to place persistent strain on public finances, requiring higher spending on pensions, healthcare, disaster relief, and climate adaptation (Rogoff, 2022; IMF, 2023; Koutsogeorgopoulou and Morgavi, 2025). Taken together, these developments underscore the urgent need for well-designed fiscal strategies to restore debt sustainability and prompt a reassessment of whether fiscal adjustments can genuinely increase the likelihood of achieving a durable reduction in public debt ratios.

Building on the above, this paper employs a newly dataset from (by Adler et al., 2024) that isolates deficit-reducing fiscal actions unrelated to cyclical conditions, the analysis

focuses on measuring their medium-term effects on debt dynamics. Using data for 29 countries for the period 1980-2020 and by applying a state-dependent local projections framework, the paper captures how fiscal consolidation outcomes differ with respect to private debt, private investment, and the composition of adjustment measures. This empirical strategy allows for a systematic assessment of whether fiscal tightening can generate sustained debt reductions, and under which macro-financial and institutional settings such outcomes are most likely to materialise.

The empirical findings show that fiscal adjustments can, under the right conditions, deliver meaningful reductions in public debt. A 1% of GDP fiscal adjustment depresses public debt by 2.76% in the medium term, but this average impact masks substantial state dependence. Consolidations are markedly more effective when undertaken in economies with low private debt or robust private investment, whereas high private leverage or weak investment dynamics significantly dampen, or even reverse, their effects. Initial fiscal positions also prove decisive: countries entering consolidation episodes with lower debt ratios achieve larger and more persistent declines, while high-debt economies experience only limited improvements. Institutional and risk-related factors further shape outcomes. Fiscal adjustments implemented in high sovereign default risk environments or in countries with more independent central banks yield stronger debt reductions, suggesting that credibility and market perceptions play an important amplifying role. Moreover, the composition of consolidation matters, with spending-based measures systematically outperforming tax-based ones in delivering sustained improvements in debt dynamics. Taken together, these findings underscore that the success of fiscal consolidations hinges critically on underlying macro-financial conditions and institutional frameworks. Overall, these findings suggest that fiscal

policy effectiveness depends critically on private sector conditions, institutional credibility, and the design of policy measures.

Finally, potential limitations of this study include the focus on country-specific dynamics, which may lead to heterogeneous effects being masked in the aggregated analysis. Moreover, these results highlight clear policy implications, suggesting that the design of fiscal consolidation strategies should account for the unique macro-financial and institutional context of each country to enhance debt-reducing effectiveness. While this study provides robust evidence on how macro-financial and institutional conditions shape the effectiveness of fiscal consolidations, several avenues remain open for future research. First, the analysis does not distinguish between growth-friendly and growth-dampening consolidation strategies, an aspect that could refine our understanding of how fiscal adjustments interact with long-term economic performance. Secondly, country-specific structural characteristics such as the composition of the tax base, labor market rigidities, financial sector depth, or political economy constraints may further influence the transmission of fiscal consolidations and warrant closer examination.

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