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FISCAL CONSOLIDATION: TEMPORARY COSTS OR LASTING SCARS?¹

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September 2026

Abstract

This paper studies how fiscal consolidation affects economic activity in both the short and long run, with particular attention to supply-side channels and the risk of self-defeating austerity. Using a broad cross-country panel covering 1970–2024, we find that fiscal consolidations reduce output only modestly in the short run but may generate mild scarring effects over longer horizons. Consolidation episodes are identified using a combination of cyclically adjusted primary balances, residual-based fiscal shocks, and Bai-Perron structural break detection. Local projection estimates show that output losses are concentrated around the implementation period and dissipate thereafter, while Dynamic OLS and error-correction estimates point to a small but persistent negative long-run association between consolidation and output. Although fiscal consolidation is, on average, associated with lower public debt ratios, the estimated effects are imprecise, and more than half of identified episodes can be classified as self-defeating, because debt ratios increase within three years of adjustment. The effects are state-dependent and vary systematically with initial debt conditions, macroeconomic environments, and the composition of adjustment measures.

Keywords: Fiscal consolidation; Fiscal adjustment; Debt sustainability; Self-defeating austerity; Fiscal shocks; Supply-side effects; State dependence; Local projections.

JEL Classification: E62, H30, H50, H60, H63, C23.

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1. INTRODUCTION

High government indebtedness in most advanced economies is motivating renewed policy discussions around the macroeconomic effects of fiscal consolidation. In the OECD area alone, general government gross debt rose by more than 40 percentage points relative to its 1997–2007 average, reaching close to 113 percent of GDP in 2025 (OECD, 2026). Debt burdens are also elevated among emerging-market and developing economies: the IMF projects global public debt at just above 95 percent of world GDP in 2026, rising toward 100 percent by 2030, while many low-income countries are already at high risk of debt distress and face tightening external financing conditions (IMF, 2026). Against this backdrop, fiscal consolidation is widely regarded as necessary to restore debt sustainability, rebuild fiscal buffers and create room for priority spending in areas such as population ageing, digitalization, and climate transition.

At the same time, fiscal consolidation raises important questions about its macroeconomic consequences. Policy measures aimed at increasing revenue and/or reducing expenditure typically depress economic activity in the short run through standard demand-side channels. However, consolidation may also have longer-term consequences through supply-side mechanisms. While short-term demand effects are relatively well understood within a Keynesian framework, the longer-term supply-side implications remain more uncertain and are central to the literature on self-defeating consolidations, which examines why public debt may continue to rise relative to GDP despite sustained fiscal adjustment (Castro et al., 2015; Attinasi and Metelli, 2017; House, Proebsting and Tesar, 2020; Gale, Berlin and Thorpe, 2025; Pina et al., 2025).

A key insight from the literature is that the composition of fiscal adjustment—whether based on current spending cuts, public investment reductions, or tax increases—plays a crucial role in shaping both macroeconomic outcomes and the sustainability of government debt. A large body of empirical work finds that expenditure-based consolidations tend to be more durable and less harmful to growth than tax-based adjustments or those relying on cuts to productive spending (Alesina and Tabellini, 1990; Alesina and Perotti, 1997; Alesina and Ardagna, 1998).

A complementary line of research highlights the constraints governments face in implementing consolidation, including downward spending rigidities associated with wage bills and entitlement programs, bureaucratic inertia, and political resistance to reforms (Piguillem and Riboni, 2024; de Mello and Jalles, 2026). Moreover, the persistence and effectiveness of fiscal adjustment depend critically on initial macroeconomic and structural conditions, institutional quality, and the degree of political commitment to reform (Alesina et al., 1998; Lodge and Rodríguez-Vives, 2013; Ziogas and Panagiotidis, 2021; Kopecky, 2022; Balasundharam et al., 2023).

Despite these contributions to the literature, an important gap remains. Much of the scholarly work focuses either on short-run output effects or long-run growth outcomes in isolation, often without explicitly linking the two. As a result, the mechanisms through which fiscal consolidation affects the supply side of the economy—and, ultimately, potential output—remain insufficiently understood. This paper addresses this gap by asking three interrelated questions. First, what are the short-run and medium-term effects of fiscal consolidation on economic activity? Second, to what extent do these effects reflect demand-side dynamics versus supply-side adjustments? Third, under what conditions—particularly in terms of composition and initial macroeconomic environment—does fiscal consolidation become more or less detrimental to economic performance?

To answer these questions, we develop an empirical framework that jointly estimates short-run dynamics and long-run relationships. Specifically, we employ an error-correction model (ECM) to capture the long-run relationship between fiscal consolidation and output, complemented by local projection methods (Jordà, 2005) to trace the dynamic responses of output following consolidation episodes. This approach allows us to embed discussions about self-defeating consolidations in a unified setting where short- and long-term effects can be estimated consistently. In addition, we extend the analysis by examining the longer-run association between consolidation and output, thereby providing evidence consistent with potential supply-side effects..

A central challenge in this analysis is identification. Fiscal policy is inherently endogenous to macroeconomic conditions, and standard measures of consolidation—such as changes in the cyclically adjusted primary balance (CAPB)—may reflect both discretionary policy actions and automatic responses to the business cycle. To address these concerns, we adopt a residual-based identification strategy grounded in fiscal policy rules, whereby predictable movements in the CAPB are purged using a regression framework that conditions on macroeconomic fundamentals. The resulting residuals—and their changes—are interpreted as exogenous fiscal innovations. This approach is complemented by the identification of structural breaks in fiscal policy using Bai and Perron (2003) techniques, which allow us to detect discrete shifts in consolidation regimes without imposing arbitrary thresholds. By combining continuous fiscal innovations with regime-based consolidation episodes, we obtain a flexible and internally consistent identification framework applicable to a broad cross-country panel.

While narrative approaches—such as those pioneered by Romer and Romer (2010) and extended by DeVries et al. (2011) and others—have provided valuable insights and remain widely used (Alesina, Favero and Giavazzi, 2015; Alesina et al., 2016), their applicability is constrained by limited country coverage and the availability of detailed historical information. For this reason, we treat narrative-based measures as robustness checks rather than the primary identification strategy.

The paper makes three main contributions. First, it provides joint evidence on short-run and long-run effects of fiscal consolidation within a unified empirical framework. Second, it contributes to the literature by focusing explicitly on supply-side channels, examining how consolidation affects potential output rather than only realized GDP. Third, it introduces a flexible identification strategy that combines residual-based fiscal shocks with structural break analysis, allowing for a comprehensive assessment of consolidation episodes across a large sample of countries.

The empirical results show that output losses following episodes of fiscal consolidation are small and short-lived. The finding holds across different definitions of consolidation over the period 1970–2024. In our baseline specification, a one-percentage-point consolidation in the CAPB is associated with a contemporaneous decline in GDP per capita of approximately 0.2 percent relative to its pre-shock path. The decline reaches a trough of roughly 0.25 percent one year after consolidation before gradually dissipating. Also, consolidations may have longer-term scarring effects on output. In our baseline estimations, a one-percentage-point consolidation in the CAPB is associated with a reduction in per capita GDP of approximately 1 percent in the long run. The finding is nevertheless less robust to different definitions of fiscal consolidation, identification strategies and sample composition than the short-term results.

Moreover, we do not find strong evidence of self-defeating consolidations, where debt is higher in relation to GDP after consolidation due to the associated output losses. In about 56 percent of our sample of consolidation episodes debt-to-GDP ratios do rise within three years following consolidation. However, parameters are estimated imprecisely when we regress three- and five-year cumulative debt-to-GDP ratios on consolidation episodes.

Finally, we provide evidence of state dependence in the association between fiscal consolidation and economic activity. Consolidations implemented in high-debt environments are found to be associated with substantially larger output losses than consolidations undertaken when debt levels are relatively low. In addition, we find that spending-based consolidations are associated with relatively small output effects throughout the forecast horizon. The estimated responses remain close to zero and display little persistence, suggesting limited average output costs. Parameters are estimated less precisely for tax-based consolidations. This contrasts with earlier findings in the fiscal consolidation literature, which often report larger contractionary effects for tax-based adjustments than for expenditure-based consolidations.

The remainder of the paper is organized as follows. Section 2 reviews the literature review. Section 3 presents a conceptual framework linking fiscal consolidation to supply-side channels and derives testable implications. Section 4 outlines the empirical strategy and

identification approach and describes the data. Section 5 reports the empirical results. Section 6 concludes.

2. LITERATURE REVIEW

The literature on fiscal consolidation is large, but it remains uneven in its treatment of three issues that are central to this paper: identification, the distinction between short-run demand-side effects and longer-run supply-side equilibrium relationships, and the role of composition and policy constraints in shaping outcomes. Most of the literature focuses on whether fiscal consolidations depress activity in the short run and on whether expenditure-based adjustments are less contractionary than tax-based ones. Much less attention has been paid to the medium- to long-run channels through which consolidations may affect potential output, and to the conditions under which fiscal adjustment becomes self-defeating. This paper contributes to these debates by bringing together these strands in a unified empirical setting.

A first strand of the literature is concerned with the political economy and design of fiscal adjustment. Early contributions emphasized that fiscal consolidation is not merely a technical response to imbalances, as it is also underpinned by a political process shaped by distributional conflict, institutional incentives, and reform sequencing. Alesina and Tabellini (1990), Alesina and Drazen (1991), and Baron (1996) showed that delays in stabilization may emerge from strategic conflict among social groups and political actors. Alesina and Perotti (1997), Alesina and Ardagna (1998), and Alesina et al. (1998) then documented that the composition of consolidation matters for its durability and macroeconomic consequences, with expenditure-based adjustments typically found to be more persistent and less harmful to growth than tax-based ones.

More recent work has reinforced the importance of fiscal design and political commitment. Lodge and Rodríguez-Vives (2013), Ziogas and Panagiotidis (2021), and Balasundharam et al. (2023) show that the persistence and success of fiscal consolidation depend critically on initial macroeconomic conditions, fiscal institutions, and the credibility of the policy commitment. These insights matter for the present paper because they suggest that the macroeconomic effects of consolidation cannot be understood independently of how adjustment is implemented.

A second major strand of scholarly work studies the macroeconomic effects of consolidation, especially through short-run demand channels. This literature asks whether fiscal tightening is contractionary, and whether some consolidations can be expansionary. The early “expansionary fiscal contraction” hypothesis was associated with cases in which credibility gains, lower interest rates, or exchange rate depreciation offset the direct contractionary effects of spending cuts or tax increases. Subsequent empirical work, however,

showed that such outcomes are far from general. Alesina, Favero and Giavazzi (2015) and Alesina et al. (2016, 2019) use narratively identified consolidation plans to show that spending-based consolidations are generally less costly than tax-based ones, but they do not imply that consolidation is harmless.

More recent assessments continue to stress that the output costs of consolidation depend on the macroeconomic environment. Heimberger (2024), surveying the euro area experience, argues that the negative growth effects of fiscal adjustments were especially large during the sovereign debt crisis, when there was economic slack, monetary policy was constrained, and several countries consolidated simultaneously. Gale, Berlin and Thorpe (2025) likewise emphasize that the output effects of consolidation depend on composition, timing, monetary accommodation, and whether trading partners are consolidating at the same time. They also note that evidence on medium- or long-run growth effects remains relatively limited.

A third strand of empirical analysis focuses on self-defeating consolidations; namely, episodes in which fiscal tightening fails to improve, or even worsens, debt dynamics because the associated contraction in GDP more than offsets the improvement in the fiscal balance. Attinasi and Metelli (2016) and House, Proebsting and Tesar (2020) show that such consolidations are not uncommon in environments characterized by large multipliers, weak demand, or constrained monetary policy. Indeed, Gale, Berlin and Thorpe (2025) argue that many austerity episodes implemented in Europe after the Great Recession were self-defeating because the associated output losses raised, rather than lowered, debt-to-GDP ratios. In addition, Patel (2024) shows that growth shocks account for a much larger share of debt dynamics than discretionary fiscal policy changes in advanced economies, reinforcing the idea that the “denominator effect” is central to debt sustainability assessments. This literature motivates our focus on potential output: if consolidation affects the economy’s supply side, then debt dynamics may deteriorate not only because demand falls temporarily, but also because the productive capacity of the economy is durably weakened.

A fourth strand of empirical work looks at the composition of adjustment and the supply side of the economy. The traditional result that expenditure-based consolidations are more growth-friendly than tax-based ones is well established (Alesina and Perotti, 1997; Alesina and Ardagna, 1998; Alesina, Favero and Giavazzi, 2019). However, this general finding is coarse. The relevant question is not only whether adjustment is expenditure- or revenue-based, but which specific components bear the burden of adjustment and how these choices affect private investment, labor supply, and productivity. Bermperoglou, Pappa and Vella (2017) show that changes in the government wage bill can have important effects on private activity. Piguillem and Riboni (2024) highlight the role of sticky spending in shaping debt adjustment.

Consistent with this, de Mello and Jalles (2026) show that higher wage bill rigidities are associated with lower odds of entering a consolidation and, conditional on adjustment taking place, with larger cuts in public investment—especially outside advanced economies. This is directly relevant for supply-side effects because consolidation achieved through cuts to public investment may be more damaging to medium-term growth than consolidation based on current spending restraint or well-designed revenue measures.

A fifth strand of the literature concerns identification and the measurement of fiscal consolidation episodes. A long-standing challenge is that fiscal policy responds endogenously to the cycle, so simple changes in the fiscal balance or the CAPB may not isolate discretionary fiscal actions. Romer and Romer (2010) pioneered the narrative approach for tax shocks, and DeVries et al. (2011) extended the action-based approach to fiscal consolidations in advanced economies. This work has shaped subsequent contributions, such as Alesina, Favero and Giavazzi (2015) and Alesina et al. (2016). However, narrative datasets remain limited in country coverage and sample length. Adler et al. (2024) provide an updated action-based dataset for 17 OECD economies through 2020 and extend the same methodology to 14 Latin American and Caribbean economies through 2020. They also restate why CAPB-based approaches can be problematic, notably because cyclical adjustment is measured with error and because CAPB movements may embed non-discretionary factors.

The limited country coverage of extant narrative datasets and the approach's requirement of detailed historical policy reconstruction calls for alternative identification strategies for broader cross-country work. A growing body of work therefore relies on policy-rule residuals, forecast errors, announcements, and other data-driven strategies. The forecast-error approach associated with Auerbach and Gorodnichenko (2012) has been widely used to address fiscal foresight and anticipation effects, while more recent work focuses on the role of fiscal consolidation announcements. David et al. (2024), for example, show that consolidation announcements reduce medium-term inflation expectations, suggesting that expectations and credibility channels are empirically relevant and may mediate the broader macroeconomic effects of adjustment.

These newer approaches are especially useful when the goal is to identify the unexpected component of consolidation in real time or across a large number of countries. Our empirical strategy speaks directly to this literature by combining CAPB-based measures with residual-based fiscal innovations and Bai-Perron structural breaks, while using narrative chronologies as robustness checks rather than as the core identification strategy.

A final set of empirical studies that motivates this paper is related to the fiscal conditions under which consolidation succeeds or fails, including debt dynamics and debt distribution. Bohn (1998) and subsequent work established the importance of fiscal responsiveness to debt for sustainability. More recent contributions examine how consolidation interacts with the

level and distribution of debt burdens. Frangiamore et al. (2025), for example, analyzes the effects of fiscal consolidations on the distribution of debt outcomes rather than only on mean debt dynamics, emphasizing that the effectiveness of expenditure consolidations depends on the broader macro-fiscal environment. This newer literature reinforces the idea that average effects can be misleading, and that heterogeneity across episodes and across countries is central to understanding the consequences of fiscal adjustment.

Against this background, this paper contributes to the literature in three ways. First, it links the short-run macroeconomic effects of fiscal consolidation to its longer-run implications for supply and potential output, an issue that remains underexplored in the empirical literature. Second, it brings together different identification strategies—CAPB-based innovations, policy-rule residuals, and Bai-Perron regime shifts—within a unified empirical framework that can be implemented in a broad cross-country panel. Third, it examines how the composition of adjustment and the structure of expenditure rigidities shape the persistence and macroeconomic consequences of consolidation, thereby connecting the literature on multipliers and debt dynamics with the literature on spending rigidity, fiscal institutions, and reform design.

3. CONCEPTUAL FRAMEWORK

Fiscal consolidation can affect the economy through both short-run demand channels and medium-to-long-run supply channels. In the short run, consolidation reduces aggregate demand through lower public spending and/or higher taxation, consistent with standard Keynesian mechanisms (Blanchard and Leigh, 2013; Auerbach and Gorodnichenko, 2012). Over time, however, its effects depend on how adjustment influences private investment, labor supply, productivity, and sovereign risk (Alesina, Favero and Giavazzi, 2019; Fatás and Summers, 2018). Whether consolidation is ultimately growth-enhancing or self-defeating therefore hinges on the interaction between these channels.

To formalize these mechanisms, consider a reduced-form representation of potential output:

$$Y_{ct}^* = A_{ct} K_{ct}^\alpha L_{ct}^{1-\alpha}, \quad (1)$$

where Y_{ct}^* denotes potential output in country c at time t , A_{ct} is total factor productivity, K_{ct} is the capital stock, L_{ct} is labor input, and $\alpha \in (0,1)$.

This formulation captures the standard supply-side determinants of output, where fiscal policy may affect A_{ct} , K_{ct} , and L_{ct} through multiple channels.

Actual output may deviate from potential output in the short run due to demand conditions:

$$Y_{ct} = Y_{ct}^* + \tilde{Y}_{ct}, \quad (2)$$

where $\tilde{Y}_{ct}$ denotes the output gap.

Fiscal consolidation affects both components: it can depress $\tilde{Y}_{ct}$ immediately through demand contraction, while also influencing Y_{ct}^* over time through its effects on capital accumulation, labor utilization, and productivity.

Let the fiscal stance be summarized by a consolidation variable C_{ct} , where higher values correspond to tighter fiscal policy. The short-run evolution of the output gap can then be written as:

$$\tilde{Y}_{ct} = \rho \tilde{Y}_{c,t-1} - \theta C_{ct} + \Gamma' Z_{ct} + \varepsilon_{ct}, \quad (3)$$

where $\rho \in (0,1)$ captures persistence in cyclical conditions, $\theta > 0$ measures the contractionary effect of fiscal consolidation, Z_{ct} is a vector of controls, and ε_{ct} is an error term.

Parameter θ summarizes the fiscal multiplier associated with consolidation episodes and is expected to vary with macroeconomic conditions, including slack and monetary policy constraints.

Turning to supply-side considerations, a reduced-form representation is given by:

$$\ln Y_{ct}^* = \phi_1 C_{ct} + \phi_2 M_{ct} + \phi_3 (C_{ct} \times M_{ct}) + \Lambda' X_{ct} + u_{ct} \quad (4)$$

where M_{ct} captures mediating factors, such as the composition of adjustment, initial debt levels, financing conditions, or institutional credibility; X_{ct} is a vector of controls; and u_{ct} is an error term.

Parameter ϕ_1 measures the average long-run supply-side effect of fiscal consolidation on the level of potential output, while ϕ_3 allows this effect to vary systematically with structural characteristics and macroeconomic conditions. The sign of ϕ_1 is theoretically ambiguous. On the one hand, fiscal consolidation may support potential output through improved macroeconomic stability, lower sovereign risk premia, stronger policy credibility, and enhanced private-sector confidence. On the other hand, consolidation may reduce potential

output if adjustment disproportionately affects productive public expenditure, discourages investment, weakens labour supply incentives, or lowers productivity growth.

The net effect therefore depends on both the composition of adjustment and the broader macroeconomic environment. Importantly, because these channels operate through the economy's productive capacity, fiscal consolidation may generate persistent effects on the level of potential output even after short-run demand effects have dissipated. This distinction between temporary cyclical responses and longer-run changes in output levels is central to the empirical analysis that follows.

To assess whether fiscal consolidation improves fiscal sustainability, consider the standard law of motion for the debt-to-GDP ratio:

$$\Delta d_{ct} = (r_{ct} - g_{ct})d_{c,t-1} - pb_{ct}, \quad (5)$$

where d_{ct} denotes the public debt-to-GDP ratio, r_{ct} is the effective interest rate, $g_{ct} \equiv \Delta \ln Y_{ct}$ is real GDP growth, and pb_{ct} is the primary balance.

Fiscal consolidation increases the primary balance, $\partial pb_{ct} / \partial C_{ct} > 0$, but may simultaneously reduce output growth, $\partial g_{ct} / \partial C_{ct} < 0$, through the channels described above.

Differentiating equation (5) with respect to C_{ct} yields:

$$\frac{\partial \Delta d_{ct}}{\partial C_{ct}} = -\frac{\partial pb_{ct}}{\partial C_{ct}} - d_{c,t-1} \frac{\partial g_{ct}}{\partial C_{ct}}. \quad (6)$$

This expression makes it clear that the effect of fiscal consolidation on debt dynamics depends on the balance between the direct improvement in the primary balance and the induced effect on output growth. A consolidation is self-defeating if:

$$d_{c,t-1} \left| \frac{\partial g_{ct}}{\partial C_{ct}} \right| > \frac{\partial pb_{ct}}{\partial C_{ct}}. \quad (7)$$

In other words, when the adverse growth effect of consolidation—amplified by high initial debt levels—is sufficiently large, the debt-to-GDP ratio may increase rather than decline despite fiscal tightening. This mechanism is consistent with the empirical findings in Attinasi and Metelli (2016) and House, Proebsting and Tesar (2020), and highlights the importance of distinguishing between short-run and persistent supply-side effects.

This framework yields several testable implications. Fiscal consolidation is expected to reduce output in the short run through demand channels, but its medium-to-long-run effects depend on the composition of adjustment and the macroeconomic environment. In particular, consolidations that disproportionately affect productive expenditure or operate under weak growth conditions are more likely to generate persistent output losses. These effects are amplified in high-debt environments, where the growth channel plays a central role in debt dynamics. As a result, the likelihood that consolidation becomes self-defeating is inherently state-dependent and mediated by both structural characteristics and policy design.

This reduced-form structure provides a direct bridge to the empirical strategy. Equation (4) motivates the estimation of long-run relationships using an error-correction framework, while equation (3) underpins the use of local projections to trace the dynamic response of output to consolidation shocks. Together, these approaches allow for a joint assessment of short-run demand effects and longer-run supply-side dynamics, and provide a coherent framework to test whether fiscal consolidations can become self-defeating under empirically relevant conditions.

4. EMPIRICAL STRATEGY AND DATA

This section describes the identification of fiscal consolidation shocks, the econometric framework used to estimate their effects, and the data employed in the analysis. The empirical strategy is designed to isolate exogenous variation in fiscal policy and to jointly assess short-run dynamics and long-run supply-side effects, in line with the conceptual framework developed in Section 3.

4.1 Identification of fiscal consolidation episodes

To isolate exogenous variations in fiscal policy, we adopt a multi-step identification strategy combining CAPB-based measures, residual-based fiscal innovations, and structural break detection. We begin by defining the fiscal stance as:

$$C_{ct} \equiv \Delta CAPB_{ct}, \quad (8)$$

where $CAPB_{ct}$ denotes the cyclically adjusted primary balance as a share of GDP in country c at time t . Positive values of C_{ct} correspond to fiscal tightening.

The CAPB is constructed using statistical estimates of potential output. In particular, potential output is obtained using both the Hodrick–Prescott (HP) and Hamilton (2018) filters, which provide a more robust alternative to standard detrending approaches. The output gap is computed as the deviation of actual output from its estimated trend and used to cyclically adjust the primary balance. This approach ensures consistency and comparability across

countries, while avoiding reliance on narrative or institutional adjustments that are typically available only for a limited set of economies.

To isolate the discretionary component of fiscal policy, we estimate a fiscal reaction function as:

$$C_{ct} = \delta_0 + \delta_1 d_{c,t-1} + \delta_2 Z_{ct} + v_{ct}, \quad (9)$$

where $d_{c,t-1}$ is the lagged public debt-to-GDP ratio, Z_{ct} is a vector of structural and institutional controls, and v_{ct} is an error term.

Inclusion of lagged debt in the fiscal reaction function captures the well-established tendency of fiscal policy to respond to sustainability pressures (Bohn, 1998), while Z_{ct} accounts for slow-moving determinants of fiscal behavior, such as demographics, political variables, or institutional quality.

Importantly, the output gap is not included among the regressors in equation (9). Since the CAPB is already constructed using estimates of potential output, including cyclical indicators directly in the fiscal reaction function would introduce mechanical correlation and contaminate the identification of discretionary policy innovations. By relying on cyclically adjusted fiscal balances and excluding contemporaneous demand conditions, the residual component isolates policy movements that are orthogonal to standard cyclical adjustments.

We interpret the residual v_{ct} as the unanticipated component of fiscal policy and define fiscal shocks as:

$$\varepsilon_{ct}^C \equiv v_{ct}. \quad (10)$$

These residual-based innovations capture discretionary fiscal actions that cannot be explained by systematic responses to debt dynamics or structural factors and therefore provide a data-driven proxy for exogenous fiscal consolidation shocks.

In addition to continuous fiscal innovations, we also identify discrete consolidation episodes using the Bai and Perron (2003) multiple structural break methodology. This approach detects statistically significant changes in the mean of the CAPB series:

$$CAPB_{ct} = \mu_j + \eta_{ct}, \text{ for } t \in (\tau_{j-1}, \tau_j], \quad (11)$$

where μ_j denotes regime-specific means and $\{\tau_j\}$ are estimated breakpoints. Structural breaks correspond to sustained shifts in fiscal policy regimes and capture consolidation episodes that are persistent rather than transitory.

The identification strategy rests on the assumption that the residual-based fiscal innovations, ε_{ct}^C , capture discretionary policy changes that are orthogonal to contemporaneous macroeconomic conditions, conditional on the information set included in equation (9). This assumption is grounded in two key considerations. First, using CAPB ensures that fiscal policy is purged of systematic responses to the business cycle. Because the CAPB is constructed using estimates of potential output derived from statistical filters, it removes the predictable component of fiscal policy associated with cyclical fluctuations in output. As a result, remaining variation in C_{ct} is less likely to reflect automatic stabilizers or endogenous fiscal responses to demand conditions.

Second, the fiscal reaction function explicitly controls for lagged debt and structural determinants of fiscal behavior. Inclusion of $d_{c,t-1}$ captures the systematic response of fiscal policy to sustainability concerns, consistent with the empirical framework of Bohn (1998), while the vector Z_{ct} accounts for slow-moving institutional and structural factors. The residual component v_{ct} therefore reflects deviations from predictable fiscal behavior and can be interpreted as a proxy for discretionary fiscal innovations.

Importantly, exclusion of contemporaneous cyclical indicators from equation (9) avoids mechanical correlation arising from the construction of CAPB. Including the output gap would effectively double-count cyclical information, given that it already enters the CAPB adjustment, and would bias the residual toward zero by construction. By relying instead on cyclically adjusted fiscal balances and lagged fundamentals, the identification strategy isolates fiscal shocks that are orthogonal to standard macroeconomic drivers. Interpretation of ε_{ct}^C as an exogenous fiscal shock is therefore conditional on the maintained assumption that, after controlling for lagged debt and structural factors, no omitted variable simultaneously drives both discretionary fiscal policy and contemporaneous output innovations. While this assumption cannot be tested directly, it is supported by the inclusion of fixed effects, which absorb time-invariant country characteristics, and time effects, which capture common global shocks.

The use of structural break detection provides an additional and complementary layer of identification. The Bai and Perron (2003) methodology identifies discrete and persistent changes in fiscal policy regimes that are unlikely to be driven by short-run macroeconomic fluctuations. These regime shifts often correspond to policy episodes motivated by medium-term fiscal objectives—such as consolidation plans or institutional reforms—rather than contemporaneous cyclical conditions. As such, they provide an alternative proxy for exogenous fiscal adjustment that does not rely on continuous variation in fiscal balances.

Relative to narrative approaches (Romer and Romer, 2010; DeVries et al., 2011; Alesina, Favero and Giavazzi, 2015), the present strategy trades off detailed policy classification for broader country coverage and internal consistency. Narrative measures rely on historical and institutional information that is not available for a large cross-section of countries and are therefore difficult to generalize in panel settings. By contrast, the residual-based and structural break approaches employed here are data-driven and can be implemented consistently across a large sample. At the same time, narrative-based consolidation measures are used as robustness checks to assess the sensitivity of the results to alternative identification strategies.

Taken together, this multi-layered identification strategy—combining cyclically adjusted fiscal balances, residual-based innovations, and structural break detection—aims to isolate plausibly exogenous variation in fiscal policy while maintaining broad cross-country applicability. This approach allows us to credibly estimate both the short-run and long-run effects of fiscal consolidation and to assess the conditions under which such policies may become self-defeating.

4.2 Long and short-run effects of fiscal consolidation

This section outlines the empirical framework used to estimate the effects of fiscal consolidation on economic activity over different horizons. Consistent with the conceptual framework developed above, we distinguish between medium-to-long-run supply-side effects and short-run demand dynamics. To do so, we combine an error-correction framework to identify long-run relationships with local projection methods to trace dynamic responses to fiscal shocks.

4.2.1 Long-run relationship: error-correction framework

To estimate the long-run effects of fiscal consolidation on economic activity, we adopt a panel error-correction framework that allows for non-stationarity in the underlying variables while preserving a well-defined long-run equilibrium relationship. The long-run relationship is specified as:

$$\ln Y_{ct} = \alpha_0 + \alpha_1 C_{ct} + \sum_i \beta_i X_{ct} + D_c + D_t + u_{ct}, \quad (12)$$

where C_{ct} is the fiscal consolidation measure identified in Section 4.1, X_{ct} is a vector of control variables capturing structural determinants of output (such as investment, labor market conditions, or external factors), D_c and D_t denote country and time fixed effects, and u_{ct} is an error term.

Coefficient α_1 captures the long-run association between fiscal consolidation and output.

Because Y_{ct} and some elements of X_{ct} may be non-stationary, we estimate equation (12) using the Dynamic OLS (DOLS) estimator developed by Stock and Watson (1993) and extended to panel settings by Mark and Sul (2003). DOLS corrects for endogeneity and serial correlation by augmenting the regression with leads and lags of first differences of the regressors:

$$\ln Y_{ct} = \alpha_0 + \alpha_1 C_{ct} + \sum_i \beta_i X_{ct} + \sum_{k=-p}^p \Gamma_k \Delta W_{c,t+k} + D_c + D_t + \varepsilon_{ct}, \quad (13)$$

where W_{ct} includes C_{ct} and the elements of X_{ct} , and Γ_k captures short-run adjustment dynamics.

This specification ensures consistent estimation of the long-run coefficients under fairly general conditions, even in the presence of endogenous regressors and serially correlated errors. The error-correction interpretation arises from the implied dynamic representation:

$$\Delta \ln Y_{ct} = \lambda (Y_{c,t-1} - \alpha_0 - \alpha_1 C_{c,t-1} - \sum_i \beta_i X_{c,t-1}) + \sum_j \psi_j \Delta Z_{c,t-j} + D_c + D_t + \eta_{ct}, \quad (14)$$

where $\lambda < 0$ measures the speed of adjustment toward the long-run equilibrium, and Z_{ct} includes C_{ct} and X_{ct} . In this formulation, deviations from the long-run relationship are gradually corrected over time, allowing us to distinguish between permanent and transitory effects of fiscal consolidation.

The long-run coefficient, α_1 , is of central interest. A negative value indicates that fiscal consolidation is associated with lower long-run output, consistent with adverse supply-side effects (e.g., via reduced public investment or labor supply distortions). A positive or insignificant coefficient suggests that consolidation does not harm—or may even support—potential output, for instance through improved macroeconomic stability or reduced sovereign risk premia (Alesina et al., 2015; Fatás and Summers, 2018; House, Proebsting and Tesar, 2020).

4.2.2 Short-run dynamics: Local projection estimations

To estimate the dynamic effects of fiscal consolidation, we employ the local projection method proposed by Jordà (2005), augmented to address anticipation effects, persistence, and cross-sectional dependence. This framework allows us to trace the impulse response of

the level of economic activity to fiscal shocks in a flexible and robust manner, without imposing the dynamic restrictions inherent in vector autoregressions. Focusing on output levels rather than growth rates is particularly useful in the present context because it allows us to assess whether fiscal consolidations generate persistent effects on economic activity and ensures consistency with the long-run error-correction framework described above.

For each horizon $k = 0, 1, \dots, K$, we estimate:

$$\begin{aligned}
100[\ln(Y_{c,t+k}) - \ln(Y_{c,t-1})] &= \alpha_k \varepsilon_{ct}^C + \sum_{h=1}^H \theta_{(k,h)} \varepsilon_{c,t+h}^C \\
&+ \sum_{j=1}^p \rho_{(k,j)} \Delta \ln(Y_{c,t-j}) + \sum_{j=0}^p \Gamma_{(k,j)} X_{c,t-j} \\
&+ D_c + D_t + \varepsilon_{c,t+k}, \quad (15)
\end{aligned}$$

where ε_{ct}^C denotes the identified fiscal consolidation shock, X_{ct} is a vector of control variables, and D_c and D_t are country and time fixed effects, respectively.

Coefficient α_k captures the cumulative percentage response of real GDP per capita at horizon k to a fiscal consolidation shock occurring at time t . In this formulation, the estimated impulse responses can be interpreted as deviations of output from its baseline path, allowing us to assess not only the immediate effects of consolidation but also whether output eventually returns to its pre-shock trajectory or experiences more persistent losses.

This specification incorporates several important extensions to the baseline local projection framework. First, we include leads of fiscal shocks, $\varepsilon_{c,t+h}^C$, to account for potential anticipation effects. If economic agents adjust behaviour in advance of announced fiscal measures, failure to control for expected future policy changes may bias the estimated responses (Ramey, 2011; Leeper, Walker and Yang, 2013). Including leads ensures that the estimated coefficient α_k captures the impact of unanticipated fiscal innovations rather than anticipated policy changes.

Second, we allow for dynamic persistence by including lags of the dependent variable and control variables. This captures the gradual adjustment of output and mitigates concerns about omitted dynamics that could bias the estimated impulse responses. The lag length p is selected using standard information criteria, such as the Akaike Information Criterion (AIC), applied to the baseline specification. This data-driven approach ensures a parsimonious yet sufficiently flexible dynamic structure.

Third, we account for cross-sectional dependence and serial correlation in the error term by computing Driscoll–Kraay standard errors (Driscoll and Kraay, 1998). This is particularly

important in a multi-country panel context, where shocks may be correlated across countries due to global factors and where conventional clustering may understate true uncertainty.

Impulse response functions (IRFs) are obtained by plotting the sequence of coefficients $\{\alpha_k\}_{k=0}^K$, with confidence intervals constructed using Driscoll–Kraay standard errors. We report both 68 and 90 percent confidence bands to provide a comprehensive characterization of statistical uncertainty. This enriched local projection framework is well suited to our empirical setting. It accommodates externally identified fiscal shocks, allows for flexible dynamic responses, and explicitly addresses anticipation effects and cross-sectional dependence. As a result, it provides a robust basis for assessing the short- and medium-term effects of fiscal consolidation on the level and trajectory of economic activity.

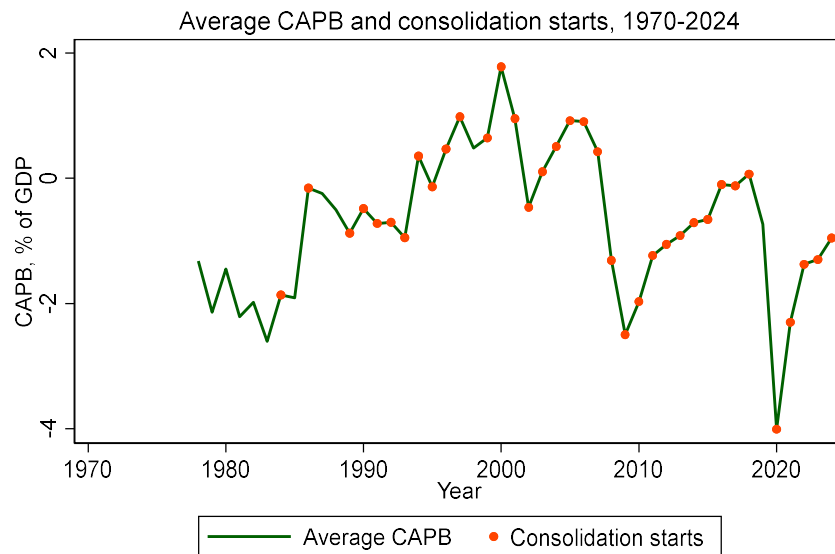
4.3 Data and Stylized Facts

This section presents a set of descriptive patterns characterizing fiscal consolidation episodes in the sample over the period 1970–2024. The stylized facts focus on four dimensions: the evolution of fiscal consolidations over time, the association between consolidations and output dynamics, the role of initial debt conditions, and the composition of adjustment packages.

Figure 1 reports the evolution of CAPB as a share of GDP together with the timing of consolidation starts across the sample. Two main patterns emerge. First, the average CAPB remained persistently negative during much of the late 1970s and early 1980s, deteriorating to nearly –2.5 percent of GDP in the early 1980s. Fiscal positions improved considerably during the 1990s and early 2000s, with the average CAPB reaching positive territory around the turn of the millennium. A renewed deterioration followed the Global Financial Crisis and, more dramatically, the COVID-19 pandemic, when the average CAPB fell sharply to approximately –4 percent of GDP in 2020.

Second, consolidation starts are concentrated around periods of fiscal stress and rising debt pressures. Consolidation episodes become particularly frequent during the late 1980s and throughout the 1990s, coinciding with widespread fiscal adjustment programs across both advanced and emerging-market economies. Additional waves of consolidation are visible following the Global Financial Crisis and after the pandemic-related fiscal expansion.

Figure 1. Fiscal consolidation over time



Notes: The solid line reports the annual cross-country average cyclically adjusted primary balance (CAPB), expressed as a share of GDP. Dots indicate years in which at least one fiscal consolidation episode starts in the sample. Sample period: 1970–2024.

Table 1 summarizes the main characteristics of consolidation episodes by income group. High-income economies account for the largest number of episodes (297), reflecting both greater historical fiscal activism and more complete data availability. Upper-middle-income economies display the largest average consolidation size, at approximately 2.45 percentage points of GDP. Lower-middle-income countries exhibit somewhat smaller adjustments, while low-income countries display relatively few identified episodes and comparatively modest adjustment sizes. In addition, the average duration of consolidation episodes is relatively similar across groups, ranging between 2.6 and 3 years. This finding suggests that fiscal consolidations are generally medium-term processes involving sustained policy efforts rather than one-off adjustments.

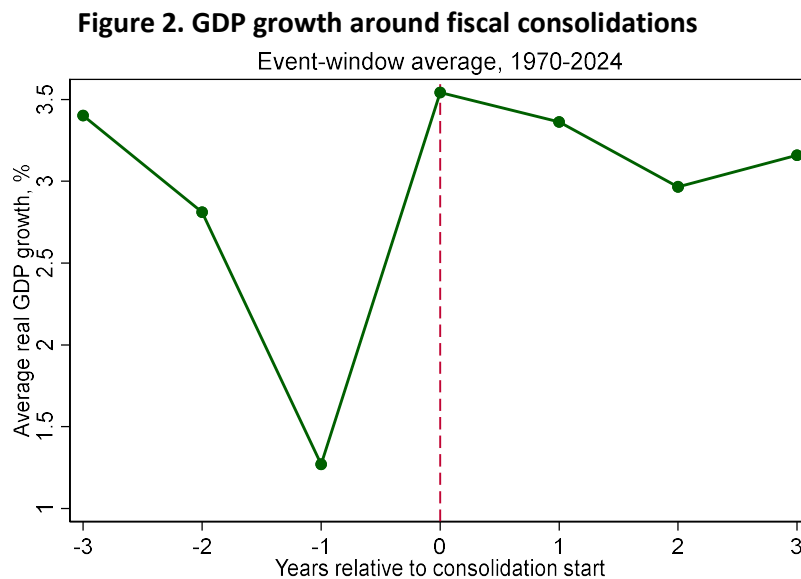
Table 1. Summary of consolidation episodes

Income group	Frequency	Mean size	Mean duration
High income	297	1.79	3.03
Upper-middle income	142	2.45	2.65
Lower-middle income	74	1.68	2.89
Low income	5	0.90	3.00

Notes: Frequency denotes the number of identified fiscal consolidation episodes. Mean size refers to the average cumulative improvement in the cyclically adjusted primary balance (percentage points of GDP) during consolidation episodes. Mean duration measures the average number of years per consolidation episode.

Figure 2 presents the average evolution of real GDP growth around the start of fiscal consolidation episodes using an event-window approach spanning three years before and after consolidation starts. The figure reveals a marked decline in economic growth in the period immediately preceding fiscal adjustment. Average GDP growth falls from approximately 3.4 percent three years before consolidation to nearly 1.3 percent in the year prior to adjustment. This sharp slowdown suggests that consolidations are frequently initiated in environments characterized by macroeconomic weakness or fiscal stress. Importantly, however, economic growth rebounds substantially during the consolidation year itself, reaching roughly 3.5 percent on average, and remains broadly stable thereafter. Post-consolidation growth fluctuates between approximately 3 and 3.4 percent over the subsequent three years.

At a descriptive level, these patterns do not support the view that fiscal consolidations are systematically associated with prolonged economic contractions. Instead, the evidence is broadly consistent with the notion that consolidations often follow periods of economic weakness and fiscal deterioration, after which growth gradually stabilizes and recovers. Naturally, these raw correlations should not be interpreted causally, since they do not account for endogeneity, anticipation effects, or differences in macroeconomic environments across episodes.



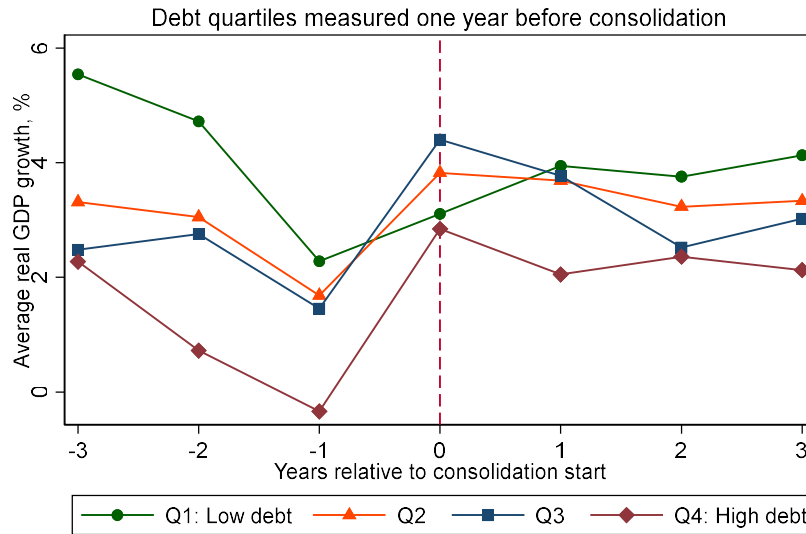
Notes: The figure reports average real GDP growth in a seven-year event window around the start of fiscal consolidation episodes. Year 0 denotes the first year of the consolidation episode. The dashed vertical line marks the consolidation start year. Sample period: 1970–2024.

Figure 3 explores heterogeneity in output responses according to initial debt conditions. Consolidation episodes are divided into quartiles based on the level of public debt in relation to GDP in the year preceding adjustment. Two main patterns emerge. First, countries entering consolidation with relatively low debt-to-GDP ratios exhibit consistently stronger growth throughout the event window. Growth in the lowest debt quartile remains above 3 percent on average and recovers relatively quickly following consolidation. In contrast, countries in the highest debt quartile experience substantially weaker growth both before and after consolidation starts. Average growth in highly indebted economies declines close to zero in the year prior to adjustment and remains persistently below the levels observed in low-debt countries during the post-consolidation period.

Second, differences in growth performance across debt quartiles are economically large. Prior to consolidation, the gap in average growth between the lowest and highest debt quartiles exceeds five percentage points. Although all quartiles experience some recovery following consolidation starts, highly indebted economies continue to display weaker performance throughout the post-consolidation horizon. Intermediate debt quartiles display outcomes between these two extremes.

These findings suggest that initial fiscal conditions play an important role in shaping the macroeconomic consequences of fiscal consolidation. Economies with greater fiscal space may benefit from stronger policy credibility, lower sovereign risk premia, and more favorable financing conditions, thereby mitigating the contractionary effects of adjustment. Conversely, heavily indebted economies may face tighter financial constraints and weaker private demand, leading to more adverse output dynamics during consolidation episodes.

Figure 3. GDP growth around consolidations by initial debt



Notes: The figure reports average real GDP growth around consolidation starts by quartiles of initial public debt. Initial debt is measured one year before the start of the consolidation episode. Q1 denotes the lowest-debt quartile and Q4 the highest-debt quartile. The dashed vertical line marks the consolidation start year. Sample period: 1970–2024.

Table 2 reports the composition of fiscal consolidation episodes. Expenditure-based and mixed consolidations dominate the sample, accounting for approximately 44.6 percent and 45.8 percent of all episodes, respectively. By contrast, purely tax-based consolidations are comparatively rare, representing less than 10 percent of the sample. This distribution is consistent with the broader empirical literature emphasizing the prevalence of expenditure restraint and mixed adjustment packages in historical fiscal consolidations. Governments may prefer expenditure-based adjustments because of concerns regarding the distortionary effects of higher taxation, competitiveness, and private-sector incentives.

At the same time, the large share of mixed consolidations suggests that many adjustment programs rely on combinations of revenue increases and expenditure restraint rather than exclusively one-sided strategies. The predominance of expenditure-based and mixed adjustments provides further motivation for distinguishing between different consolidation types in the subsequent empirical analysis, as the macroeconomic consequences of fiscal adjustment are likely to depend critically on the composition of the policy package.

Table 2. Composition of consolidation

Composition	Frequency	Share (%)
Expenditure-based	231	44.59
Tax-based	50	9.65
Mixed	237	45.75

Notes: Expenditure-based consolidations are episodes primarily driven by expenditure reductions; tax-based consolidations are primarily driven by revenue increases; and mixed consolidations combine both expenditure and revenue measures. Shares are computed relative to the total number of identified consolidation episodes.

5. EMPIRICAL RESULTS

5.1 Baseline Dynamic Effects

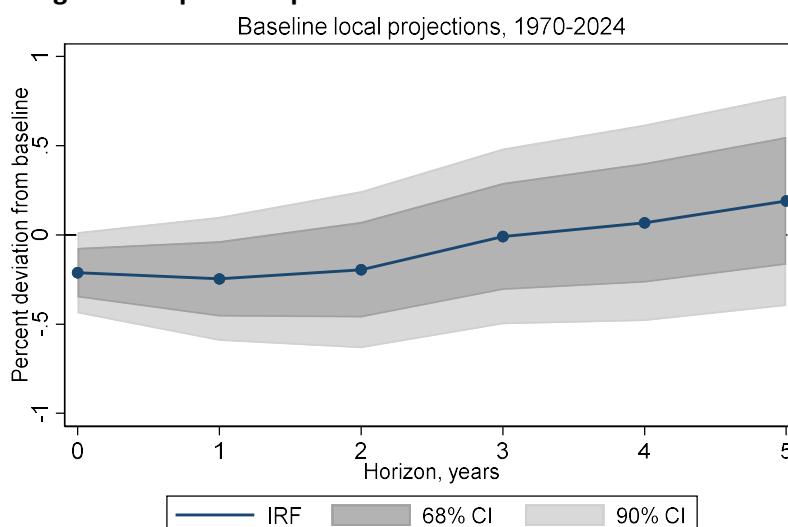
This section presents the baseline dynamic effects of fiscal consolidation episodes on economic activity using the local projection framework described in Section 4.2.2. The impulse response of the level of real GDP per capita to a fiscal consolidation shock is computed over a multi-year horizon while controlling for macroeconomic fundamentals, country fixed effects and common global shocks. By focusing on output levels, rather than growth rates, the analysis directly assesses whether fiscal consolidations generate persistent output losses or merely temporary deviations from trend.

The baseline specification focuses on the average response of output to a one-percentage-point improvement in the CAPB associated with consolidation episodes. The methodology is particularly well suited to this analysis, because it allows for flexible dynamic responses without imposing the strong parametric restrictions associated with vector autoregressive models. Moreover, the framework naturally accommodates nonlinearities, heterogeneous responses and state dependence explored in subsequent sections.

Figure 4 depicts the estimated impulse response functions (IRFs), while Table A1 reports the underlying coefficient estimates and confidence intervals. The results indicate that fiscal consolidations are associated with modest but economically meaningful short-run output losses. Upon impact (horizon 0), a one-percentage-point fiscal consolidation shock lowers the level of real GDP per capita by approximately 0.2 percent relative to its pre-shock path. Output

declines by approximately 0.2 percent on impact, reaches a trough of about 0.25 percent one year later, and subsequently recovers.

Figure 4. Impulse response of GDP to fiscal consolidation shocks



Notes: The figure reports local projection estimates of the the cumulative response of real GDP per capita relative to its pre-shock level.. The solid line represents the estimated impulse response function (IRF), while shaded areas denote 68 and 90 percent confidence intervals based on robust standard errors clustered at the country level. Horizon 0 corresponds to the year of the consolidation shock. The specification includes country and year fixed effects as well as standard macroeconomic controls. Sample period: 1970–2024.

Importantly, the effects appear temporary rather than persistent. Output remains below baseline during the first two years following consolidation, but the magnitude of the losses steadily declines over time. By horizon 3, the estimated response is effectively zero, while the point estimates become mildly positive at horizons 4 and 5. However, these medium-term gains are not statistically distinguishable from zero, suggesting that fiscal consolidations neither generate persistent output losses nor produce systematic expansionary effects on average.

The confidence intervals provide additional information about the uncertainty surrounding these effects. The 90 percent confidence bands include zero at all horizons, whereas the narrower 68 percent bands exclude zero on impact and one year after consolidation. The results therefore point to modest short-run output costs, although the evidence is not statistically significant at conventional confidence levels. Economic activity gradually returns to its pre-shock path over the medium term.

Overall, the baseline results suggest that fiscal consolidations impose temporary output costs consistent with conventional Keynesian demand-side mechanisms. However, the absence of persistent negative effects implies that these costs largely dissipate within a few

years. This pattern is consistent with short-run demand contractions gradually being offset by stabilizing forces, such as improved fiscal sustainability, enhanced policy credibility, lower risk premia or reduced macroeconomic uncertainty.

The estimated responses are broadly consistent with the empirical literature, while also emphasizing that the magnitude and persistence of contractionary effects depend on identification strategies, macroeconomic conditions and the composition of adjustment. In the present sample, the average consolidation episode is associated with relatively modest output losses that do not translate into long-run economic scarring.

To assess the robustness of the baseline findings.

Appendix Figure A1 employs an alternative fiscal shock definition based on all positive changes in the CAPB rather than restricting attention to identified consolidation episodes. The resulting impulse responses closely resemble the baseline estimates, exhibiting moderate short-run declines in output followed by a gradual return toward baseline. Relative to the baseline specification, the short-run losses are slightly smaller and the medium-term responses somewhat weaker, suggesting that identified consolidation episodes capture more economically meaningful adjustment efforts than simple CAPB improvements.

Appendix Figure A2 instead uses narrative consolidation episodes. The estimated short-run effects are somewhat larger in magnitude, with output remaining below baseline for approximately three years before recovering. This pattern is consistent with the view that narrative-based consolidations capture more deliberate and policy-driven adjustment efforts that exert stronger demand-side effects in the short run.

Finally, Appendix Figure A3 reports the baseline specification excluding macroeconomic control variables. In this case, the estimated output losses are larger and somewhat more persistent, suggesting that part of the observed adjustment process is mediated through broader macroeconomic conditions. Nevertheless, the qualitative pattern remains unchanged, reinforcing the conclusion that fiscal consolidations generate temporary output costs but do not produce lasting reductions in economic activity.

Taken together, the baseline and robustness exercises provide consistent evidence that fiscal consolidations are associated with moderate short-run output losses, but little evidence of persistent adverse effects on the long-run level of economic activity.

5.2 Long-Run Effects

While the local projection estimates in the previous section provide evidence of a dynamic adjustment of output following fiscal consolidation, they do not directly address the

question of whether such consolidations leave a lasting imprint on the long-run level of economic activity.

To investigate this possibility, we estimate long-run relationships between output and fiscal consolidation using Dynamic Ordinary Least Squares (DOLS), complemented by error-correction model (ECM) estimates. Whereas the local projections focus on the dynamic path of output following fiscal shocks, the DOLS and ECM specifications examine whether fiscal consolidations are associated with systematic differences in the long-run level of real GDP per capita. Together, these approaches provide a comprehensive assessment of both short-run adjustment dynamics and potential longer-run consequences.

Table 3 reports the baseline DOLS estimates. Across the first three specifications, fiscal consolidation shocks are negatively associated with the long-run level of output. The estimated coefficients range between -0.010 and -0.013 and are statistically significant at conventional levels. Quantitatively, these estimates imply that a one-percentage-point fiscal consolidation shock is associated with a reduction in real GDP per capita of approximately 1 percent in the long run. By contrast, when fiscal policy is measured using the CAPB, rather than consolidation shocks, the estimated coefficient becomes small and statistically insignificant.

Table 3. Long-run effects of fiscal consolidation: DOLS estimates

Variable	Shock only	+ Debt	+ Controls	CAPB level
Shock	-0.0129*** (0.00414)	-0.0102** (0.00441)	-0.00986** (0.00453)	
CAPB				-0.00105 (0.00227)
Debt		-0.000706** (0.000357)	-0.000646* (0.000361)	-0.00248*** (0.000482)
Inflation			-0.00103* (0.000531)	-0.00131 (0.00114)
Trade			-3.62e-14*** (7.83e-15)	0.000145 (0.000581)
Observations	3,739	3,739	3,739	1,831
Within R ²	0.575	0.583	0.587	0.732

Notes: Dependent variable is log real GDP per capita. DOLS specifications include country fixed effects, year fixed effects, and one lead and one lag of first differences of regressors. Standard errors clustered at the country level are reported in parentheses. Sample period: 1970–2024. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

The negative long-run coefficients suggest that some fiscal consolidation episodes may be associated with lower long-run levels of output. However, the magnitude of the estimated

effects remains modest, and the interpretation should be viewed in conjunction with the local projection evidence presented in Section 5.1. While the impulse-response analysis indicates that output losses following consolidation are temporary and largely dissipate within a few years, the DOLS estimates capture average long-run correlations across countries and consolidation episodes. Consequently, the two approaches provide complementary rather than contradictory perspectives on the effects of fiscal adjustment.

The control variables behave broadly as expected. Public debt is negatively associated with long-run output across specifications, with the magnitude of the coefficient increasing when the CAPB is included in the regressions. Inflation is also negatively signed, while trade openness is statistically significant in the baseline specification, although its economic magnitude is negligible.

Appendix Table A2 examines alternative DOLS specifications to assess the robustness of the baseline findings. The negative association between fiscal consolidation and output is strongest when fiscal shocks are defined as all positive changes in the CAPB. Narrative consolidations, by contrast, are positively signed but statistically insignificant. Moreover, the coefficient on the baseline shock loses statistical significance in the extended-control specification and in the advanced-economy and emerging-market subsamples. These results suggest that the estimated long-run relationship is sensitive to both sample composition and model specification.

The ECM estimates reported in Appendix Table A3 provide complementary evidence on adjustment dynamics. The error-correction coefficient is negative and highly statistically significant across all specifications, averaging approximately -0.05 . This implies a gradual convergence towards the long-run equilibrium following deviations from the estimated relationship. Quantitatively, roughly 5 percent of any disequilibrium is corrected each year, indicating relatively slow adjustment.

The short-run ECM coefficients are consistently negative and statistically significant, reinforcing the conclusion from the local projection analysis that fiscal tightening is associated with weaker economic activity in the short run. In the most dynamic specification, the contemporaneous, first-lag, and second-lag consolidation terms are all negatively signed and statistically significant, suggesting that the effects of fiscal adjustment may be distributed over several years rather than concentrated exclusively in the year of implementation.

Taken together, the DOLS, ECM, and local projection results suggest a nuanced interpretation of fiscal consolidation. The evidence consistently points to contractionary short-run effects, while the existence and magnitude of long-run output costs appear considerably more sensitive to specification choices, identification strategies, and sample

composition. Accordingly, the results provide stronger support for temporary adjustment costs than for substantial long-run economic scarring.

5.3 Self-Defeating Consolidations

The previous sections show that fiscal consolidations are associated with modest short-run output losses and limited long-run scarring. This section asks whether these output losses are large enough to make consolidations self-defeating; that is, whether fiscal tightening ultimately worsens rather than improves public debt dynamics.

Table 4 reports debt-dynamics regressions where the dependent variable is the cumulative change in the public debt-to-GDP ratio over one-, three-, and five-year horizons. The coefficient on fiscal consolidation is negatively signed across all specifications, suggesting that consolidations are associated with subsequent reductions in the debt ratio. The estimated effect becomes larger over time, rising from –0.22 percentage points after one year to –0.60 percentage points after five years. However, these estimates are not statistically significant, indicating that the average debt-reducing effect is imprecisely estimated.

Table 4. Fiscal consolidations and debt dynamics

Variable	Debt t+1	Debt t+3	Debt t+5	Debt t+3 × Growth	Debt t+5 × Growth
Shock	-0.220 (0.390)	-0.410 (0.451)	-0.595 (0.444)	-0.414 (0.452)	-0.650 (0.483)
Lagged debt	-0.0990*** (0.0172)	-0.331*** (0.0315)	-0.523*** (0.0474)	-0.331*** (0.0315)	-0.522*** (0.0474)
Lagged GDP growth	-0.0710 (0.0759)	-0.100 (0.0885)	-0.0145 (0.136)	-0.0962 (0.0878)	-0.0221 (0.139)
Lagged inflation	-0.0172 (0.0256)	0.0415 (0.0270)	0.0188 (0.0341)	0.0417 (0.0268)	0.0185 (0.0338)
Lagged trade	-2.63e-12*** (4.37e-13)	-1.15e-11*** (7.23e-13)	-3.47e-11*** (1.04e-12)	-1.16e-11*** (7.35e-13)	-3.46e-11*** (1.07e-12)
Shock × Lagged GDP growth				-0.0201 (0.0548)	0.0382 (0.108)
Observations	4,265	4,257	3,940	4,257	3,940
Within R ²	0.149	0.335	0.449	0.335	0.449

Notes: The dependent variable is the cumulative change in the public debt-to-GDP ratio. Fiscal consolidation is defined as positive changes in the CAPB during identified consolidation episodes. All specifications include country and year fixed effects. Standard errors clustered at the country level are reported in parentheses. Sample period: 1970–2024. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

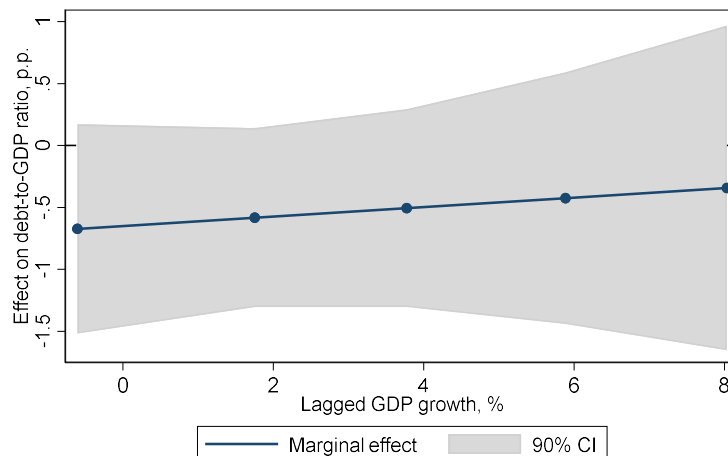
In addition, the estimations show that the effect of consolidation on debt is unrelated to the state of the economy when consolidation is implemented. The interaction between consolidation and lagged GDP growth is statistically insignificant at both the three- and five-

year horizons. This suggests that, in this specification, initial growth conditions do not strongly alter the average relationship between consolidation and subsequent debt dynamics.

Figure 5 illustrates the same mechanism by plotting the marginal effect of consolidation on debt at different levels of lagged GDP growth. The estimated marginal effect is negatively signed throughout the observed range, indicating that consolidation is associated with lower debt ratios even when initial growth is weak. However, the confidence bands are wide and include zero across the full range, so the debt-reducing effect should be interpreted cautiously.

The episode-level classification in Appendix Table A4 provides a complementary perspective. Among identified consolidation episodes with available three-year debt outcomes, 228 episodes, or 44 percent of the sample, are debt-reducing, while 290 episodes, or 56 percent of the sample, are classified as self-defeating because the debt ratio increases within three years following consolidation.

Figure 5. Net effect of fiscal consolidation on debt conditional on initial GDP impact



Notes: The figure reports the marginal effect of a fiscal consolidation shock on the five-year cumulative change in the public debt-to-GDP ratio, conditional on lagged GDP growth. Negative values indicate debt-reducing consolidations, while positive values indicate self-defeating outcomes. The shaded area denotes the 90 percent confidence interval. Sample period: 1970–2024.

Taken together, the evidence points to a nuanced conclusion. The regression estimates suggest that consolidations are, on average, associated with lower subsequent debt ratios, but the effects are not statistically precise. At the same time, the episode-level classification shows that self-defeating outcomes are frequent. This implies that fiscal consolidations are not necessarily debt-reducing: their success depends on the broader macroeconomic environment, the size and persistence of output losses, and the ability of fiscal adjustment to offset adverse denominator effects.

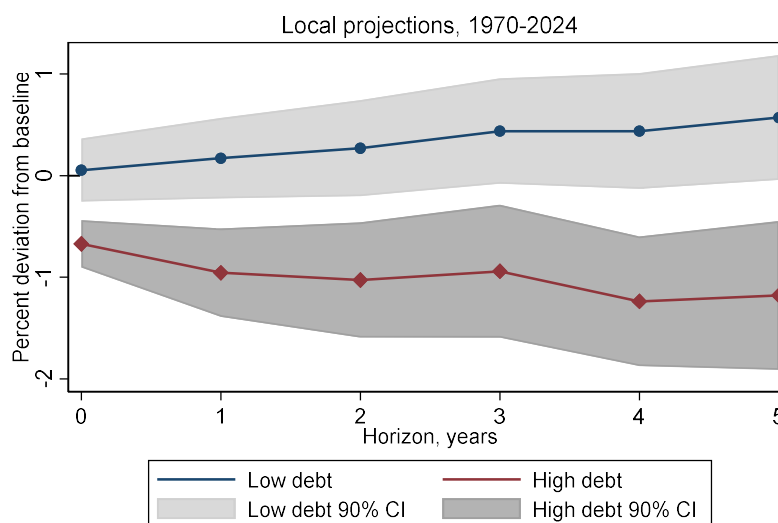
5.4 Heterogeneity, State Dependence and the role of composition

To shed further light on the findings reported above, we further explore the effects of heterogeneity across fiscal environments and adjustment strategies that may be concealed when emphasis is put on the estimation of average effects. In particular, the economic consequences of fiscal consolidation may depend on the initial fiscal position of the economy and on whether adjustment is implemented primarily through expenditure reductions or revenue increases. To investigate these issues, this section examines state dependence and composition effects using both interaction regressions and heterogeneous local projection estimates.

Following up on the previous section, we first examine whether the output effects of fiscal consolidation vary with the level of public debt prior to adjustment. Figure 6 depicts impulse response functions estimated separately for countries with high and low initial debt levels, while Table 5 reports the estimation of interaction terms in the regressions that formally test whether consolidation effects differ across debt regimes.

A clear pattern emerges from Figure 6. Consolidations implemented in high-debt environments are associated with substantially larger output losses than consolidations undertaken when debt levels are relatively low. For low-debt countries, the estimated output responses remain close to zero throughout the forecast horizon and gradually become mildly positive after three years. By contrast, high-debt economies experience persistent output declines that exceed one percent of GDP per capita at medium-term horizons. Although confidence intervals remain relatively wide, the divergence in point estimates suggests that fiscal conditions play an important role in shaping the economic consequences of adjustment.

Figure 6. Output effects of fiscal consolidation under high and low public debt



Notes: The figure reports the estimated impulse response of real GDP per capita to a one-percentage-point fiscal consolidation shock, separately for countries with high and low initial public debt levels. High debt is defined relative to the median lagged debt-to-GDP ratio among consolidation observations. The dependent variable is the cumulative percentage deviation of real GDP per capita from its pre-shock level, measured as $100[\ln(Y_{t+h}) - \ln(Y_{t-1})]$. Shaded areas denote 90 percent confidence intervals. Sample period: 1970–2024.

The interaction regressions reported in Table 5 provide additional support for this interpretation. The coefficient on the fiscal consolidation shock captures the effect of consolidation when debt levels are relatively low. Across all horizons, these coefficients are small and statistically insignificant, indicating limited output costs in lower-debt environments. By contrast, the interaction term between fiscal consolidation and high initial debt is negative at every horizon and becomes economically sizeable over time. At horizon 2, the interaction coefficient reaches -0.736 and is statistically significant at the 10 percent level. This implies that a one-percentage-point fiscal consolidation undertaken under high debt is associated with an additional output loss of approximately 0.7 percent relative to an otherwise similar consolidation implemented under lower debt conditions.

While statistical significance is limited beyond horizon 2, the consistency of the negative interaction coefficients reinforces the conclusion that fiscal consolidations tend to be more contractionary when public debt is already elevated. One possible explanation is that highly indebted economies often face tighter financial conditions, and reduced policy flexibility, limiting their ability to absorb fiscal tightening without adverse effects on economic activity.

Table 5. State dependence: fiscal consolidation and initial debt

Variable	h = 0	h = 1	h = 2	h = 3
Fiscal consolidation shock	-0.025 (0.188)	0.051 (0.243)	0.189 (0.287)	0.349 (0.322)
Shock × High initial debt	-0.358 (0.225)	-0.569 (0.357)	-0.736* (0.445)	-0.703 (0.507)
High initial debt	-0.020 (0.228)	-0.072 (0.439)	0.003 (0.652)	-0.141 (0.867)
Observations	4,264	4,263	4,262	4,259
Within R ²	0.246	0.202	0.170	0.167

Notes: Dependent variable is $100[\ln(Y_{t+h}) - \ln(Y_{t-1})]$. All regressions include country and year fixed effects, lagged output growth, lagged debt, lagged inflation, and lagged trade openness. Standard errors clustered at the country level in parentheses. High debt is defined relative to the median lagged debt ratio among consolidation observations. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

We next investigate whether the composition of fiscal adjustment influences its economic consequences. Figure 7 reports impulse response functions estimated separately for spending-based and tax-based consolidation episodes.

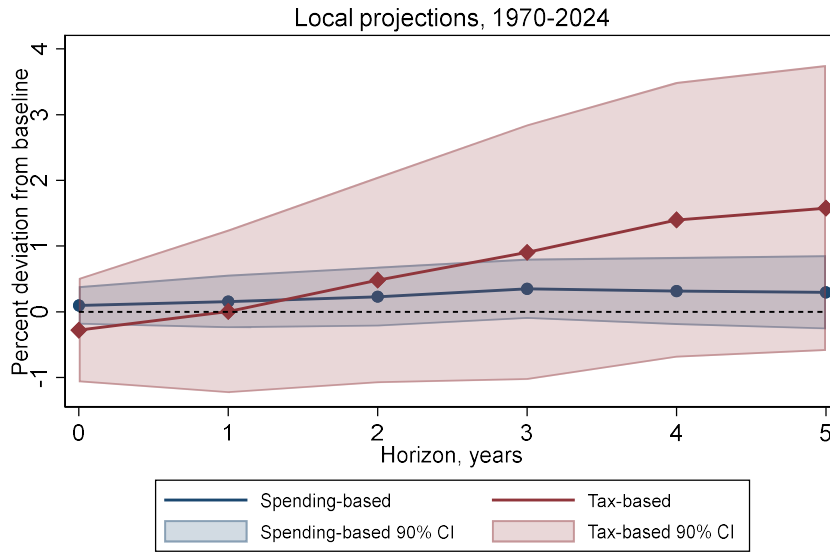
The results indicate notable differences in point estimates across consolidation types, although these differences should be interpreted cautiously. Spending-based consolidations are associated with relatively small output effects throughout the forecast horizon. The estimated responses remain close to zero and display little persistence, suggesting limited average output costs.

Tax-based consolidations exhibit increasingly positive point estimates over the forecast horizon. Taken at face value, this pattern is more favorable than that observed for spending-based consolidations. However, the associated confidence intervals are extremely wide and overlap substantially, so the difference is not statistically identified.

The absence of strong statistical differences contrasts with some earlier findings in the fiscal consolidation literature, which often report larger contractionary effects for tax-based adjustments than for expenditure-based consolidations. In the present sample, the evidence suggests that composition may matter, but the uncertainty surrounding the estimates is sufficiently large that firm conclusions cannot be drawn.

Taken together, the results of this section suggest that initial fiscal conditions appear more important than adjustment composition in explaining heterogeneity in consolidation outcomes. While there is reasonably consistent evidence that consolidations undertaken under high debt are associated with larger output costs, the distinction between spending-based and tax-based adjustments is considerably less pronounced. These findings highlight the importance of accounting for macroeconomic conditions when evaluating the likely consequences of fiscal consolidation programs.

Figure 7. Output effects of spending-based and tax-based fiscal consolidations



Notes: The figure reports the estimated impulse response of real GDP per capita to spending-based and tax-based fiscal consolidation shocks. The dependent variable is the cumulative percentage deviation of real GDP per capita from its pre-shock level, measured as $100[\ln(Y_{t+h}) - \ln(Y_{t-1})]$. Shaded areas denote 90 percent confidence intervals. The substantial overlap between confidence bands indicates considerable uncertainty regarding differences in the effects of spending-based and tax-based adjustment strategies. Sample period: 1970–2024.

6. CONCLUSION AND POLICY IMPLICATIONS

This study shows that fiscal consolidation rarely involves a simple trade-off between deficit reduction and temporary output loss. Instead, its effects on the economy depend on the composition of adjustment, initial debt conditions, and the broader macroeconomic environment. Across a large cross-country panel covering 1970–2024, output losses following consolidations appear to be modest in both short horizons and in the long run. However, in some cases a fiscal tightening has a long-run scarring effect on output, and debt-to-GDP ratios may rise rather than fall after tightening, making consolidation self-defeating.

The main empirical result from local projection estimations is that consolidation tends to reduce output growth on impact, but the effect is generally short-lived and economically modest. The DOLS estimates indicate a small negative long-run association between consolidation and real GDP per capita, while the ECM results provide evidence of gradual adjustment towards the estimated long-run relationship.. These findings matter, because they imply that the macroeconomic cost of consolidation cannot be assessed solely through contemporaneous demand-side responses. Also, debt sustainability depends not only on the size of fiscal adjustment, but also on whether the adjustment preserves the economy's productive capacity.

A second major implication of this empirical evidence concerns policy design. Expenditure-based and mixed-instrument consolidations dominate the sample, and the paper's findings suggest that the composition of adjustment matters for persistence and output effects. The broader literature suggests that adjustments protecting productive expenditure may be less damaging. The present results do not identify statistically robust differences between spending- and tax-based consolidations, however, and therefore warrant caution when drawing conclusions about composition. This is consistent with the broader literature on fiscal adjustment, but the paper adds that composition matters not just for short-run demand, but also for long-run supply-side performance.

The results also underscore the importance of state dependence. Consolidations implemented in weak macroeconomic environments or high-debt settings are more likely to generate adverse feedback loops, especially when growth is already fragile. That suggests the timing, sequencing, and composition of adjustment should reflect country-specific conditions, financing constraints, and the scope for supporting measures that protect public investment and productive capacity.

Overall, the paper argues for a more nuanced view of consolidation than the standard short-run versus long-run distinction. Fiscal tightening is likely to be necessary for restoring sustainability, but its success depends on whether it is designed and timed in a way that avoids weakening the economy's supply side. Future research could usefully explore further alternative identification strategies to deal with composition effects, sectoral channels, and the interaction between consolidation and monetary accommodation, especially in episodes where debt reduction and growth stabilization are both urgent policy goals.

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APPENDIX

Table A1. Baseline local projection estimates: cumulative output-level effects of fiscal consolidation

Horizon (Years)	Response (%)	Std. Error	90% CI
0	-0.212	0.138	[-0.439, 0.015]
1	-0.247	0.211	[-0.593, 0.100]
2	-0.195	0.267	[-0.634, 0.245]
3	-0.009	0.299	[-0.501, 0.483]
4	0.067	0.334	[-0.483, 0.617]
5	0.191	0.358	[-0.398, 0.779]

Notes: The table reports local projection estimates of the cumulative response of real GDP per capita to a fiscal consolidation shock. The dependent variable is $100 \times [\ln(Y_{c,t+h}) - \ln(Y_{c,t-1})]$, implying that coefficients can be interpreted as cumulative percentage deviations of output from its pre-shock level. Fiscal consolidation shocks are defined as positive changes in the cyclically adjusted primary balance during identified consolidation episodes. All regressions include country and year fixed effects, lagged output growth, lagged public debt, lagged inflation, and lagged trade openness. Standard errors are clustered at the country level. The sample covers 1970–2024.

Appendix Table A2. Alternative DOLS specifications

Variable	Positive dCAPB	Narrative	+ Extra controls	Advanced	EMDE
Positive dCAPB shock	-0.00930*** (0.00348)				
Narrative shock		0.0174 (0.0213)			
Baseline shock			0.000150 (0.00586)	0.000961 (0.00401)	-0.00332 (0.00375)
Debt	-0.000644* (0.000360)	-0.000682* (0.000360)	-0.000772** (0.000355)	-0.00135*** (0.000451)	-0.000682* (0.000389)
Inflation	-0.00103* (0.000530)	-0.00104* (0.000527)	-0.00296*** (0.000950)	0.000210 (0.00213)	-0.000675* (0.000383)
Trade	-3.59e-14*** (7.83e-15)	-3.63e-14*** (7.71e-15)	-3.43e-14*** (1.05e-14)	0.000816 (0.000771)	-1.55e-14*** (5.89e-15)
Investment			-0.118 (0.188)		
Unemployment			-0.0165*** (0.00334)		
Observations	3,739	3,739	2,416	1,158	3,109
Within R ²	0.587	0.586	0.763	0.766	0.540

Notes: Dependent variable is log real GDP per capita. All specifications include country and year fixed effects. Standard errors clustered at the country level are reported in parentheses. Sample period: 1970–2024. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Appendix Table A3. Error-correction estimates

Variable	Baseline ECM	+ Shock lag	+ Two shock lags
Error-correction term	-0.0520*** (0.00831)	-0.0517*** (0.00831)	-0.0516*** (0.00832)
Δ dCAPB shock	-0.00111* (0.000626)	-0.00154** (0.000727)	-0.00202** (0.000813)
L.Δ dCAPB shock		-0.00166*** (0.000551)	-0.00225*** (0.000657)
L2.Δ dCAPB shock			-0.00182*** (0.000575)
Δ Debt	-0.000937*** (0.000173)	-0.000929*** (0.000173)	-0.000925*** (0.000172)
Δ Inflation	-0.000447*** (0.0000909)	-0.000450*** (0.0000899)	-0.000452*** (0.0000890)
Δ Trade	8.28e-15*** (1.31e-15)	8.11e-15*** (1.32e-15)	7.91e-15*** (1.33e-15)
Observations	3,739	3,739	3,739
Within R ²	0.315	0.316	0.317

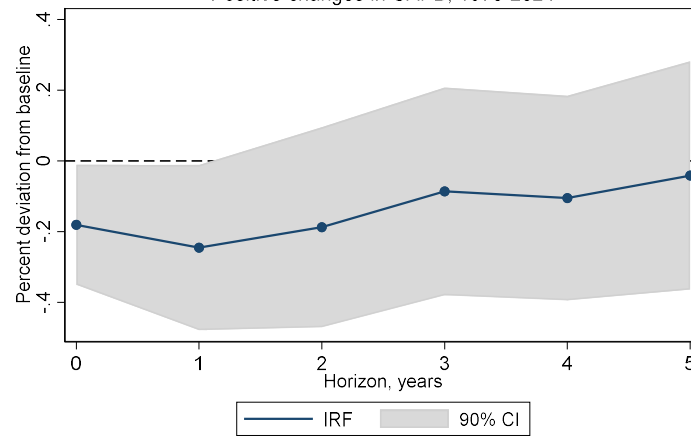
Notes: Dependent variable is change in log real GDP per capita. The error-correction term is the lagged residual from the long-run DOLS-style relationship. A negative coefficient indicates convergence to long-run equilibrium. All specifications include year effects. Standard errors clustered at the country level are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Appendix Table A4. Self-defeating consolidation episodes

Outcome	Frequency	Share (%)
Debt-reducing	228	44.02
Self-defeating	290	55.98
Total	518	100.00

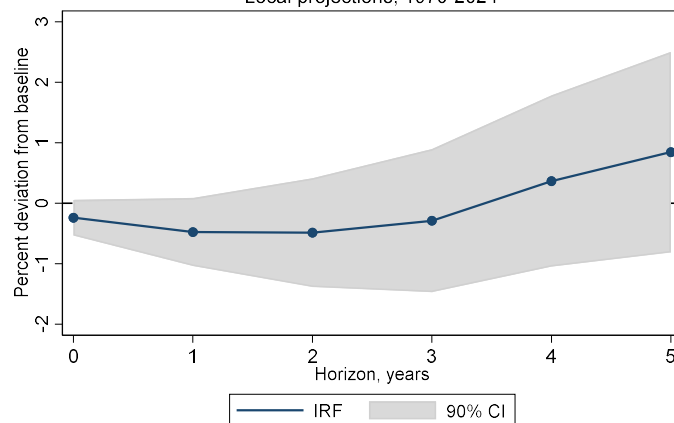
Notes: Episodes are classified as self-defeating when the public debt-to-GDP ratio increases within three years after a positive consolidation shock. Debt-reducing episodes are those in which the debt ratio does not increase over the same horizon.

Appendix Figure A1. Alternative fiscal shock
Positive changes in CAPB, 1970-2024



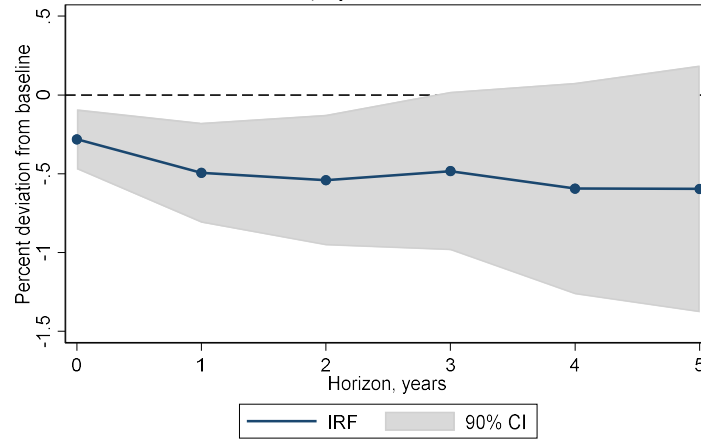
Notes: The figure reports local projection estimates using an alternative fiscal shock definition based on all positive changes in the CAPB. Shaded areas denote 90 percent confidence intervals. Sample period: 1970–2024.

Appendix Figure A2. Narrative consolidations
Local projections, 1970-2024



Notes: The figure reports local projection estimates using narrative fiscal consolidation episodes. Shaded areas denote 90 percent confidence intervals. Sample period: 1970–2024.

Appendix Figure A3. Baseline without macro controls
Local projections, 1970-2024



Notes: The figure reports local projection estimates excluding macroeconomic control variables from the baseline specification. Shaded areas denote 90 percent confidence intervals. Sample period: 1970–2024.