

Spending composition and fiscal consolidation: Enhancing resilience in the face of economic shocks

This paper examines how the composition of public spending, particularly the share of rigid expenditure such as pensions and public wages, affects the effectiveness and outcomes of fiscal consolidations in euro area countries.



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Keywords: Fiscal consolidation, public spending composition, rigid spending, local projections

JEL codes: C25, C33, H50, H62, H63

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October 9, 2025

Abstract

In the aftermath of recent shocks, including the Covid-19 pandemic, energy crisis and a changing geopolitical landscape, many European countries face high debt and increased uncertainty. A key policy question is whether EA member states can effectively implement successful consolidation plans. This paper explores how the initial composition of public spending – particularly the share of rigid expenditure such as pensions and public wages – affects a government’s ability to implement successful fiscal consolidation strategies in response to shocks. Drawing on past fiscal adjustment episodes, we develop a formal framework to assess how ex-ante fiscal conditions shape consolidation outcomes. Our analysis reveals that high share of a rigid spending significantly limits governments’ flexibility, resulting in more pronounced cuts to investment and other more flexible expenditure categories. This leads to deeper GDP contractions, slower recoveries, and less successful debt reduction in high-rigidity environments. In contrast, countries with more flexible spending structures experience more balanced expenditure cuts, resulting in more effective consolidations and greater resilience. Our findings suggest that proactive fiscal planning, including gradual shifts toward more flexible spending composition, can enhance fiscal resilience and improve the likelihood of a successful fiscal consolidation. The study offers important policy implications for governments seeking to navigate fiscal distress and long-term challenges such as ageing populations and the green transition.

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1 Introduction

In the aftermath of the COVID-19 pandemic and the 2022 energy crisis, many European countries faced a combination of high debt and high uncertainty (IMF, 2023). In this context, resilience to shocks becomes critical to preserve the confidence of markets and keep debt servicing costs low. In this study, we focus on how initial spending composition – particularly, the share of rigid expenditures like pensions and public wages – can affect the capacity of policymakers to adopt successful consolidation strategies when public debt sustainability risks intensify.

While previous research has highlighted the role of macroeconomic conditions (Perotti, 1999; Auerbach and Gorodnichenko, 2012b; Corsetti et al., 2012a) and institutional factors (Tavares, 2004; Debrun et al., 2008; Larch and Turrini, 2011) in consolidation success, the impact of pre-existing spending rigidities has received limited attention. Focusing on this element is particularly relevant given the substantial evidence on the effectiveness of spending-based consolidation strategies (SBCS) in reducing debt ratios, provided they avoid pro-cyclicality (see Alesina and Ardagna, 2013; Balasundharam et al., 2023).

This paper addresses the gap by examining how the composition of public spending shapes both the likelihood and effectiveness of fiscal consolidations. We focus specifically on ‘rigid spending’, which is politically and legally difficult to adjust. Budget rigidities are institutional, legal, contractual or other constraints that limit the government’s ability to adjust the composition and size of the budget in the short run. Following this definition, some budget components are naturally inflexible – such as public sector compensation and pensions – which we altogether define as rigid spending (see Alesina and Perotti, 1997; Holmes and Panizza, 2006; Geys and Sorensen, 2022, among others).

Our analysis makes three main contributions. First, we develop a formal framework for assessing how *ex-ante* fiscal conditions affect consolidation outcomes, moving beyond the traditional focus on contemporaneous factors. Second, we demonstrate that high rigid spending significantly constrains governments’ ability to implement successful consolidations, resulting in disproportionate reliance on cuts to more flexible expenditure categories. Third, we show that these constraints have significant macroeconomic consequences, leading to deeper GDP contractions and more persistent employment losses in high-rigidity environments.

Our results reveal that countries with high rigid spending face a particularly challenging trade-off. When fiscal consolidation becomes unavoidable, these governments typically resort to deep cuts in public investment while leaving pension and wage expenditures largely unchanged, confirming the results of Holmes and Panizza (2006). This adjustment pattern not only amplifies the short-term economic contraction but also slows the recovery and reduces the chances of successful debt reduction. In contrast, countries with more flexible spending structures tend to undertake more balanced consolidations, resulting in better macroeconomic and fiscal outcomes. In fact, high-rigidity countries may even experience an initial rise in debt ratios, as the negative growth effects dominate the fiscal gains.

These findings carry significant policy implications. They suggest that delaying fiscal adjustment until

distress materialises can be particularly costly in high spending rigidity environments. Instead, governments should consider proactive fiscal planning, gradually rebalancing their spending composition during calm times to improve flexibility. Doing so would not only improve their chances of successful adjustment when needed but also help contain risk premia and reduce debt servicing costs.

The remainder of the paper is organised as follows. Section 2 reviews the relevant literature on fiscal consolidation and expenditure rigidities. Section 3 presents stylised facts on public spending composition in the euro area. Section 4 outlines our empirical methodology including the definition of successful fiscal consolidations, while Section 5 discusses the main results. Section 6 concludes with policy implications.

2 Literature review

The literature on fiscal adjustments is extensive, covering their composition, determinants, macroeconomic impact, and distributional effects. This review focuses on three dimensions most relevant for our analysis: (i) the determinants of fiscal adjustments, (ii) their effectiveness and (iii) their macroeconomic consequences, with particular attention to the role of spending composition and rigid expenditures.

Determinants of fiscal adjustment The decision to undertake fiscal adjustment is shaped by various factors, including the initial fiscal position, macroeconomic conditions, monetary policy stance, and institutional features. The literature review indicates that the initial fiscal position is one of the main factors driving governments' decisions about adoption of fiscal measures (Guichard et al., 2007; von Hagen and Strauch, 2001). The role of macroeconomic and monetary conditions on fiscal position is debated. While von Hagen and Strauch (2001) find that a positive output gap increases the likelihood of starting fiscal tightening, others argue that fiscal consolidation is more likely to follow sharp economic downturns (Drazen and Grilli, 1993; Plekhanov et al., 2007). Loose monetary policy has also been found to facilitate fiscal adjustment by counterbalancing the effect of fiscal tightening (Ahrend et al., 2006). In particular, interest rates are more likely to fall during episodes characterised by greater reliance on current expenditure cuts, which markets may interpret as higher-quality adjustments. This result is partly confirmed by von Hagen and Strauch (2001) who found a positive lagged impact of easy monetary conditions on fiscal consolidation. Contrary to expectations, an exchange rate depreciation does not support fiscal adjustments (Alesina and Perotti, 1997; Guichard et al., 2007; Barrios et al., 2010).

The impact of fiscal governance and rules is less conclusive. Guichard et al. (2007) and Commission (2007) suggest that fiscal rules – especially expenditure rules – support longer and more sustained consolidations. In addition, combining a budget and an expenditure rule helps to achieve and maintain a primary balance which stabilises the debt-to-GDP ratio. However, Barrios et al. (2010) find no robust evidence that fiscal institutions systematically affect fiscal effort.

Political variables also matter: Alesina et al. (1995) suggest coalition governments are less likely to consolidate, while consolidation is equally probable in case of left-wing or centrist governments being in

power. Guichard et al. (2007) suggest that fiscal adjustment tends to occur after elections, though this finding is not confirmed by Commission (2007) and Munoz and Olaberria (2019). Additionally, countries with a larger degree of centralisation tend to make greater fiscal effort (Foremny et al., 2017).

While a healthy banking sector, loose monetary policy, and fiscal rules were found to be needed for a successful fiscal consolidation (Barrios et al., 2010; Ahrend et al., 2006; Commission, 2007), the size and the intensity of consolidation also matter. Longer episodes are usually more sizeable and vice versa (Guichard et al., 2007) but they can lead to fiscal fatigue and increase the risk of reverting introduced measures (von Hagen and Strauch, 2001).

Spending composition and rigid expenditures There is broad agreement that spending-based consolidations are more successful in stabilising public debt compared to tax-based ones, as they are often associated with structural reforms (see Alesina and Ardagna (1998, 2013); Barrios et al. (2010); Guichard et al. (2007); von Hagen and Strauch (2001)). However, the role of pre-existing spending composition in shaping the feasibility and success of consolidation remains underexplored. Munoz and Olaberria (2019) find that countries with high shares of rigid spending (public wages, pensions and interest payments) are more likely to experience fiscal distress and less likely to initiate successful consolidations. This result is particularly robust for pension expenditures. For euro area countries with large public sectors and ageing populations, these constraints are especially concerning.

The implementation of pension reforms can also carry sizeable political costs (Kitao, 2017). Pension reforms – aimed at rationalising public spending and restoring sustainability of public finances – are likely to be overturned when they lead to important short-term losses in pensioners’ retirement incomes. According to EC (2021), such policy reversals took place in Poland (2016), Germany (2018), Croatia (2019), the Netherlands (2019), and Spain (2020 and 2021). A recent work by IMF (2025) found that pension reform announcements are met with pronounced and persistent deterioration in public sentiment. This can, however, be mitigated when macroeconomic conditions, governance quality and the government’s ability to compensate affected groups are taken into account when designing pension reforms.

While previous studies have extensively analysed factors influencing fiscal consolidation, rigid spending has received limited empirical attention as a structural constraint shaping both the feasibility and success of consolidation. This paper addresses that gap by assessing how rigid spending affects both consolidation feasibility and macroeconomic outcomes.

Macroeconomic effects and identification challenges Understanding the macroeconomic consequences of fiscal adjustments is central to designing effective and responsible fiscal policies. However, studying this relationship is not straightforward as the budget balance depends both on adopted discretionary measures and the business cycle. This has led to two main approaches for identifying exogenous fiscal shocks.

The first approach uses changes in the cyclically adjusted primary balance (CAPB), typically as a percentage of potential GDP, to infer fiscal impulses (Alesina and Ardagna (2013)). However, this measure

has certain limitations. As noted by Pescatori et al. (2011), this policy measure can capture non-policy factors correlated with the economic cycle, such as stock market fluctuations that affect capital gains and tax revenues. CAPB also reflects both systematic policy responses to the cycle (typically measured as an output gap) and exogenous shocks, making interpretation difficult (Gali and Perotti (2003), Auerbach and Gorodnichenko (2012b) and Corsetti et al. (2012b)). In other words, as Georgantas et al. (2023) point out, rational agents have knowledge of the fiscal policy rule and may anticipate fiscal actions, blurring the distinction between systematic and unanticipated fiscal policy shifts. To isolate the truly exogenous component, one must estimate a fiscal policy rule that identifies the fiscal shock by accounting for past fiscal policy changes and country-specific fiscal fundamentals, such as indebtedness.

The second approach – the narrative method – relies on policy documents to identify discretionary fiscal actions aimed at deficit reduction or medium- to long-term growth objectives ((Guajardo et al., 2014; Alesina et al., 2015)). Nevertheless, the narrative approach is not without criticism. While it offers greater interpretability, it suffers from researcher subjectivity and often includes a significant endogenous component, as demonstrated by Alesina et al. (2019). Moreover, Òscar Jordà and Taylor (2013) show that narrative measures contain a significant forecastable component and propose using inverse propensity score weighting and additional controls to reduce bias.

For this reason, we adopt the first approach, leveraging a fiscal policy rule to isolate the exogenous component of discretionary fiscal policy and identifying the fiscal consolidation shock as a subset of the residuals derived from the estimation of the rule. In our main model, where the dependent variable is regressed on this residual, we include additional control variables to account for other relevant factors.

Once an exogenous, or assumed exogenous, measure of fiscal consolidation is identified, an estimation of the fiscal multiplier and the impact of consolidation on various macroeconomic variables is possible. A strand of literature, including Alesina and Perotti (1997) and Alesina et al. (2002), highlights how certain austerity episodes have led to increased economic growth, coining the term "expansionary austerity". However, the results in Guajardo et al. (2014), which employ a series of narrative fiscal shocks, suggest the opposite effect, showing a negative and persistent impact on private consumption and GDP. Òscar Jordà and Taylor (2013) confirm the negative effects of fiscal consolidation on GDP, noting, however, that this impact is minimised and less significant during economic booms.

By employing methods such as local projections (as in Òscar Jordà and Taylor (2013)), smooth-transition VAR (as in Auerbach and Gorodnichenko (2012a)), or threshold VAR models (as in Fazzari et al. (2015)), state-dependent responses could be obtained, varying according to the phase of the business cycle (expansion or recession) in which the consolidation was implemented. Recent works by Banerjee and Zampolli (2019) and Georgantas et al. (2023) examine the effects of fiscal consolidation shocks across various states beyond the business cycle, such as by differentiating initial debt levels, monetary policy stances, degrees of trade openness, and levels of financial stability. While the literature on fiscal multipliers (e.g. Guajardo et al. (2014); Fazzari et al. (2015) suggests that consolidation effects depend on the economic cycle and policy mix,

it has not explicitly examined how pre-existing budget rigidities influence the economic costs of adjustment.

3 Stylized facts

Understanding the composition of public spending is crucial for assessing the feasibility and effectiveness of fiscal consolidation. While total public spending has fluctuated over time in response to economic conditions and policy interventions, the composition of spending – particularly the share allocated to rigid expenditures such as pensions and public wages – has remained remarkably stable. This has significant implications for fiscal adjustment strategies, as governments with a high share of rigid spending face greater constraints in implementing successful fiscal consolidations.

This section presents key stylised facts on spending trends across euro area countries, with a focus on the persistence of rigid spending and its role in shaping fiscal performance and consolidation strategies.

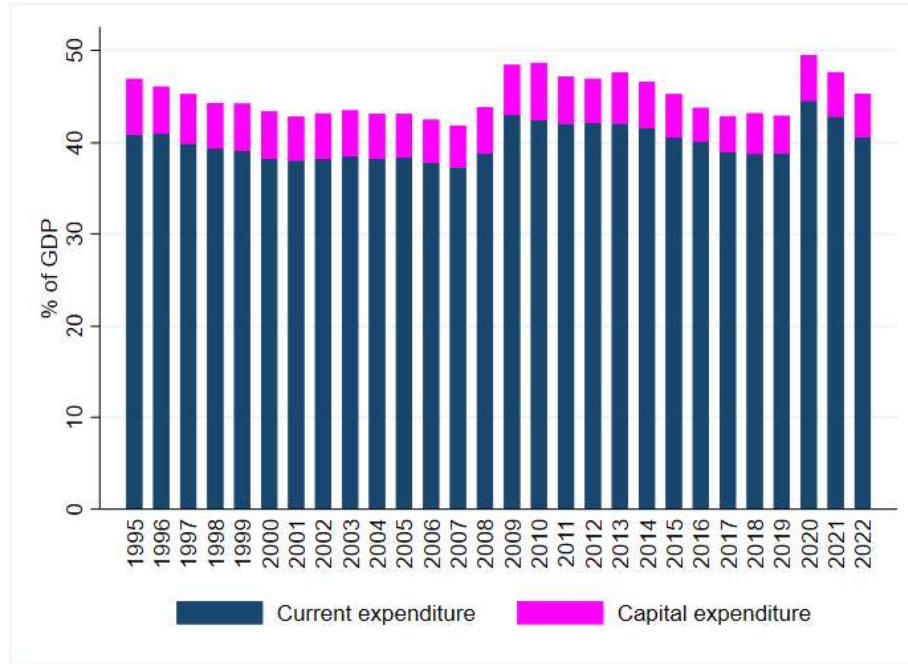
3.1 General spending trends

Public spending as a share of GDP has fluctuated significantly over the past two decades (Figure 1) driven by major economic shocks such as the Global Financial Crisis (GFC), the European Sovereign Debt Crisis and the COVID-19 pandemic. During crisis episodes, public expenditures typically increase due to automatic stabilisers and discretionary stimulus measures, while fiscal adjustments often follow during recovery periods.

At the euro area level, public expenditure remained below 50% of GDP in early 2000s, reaching its low of 42% of GDP in 2007, before rising sharply during the GFC to 48.6% of GDP in 2010. This was followed by a consolidation process which led to a gradual decline of public spending to slightly below 43% of GDP by 2019 (Figure 1). However, the COVID-19 crisis led to its historic high of 49.5 % of GDP in 2020, followed by another gradual consolidation.

Despite these fluctuations in total public expenditure, its composition has remained relatively stable. Rigid expenditures – mainly pensions (social transfers) and public sector wages – have accounted for a significant and somewhat increasing share of total, rising by about 3.7 percentage points between 2007 and 2019. Despite various consolidation efforts, countries have generally struggled to reduce rigid expenditures, relying instead on cuts to more flexible categories such as public investment (Figure 2). While social transfers declined slightly between 2020 and 2022 (by about 1 percentage point) due to the phase-out of temporary subsidies, rigid spending remains a dominant and persistent component of public finances.

Figure 1: *Public spending in the EA19, % of GDP*



Source: Eurostat

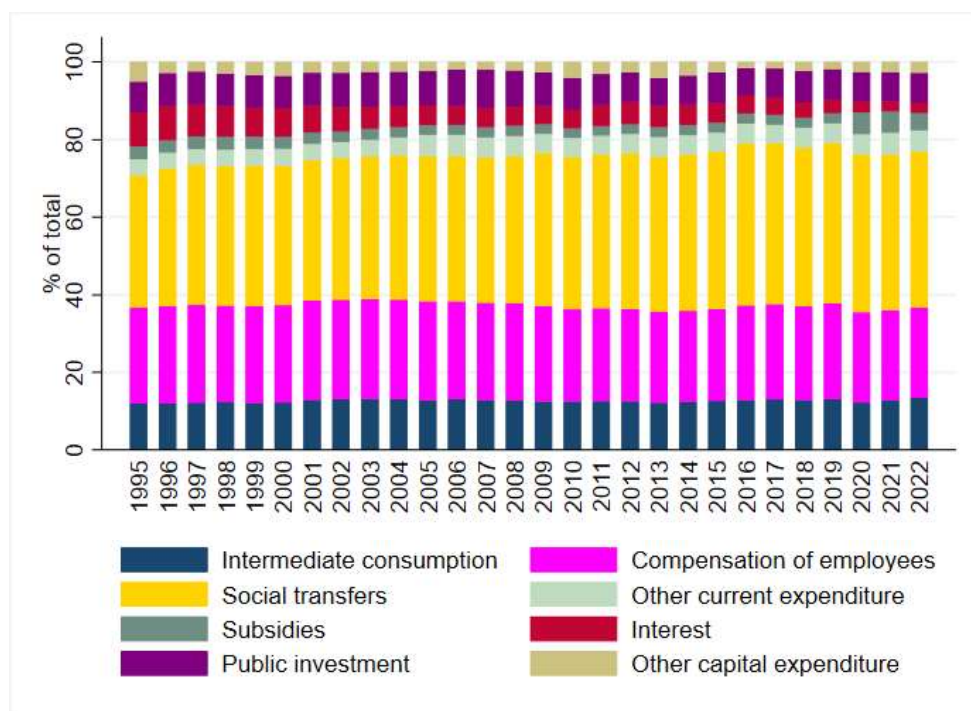
The overall level of public spending varies substantially across euro area countries. Based on primary expenditure-to-GDP ratio, we can categorise the EA countries into two groups.

- High-spending countries: Public primary spending exceeded 45% of GDP in countries such as France, Italy, Belgium, Greece, Austria and Finland in the period 2015-2019.
- Lower-spending countries: Smaller euro area economies, Central and Eastern European countries and some former ESM beneficiaries (Spain and Ireland) ¹ that maintained primary spending closer to 40% of GDP or below in the same period (Figure A.1).

Despite these differences, the dominance of social transfers and public wages as key spending components is consistent across countries, reinforcing the significance of rigid expenditures in shaping fiscal dynamics (Figure A.2).

¹Beneficiary member states (BMS) include Cyprus, Greece, Ireland, Portugal, and Spain.

Figure 2: *Decomposition of public expenditure in EA19, % of total*



Source: Eurostat

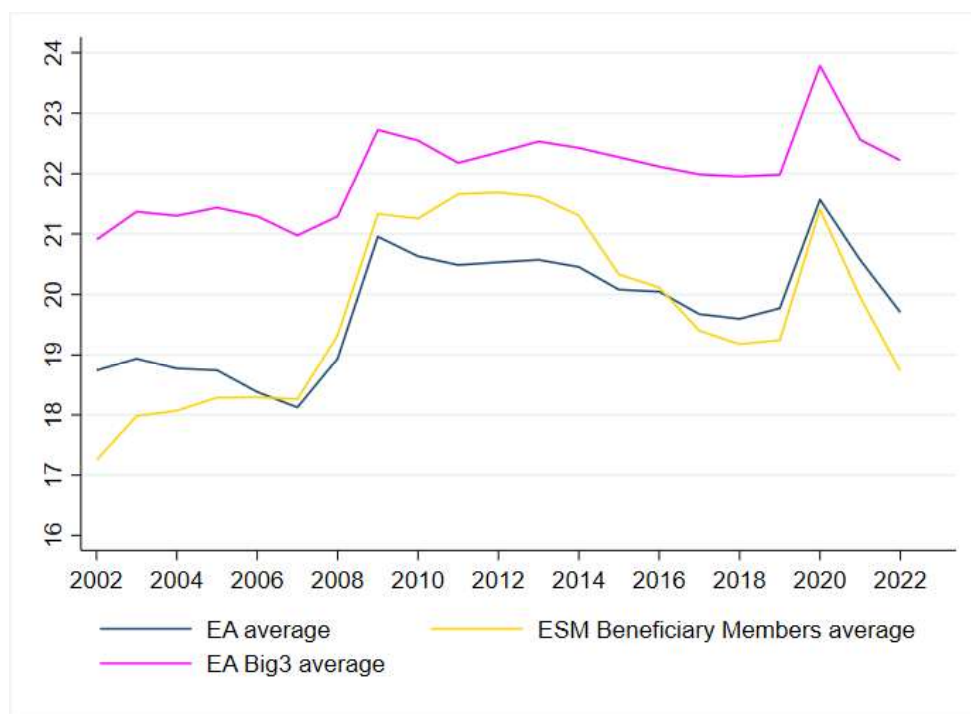
3.2 Role of "rigid spending"

Rigid spending plays a central role in determining how fiscal adjustments unfold across euro area countries. A key distinction emerges between BMS countries (those that received financial assistance programmes) and the Big-3 (Germany, France, and Italy).

During the GFC, rigid spending as a % of GDP increased across the euro area, but the increase was particularly pronounced in BMS, where public wages accounted for a larger share of primary expenditure (Figure A.3). In the aftermath of the crisis, BMS were obliged to reduce rigid spending more aggressively, either to restore fiscal balances or under the conditionality of financial assistance programmes. These adjustments were gradual, with rigid spending declining by almost 2.5 percentage points of GDP between 2012 and 2019 (Figure 3). Yet, as a share of primary expenditure, rigid spending increased by about 3 percentage points, largely at the expense of public services (Figure A.5). The Big-3 countries, in contrast, maintained structurally high spending, particularly on pensions and public sector wages, making spending-based adjustments more difficult.

Because of these rigidities, many governments – especially in BMS countries – relied instead on deep cuts to public investment, reinforcing the role of spending rigidities in shaping fiscal consolidation strategies.

Figure 3: *Rigid spending, % of GDP*



Source: Eurostat

Figure 4 shows a negative correlation between rigid spending and primary balances across euro area countries in 2020. Countries with large shares of rigid spending faced difficulties in re-allocating budgetary funds at short notice to extend pandemic support, which worsened their overall fiscal outcome. In contrast, countries with lower rigid spending had greater fiscal flexibility, allowing them to maintain stronger fiscal positions in the face of large shocks, as was the pandemic.

3.3 Institutional and legal barriers to adjusting rigid spending

Adjusting rigid spending is not only politically sensitive, it is also constrained by institutional and legal frameworks. Some rigid expenditures can be institutionally embedded through constitutional provisions, laws or decrees that earmark revenues, minimum spending requirements, or link spending to macroeconomic variables such as inflation, growth, or unemployment.²

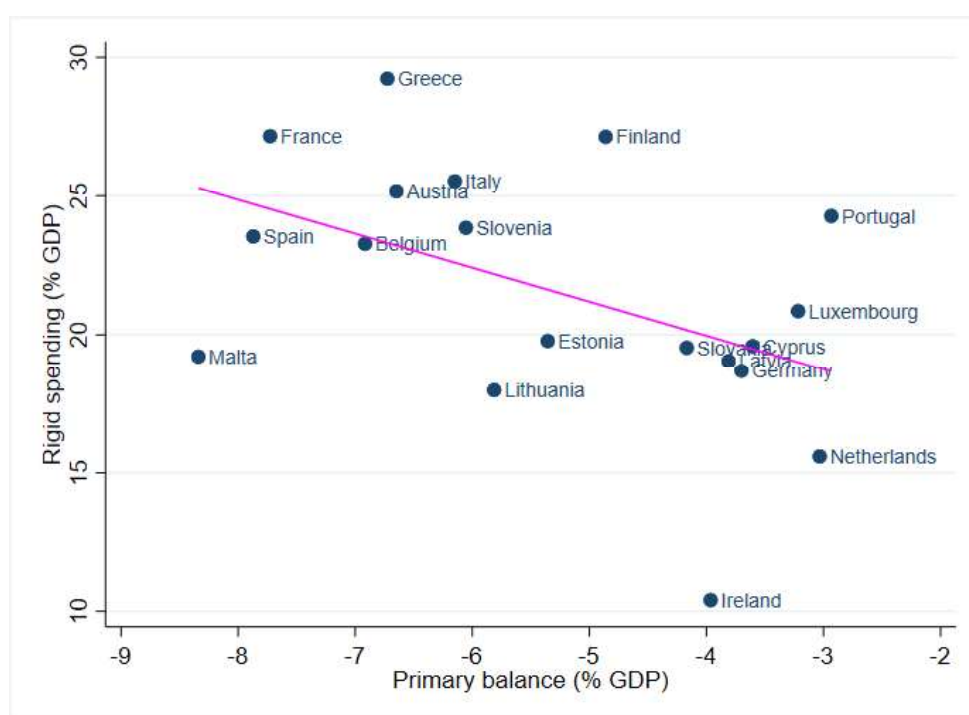
Moreover, the pace of adjustment is slow: countries typically require several years to reduce rigid spending. BMS countries, having already undergone significant adjustments in the past, may face stronger reform fatigue, making further reductions in rigid spending particularly difficult – Greece being a notable example.

²Differences in institutional settings across countries represent a major obstacle to systematically collecting international data for comparison purposes, as comparing budget rigidity across countries requires making judgments about the strength of similar constraints in different institutional settings and political realities.

Large euro area countries with structurally high public expenditures, such as France, despite repeated reform efforts, continue to face entrenched spending rigidities.

Beyond political will, successful reform also requires institutional and administrative capacity. However, institutional weaknesses may further constrain fiscal flexibility. According to the Worldwide Governance Indicators, countries such as Greece, Italy, and Slovakia lag significantly behind the euro area average in institutional quality, executive capacity and accountability. Even when reform is politically feasible, weak administrative capacity may hinder effective implementation.

Figure 4: *Primary balance and rigid spending in 2020, % of GDP*



Source: Eurostat, own calculations.

The next section empirically examines how rigid spending affects both the feasibility and macroeconomic impact of fiscal consolidation strategies across euro area countries.

4 Data and Methodology

4.1 Estimating determinants of successful fiscal consolidations

4.1.1 Defining fiscal consolidation episodes and their success

We define fiscal consolidation episodes following Alesina and Ardagna (2013), identifying periods in which the cyclically-adjusted primary balance improves each year of the episode and cumulatively by at least 2 percentage points of GDP for two-year episodes or 3 percentage points of GDP for episodes lasting three or more years. This definition - our starting point for the analysis - includes both systematic and exogenous policy components. A consolidation episode is considered successful if, two years after the adjustment, the debt-to-GDP ratio is lower than at the end of the consolidation period.

We apply this definition to a panel of 19 euro area countries (excluding Croatia), covering the period 1995–2022. A full list of identified episodes and successful consolidation episodes is presented in Table 1.

Table 1: *Identified fiscal consolidation episodes*

	Fiscal consolidation episodes	Successful fiscal consolidation episodes
Austria	1996-1997; 2022-2023	
Belgium		
Cyprus	2004-2007; 2012-2013; 2021-2023	
Germany	1996-1999; 2003-2007; 2011-2015	1996-1999; 2011-2015
Estonia	2009-2010; 2021-2023	1999-2004
Spain	2010-2014	2010-2014
Finland	1996-1998; 2021-2022	1996-1998
France		
Greece	1999-2000; 2010-2012; 2022-2023	2022-2023
Ireland	2003-2004; 2011-2013; 2016-2019; 2022-2023	2003-2004; 2011-2013; 2016-2019
Italy	1996-1997; 2011-2013; 2022-2023	1996-1997
Lithuania	1998-2000; 2009-2010; 2021-2023	1998-2000
Luxembourg	2000-2001; 2005-2008	2000-2001
Latvia	2000-2001; 2009-2012; 2022-2023	2000-2001; 2009-2012
Malta	1999-2002; 2004-2006; 2016-2017; 2022-2023	2004-2006; 2016-2017
Netherlands	2004-2005; 2012-2013	2004-2005; 2012-2013
Portugal	2006-2007; 2011-2013; 2015-2016	2011-2013; 2015-2016
Slovenia	2014-2015; 2021-2023	2014-2015
Slovakia	1997-1999; 2003-2004; 2011-2013	2003-2004; 2011-2013

4.1.2 Heckman probit estimation

To account for the interdependence between the decision to consolidate and the likelihood of success (Barrios et al. (e.g. 2010)), we estimate a two-step Heckman probit model. This allows us to jointly model the probability of undertaking a fiscal consolidation (the first-step equation) and the probability of its success (the second-step equation), conditional on a consolidation being undertaken. To ensure model identification, the first step equation (selection equation) needs to contain all regressors used in the second step equation plus at least one additional factor. Following Barrios et al. (2010), we use the general elections dummy in a given country i in a preceding year ($t-1$) to help determine the decision of the country i to consolidate in the current year t .

The probit model with sample selection (Van de Ven and Van Praag, 1981) assumes an underlying relationship

$$y_{it}^* = x_{it}\beta + \mu_{1it}, \quad (1)$$

such that we observe the binary outcome (country-years of successful consolidation episodes)

$$y_{it}^{probit} = (y_{it}^* > 0) \quad (2)$$

and the dependent variable for observation it (a country-year in a consolidation episode) is observed if the following holds

$$y_{it}^{select} = (z_{it}\gamma + \mu_{2it} > 0), \quad (3)$$

where

$$\mu_1 \sim N(0, 1) \quad \mu_2 \sim N(0, 1) \quad corr(\mu_1, \mu_2) = \rho \quad (4)$$

When $\rho \neq 0$, standard probit techniques applied to Equation 1 yield biased results. In such case, the two-step Heckman probit model would provide consistent, asymptotically efficient estimates for all the parameters.

In line with the literature (e.g. Barrios et al. (2010); von Hagen and Strauch (2001); Molnar (2012)), we control for a broad set of variables, in addition to the share of rigid spending:

- *Spending composition*: share rigid spending (public wages and old-age pensions) on primary expenditure in the year preceding a consolidation year.
- *Increases in the debt-to-GDP in year ($t-1$)*: An increasing debt ratio could motivate the need to undertake a fiscal adjustment in the future.
- *Level of and increases in primary expenditure-to-GDP in ($t-1$)*: High and increasing expenditure could raise a need to consolidate.

- *Monetary policy conditions:* These are captured by the monetary conditions index (MCI) following von Hagen and Strauch (2001) – a weighted average of a real effective exchange rate and a short-term interest rate with the weights based on standard deviation of the components.
- *Business cycle position:* This is captured by dummies for phases of the business cycle; expansion when output gap (OG) is positive and GDP growth is positive, downturn when OG is positive and GDP growth is negative, slowdown when OG is negative and GDP growth is negative, and recovery when OG is negative and GDP growth is positive.
- *Regulatory quality:* We control for this by using the regulatory quality index of the World Bank.
- *Fiscal rules:* We control for fiscal rules in effect for each country-year by including either fiscal rule dummies for individual fiscal rules separately (budget balance rule, debt rule, expenditure rule and revenue rule) or by including a control for the number of all fiscal rules in effect in each country-year. The data come from the IMF Fiscal Rules Database. Alternatively, we include increases in the European Commission’s Fiscal Rules Index (FRI).
- *Political system:* We control for the level of autonomy in fiscal governance on a sub-national level by including a federation dummy.
- *Government composition:* Following Molnar (2012), we control for increases in leftist and rightist leaning of the government in each country-year by including indicators measuring the percentage of cabinet posts held by right-wing and left-wing parties, respectively. The data come from the Comparative Political Dataset compiled by the University of Zurich, Leuphana University and University of Lucerne.
- *Official programmes:* Program periods are often accompanied by improved budget dynamics. We control for this by including a programme dummy which takes into account both IMF and ESM financial assistance programmes.
- *Financial crises:* We capture systemic financial crises episodes via a dummy using the ESRB Systemic Financial Crises Database.
- *Elections in year ($t-1$):* In the first step of the model, the selection equation, we include a dummy variable for both parliamentary and presidential elections taking place in each country-year.

4.1.3 Assessment of a likelihood to consolidate successfully

We evaluate the in-sample predictive power of the Heckman model using a signalling approach commonly used in the early warning literature (e.g. Alessi and Detken, 2011) for financial crises. A signal is issued when the probability index from the Heckman probit model exceeds a critical threshold and each country-year falls into a single quadrant of Table 2:

Table 2: *Classification matrix*

	Successful consoli- dation (conditional on consolidation taking place)	No successful con- solidation (con- ditional on con- solidation taking place)
Signal issued	True positive	False positive
No signal issued	False negative	True negative

The missed events rate can be obtained by dividing the number of false negatives by the number of periods in which successful consolidations took place (conditional on consolidations being undertaken in those periods):

$$Missed\ events\ rate = \frac{\sum False\ negative}{\sum False\ negative + \sum True\ positive}, \quad (5)$$

while false alarms rate can be calculated by dividing the number of false alarms by the number of periods in which there were no successful consolidations (conditional on consolidations taking place in those periods):

$$False\ alarms\ rate = \frac{\sum False\ positive}{\sum False\ positive + \sum True\ negative}. \quad (6)$$

Following Alessi and Detken (2011), we calculate the overall utility of each indicator using the function:

$$U = \min(\theta, 1 - \theta) - (\theta \times Missed\ events\ rate + (1 - \theta) \times False\ alarms\ rate), \quad (7)$$

where θ captures a policymaker's preferences between missing events and issuing false alarms of a success of fiscal consolidation (conditional on consolidation taking place). If θ is below 0.5, the policymaker is less averse towards missing a signal for a successful consolidation taking place than they are towards receiving a false alarm, and vice versa. Assuming balanced preferences with θ equal to 0.5, we search for the threshold that maximizes the utility function in Equation 7. This identifies the probability cutoff above which a consolidation is likely to succeed, and vice versa.

4.2 Estimating fiscal consolidation effects and spending composition adjustment

4.2.1 Fiscal policy rule

In the second part of this paper, we explore the macroeconomic consequences of fiscal adjustments, considering a country's initial spending composition. For this purpose, we use the local projection method (Jordà (2005)) which, as a single-equation method, is flexible and particularly useful for estimating nonlinear and state-dependent effects, as highlighted in Jordà and Taylor (2024).

As mentioned previously, fiscal episodes identified in line with Alesina and Ardagna (2013) are not exogenous to economic conditions. Hence, using them for identifying economic consequences of fiscal adjustment

becomes problematic. To overcome this issue, we employ a fiscal policy rule to isolate the non-predictable component of fiscal policy and obtain consistent estimates.

The construction of our fiscal policy rule builds on several examples from the literature, already referenced in section 2 and further elaborated in the recent work of Georgantzas et al. (2023). The fiscal rule is specified as follows:

$$\Delta CAPB_{i,t} = \alpha_i + v_t + \beta_0 * \Delta CAPB_{i,t-1} + \beta_1 * OG_{i,t} + \beta_2 * Debt_{i,t-1} + \epsilon_{i,t} \quad (8)$$

where α_i captures the unobserved country-specific effects, v_t accounts for the time-specific effects, $\Delta CAPB$ denotes the change in the cyclically adjusted primary balance as a percentage of potential GDP ³, OG represents the output gap (instrumented using its own lag and the first lag of the real GDP growth rate), and $Debt$ indicates the debt-to-GDP ratio.

The fiscal consolidation shock used to estimate impulse responses through local projections is constructed based on $\epsilon_{i,t}$. As previously highlighted, we impose not only a positive sign (indicating an improvement in the cyclically adjusted primary balance) but also the additional magnitude conditions in line with Alesina and Ardagna (2013). Specifically, a fiscal consolidation shock is identified if $\epsilon_{i,t}$ is positive for two consecutive years and cumulatively amounts to at least 2 percentage points of GDP, or if it is positive for three (or more) consecutive years and exceeds 3 percentage points of GDP. In brief: $D_{i,t} = \epsilon_{i,t}$ if $\epsilon_{i,t} > 0$ and the magnitude conditions are satisfied; $D_{i,t} = 0$ otherwise.

4.2.2 Local projections

We construct a series of local projections for a range of macroeconomic variables, including GDP growth, private consumption and investment. This approach yields cumulative responses of the dependent variables $Y_{i,t}$ over a maximum horizon of $h_{max} = 4$ to a consolidation shock $D_{i,t}$, obtained by regressing $Y_{i,t}$ on $D_{i,t}$ and a set of control variables $X_{i,t-1}$:

$$Y_{t+h} - Y_{i,t-1} = \alpha_{i,h} + \beta_h * D_{i,t} + \gamma_{1,h} * X_{i,t-1} + \gamma_{2,h} * Fin_crisis_{i,t} + \gamma_{3,h} * covid_t + u_{i,t+h} \quad (9)$$

$\alpha_{i,h}$ stands for country effects, β_h captures the effects of fiscal consolidation h periods after the shock, Fin_crisis is a dummy variable that accounts for episodes of systemic financial crises, while $covid$ is a dummy variable equal to 1 in 2020. Control variables included in $X_{i,t-1}$ are the lag of: real GDP growth rate, the monetary condition index (MCI), CPI, trade openness, net exports to GDP ratio and public debt to GDP ratio. In addition, each local projection includes first lag of log changes in the dependent variable.

We are interested in estimating the responses of the same variables in two different states of the economy, characterised by varying degrees of budget rigidity. The degree of rigidity is determined by the share of compensation of employees and old-age pensions in primary spending. We define an indicator function $I_{i,t}$,

³The CAPB variable considered here has been slightly adjusted by excluding a specific expenditure category, capital transfers, from its calculation. Detailed information regarding this exclusion can be found in subsection A

which takes the value 1 if the share of rigid spending for country i in year t exceeds the median share across all countries in the same year t . Otherwise, the function takes the value 0. So, when $I_{i,t} = 1$, it denotes a high-rigidity state, while $I_{i,t} = 0$ represents a low-rigidity state. We interact its first lag with treatment and control variables:

$$Y_{t+h} - Y_{i,t-1} = I_{i,t-1}[\beta_{HR,h} * D_{i,t} + \gamma_{1HR,h} * X_{i,t-1}] + (1 - I_{i,t-1})[\beta_{LR,h} * D_{i,t} + \gamma_{1LR,h} * X_{i,t-1}] + \alpha_{i,h} + \gamma_2 * Fin_crisis_{i,t} + \gamma_3 * covid_t + u_{i,t+h} \quad (10)$$

The responses of variable $Y_{i,t+h} - Y_{i,t-1}$ at horizon h are provided by the coefficients $\beta_{HR,h}$ in the high rigidity state and by $\beta_{LR,h}$ in the low rigidity state.

Finally, after examining the effects and effectiveness of fiscal consolidations, focusing on their capacity to reduce the debt-to-GDP ratio and facilitate a rapid recovery of GDP, we aim to conduct a dynamic analysis of the composition of consolidation shocks on the expenditure side. Instead of focusing on overall public expenditure, we analyze specific spending categories, adjusting for cyclical factors where necessary, using a model similar to the one described above. The impulse responses of these variables to a fiscal consolidation shock can be interpreted as the sensitivity (or flexibility) of each expenditure category to fiscal consolidation decisions.

Following Banerjee and Zampolli (2019), we rescale our dependent variables using the total (cyclically adjusted) primary expenditure:

$$(Y_{t+h} - Y_{i,t-1}) / (Cyc.Adj.Prim.Exp.)_{t-1} = \alpha_{i,h} + \beta_h * D_{i,t} + \gamma_{1,h} * X_{i,t-1} + \gamma_{2,h} * Fin_crisis_{i,t} + \gamma_{3,h} * covid_t + u_{i,t+h} \quad (11)$$

This rescaling allows us to interpret the impulse response of any specific category of public expenditure (e.g., compensation of employees) as its contribution, in percentage terms, to the cumulative change in primary expenditure in response to a fiscal consolidation shock of 1 percentage point of (potential) GDP to the CAPB. The sum of the impulse responses of all expenditure categories approximates the overall response of primary expenditure to a consolidation shock.

As with the other variables, we estimate these impulse responses in the two different states of the economy. This approach enables us to assess differences in spending composition in reaction to a fiscal consolidation shock between countries with different levels of rigid spending. The impulse response of individual expenditure categories can be viewed as a change in the composition of the fiscal consolidation shock, whose macroeconomic effects were examined using local projections in Equation 9 and Equation 10. The responses in subsequent periods reveal the speed at which individual expenditure categories return to their pre-shock levels. In such cases, certain categories of expenditure are disproportionately affected, while others are less impacted. This will be a critical element for interpreting the varying effectiveness of fiscal consolidation under different economic regimes.

To conclude, by combining these methods we gain a more comprehensive understanding of fiscal consolidations: the Heckman model helps us assess the preexisting conditions and the likelihood of a successful

consolidation, while the impulse response analysis evaluates its macroeconomic consequences, ensuring that the results are not biased by reverse causality or policy anticipation effects.

5 Results

5.1 Heckman probit

5.1.1 The determinants of fiscal consolidation and its success

Our analysis shows that high rigid spending significantly reduces the likelihood of a successful consolidation, but it does not necessarily prevent countries from initiating a consolidation effort. Macroeconomic conditions, fiscal rules, institutional quality, and political dynamics also play key roles in determining the feasibility and success of a consolidation.

We present estimates of the Heckman model using various specifications (1 to 4). Among them, model (4) demonstrates the strongest signaling power, making it our preferred choice for visualising the probability of a successful fiscal consolidation, conditional on the decision to consolidate, as shown in Figure 5.

Table 3: *Rigid spending plays an important role in determining a success of fiscal consolidations*

	(1) Successful fiscal consolidation	(1) Fiscal consolidation	(2) Successful fiscal consolidation	(2) Fiscal consolidation	(3) Successful fiscal consolidation	(3) Fiscal consolidation	(4) Successful fiscal consolidation	(4) Fiscal consolidation
Elections (t-1)		0.24* (0.14)		0.23* (0.12)		0.29** (0.14)		0.28* (0.14)
Rigid spending (t-1)	-13.14** (6.11)	-2.15 (1.73)	-11.34** (5.02)	-1.96 (2.14)	-23.61*** (8.92)	-2.41 (2.25)	-20.33** (8.71)	-2.06 (2.21)
delta debt/GDP (t-1)				0.053** (0.02)		0.07** (0.03)		0.06** (0.02)
expenditure/GDP (t-1)		-0.04** (0.02)						
delta expenditure/GDP (t-1)				-0.01 (0.03)	-0.22*** (0.06)	-0.07 (0.05)	-0.20*** (0.05)	-0.06 (0.04)
delta MCI	0.14 (0.13)	0.02 (0.07)	0.17* (0.10)	0.11 (0.07)	0.02 (0.21)	0.05 (0.06)	-0.04 (0.18)	0.08* (0.05)
Regulatory quality		-0.05 (0.24)		0.36 (0.24)		0.36 (0.26)		0.43* (0.26)
Federation	-1.26** (0.49)	0.16 (0.43)	-0.83* (0.47)	-0.14 (0.45)	-1.95** (0.85)	-0.15 (0.46)	-1.76** (0.75)	-0.18 (0.44)
Financial crisis	-0.24 (0.34)	0.38** (0.17)	0.17 (0.22)	0.09 (0.19)	0.54** (0.24)	0.20 (0.17)	0.45 (0.28)	0.23 (0.19)

Continued on next page

Table 3: *Rigid spending plays an important role in determining success of fiscal consolidations (continued)*

		(1) Successful fiscal consolidation	(1) Fiscal consolidation	(2) Successful fiscal consolidation	(2) Fiscal consolidation	(3) Successful fiscal consolidation	(3) Fiscal consolidation	(4) Successful fiscal consolidation	(4) Fiscal consolidation
Official programme	pro-	1.57** (0.78)	0.96*** (0.30)	2.14*** (0.58)	0.65* (0.35)	2.84*** (0.80)	0.48 (0.32)	2.03** (0.97)	0.51 (0.33)
expansion		0.97** (0.45)	-0.22 (0.28)	0.56 (0.48)	-0.11 (0.30)	0.86 (0.57)	-0.005 (0.30)	0.281 (0.60)	-0.07 (0.30)
recovery		1.22** (0.52)	0.32 (0.29)	1.00** (0.49)	0.15 (0.30)	1.63* (0.88)	0.20 (0.27)	0.94 (0.63)	0.17 (0.27)
downturn			-5.02*** (0.34)		-6.08*** (0.37)		-4.54*** (0.40)		-5.22*** (0.40)
delta FRI								0.46* (0.26)	0.22 (0.18)
delta no. of fiscal rules						0.77** (0.31)	0.21 (0.13)		
Budget balance rule				1.02 (0.65)	0.31 (0.50)				
Debt rule			1.14** (0.53)						
delta right leaning government	-0.004 (0.01)	-0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)	-0.01 (0.005)			-0.01 (0.01)	-0.01 (0.005)
delta left leaning government	0.003 (0.009)	-0.01** (0.004)	-0.01 (0.007)	-0.01* (0.005)				-0.006 (0.01)	-0.01** (0.004)
delta right leaning government (t-1)						0.01 (0.01)	-0.02*** (0.005)		
delta left leaning government (t-1)						0.003 (0.01)	-0.01*** (0.004)		
Constant		6.30** (2.70)	0.35 (1.30)	2.16 (2.48)	-1.02 (1.29)	8.44** (3.68)	-0.67 (1.20)	7.53* (4.07)	-0.85 (1.22)
No. of observations		415	415	410	410	410	410	410	410

Notes: The table presents coefficient estimates and their robust standard errors from different specifications of the two-step Heckman probit model in Equation 2 and Equation 3. For the full set of regression specifications, see Table A.2. Robust standard errors in parentheses. Significance levels: *** p-value < 0.01, ** p-value < 0.05, * p-value < 0.1.

Our results confirm that rigid spending significantly lowers the probability of a successful fiscal consolidation, in line with previous studies highlighting the challenges of adjusting pensions and public sector wages (Munoz and Olaberria (2019)). Countries with a high share of pension and wage expenditures face greater structural constraints in expenditure adjustments, limiting the scope for consolidation strategies that effectively reduce debt. However, rigid spending does not strongly affect the likelihood of initiating a consol-

idation, which is more closely linked to high debt levels (as in Barrios et al. (2010)) and rising expenditures, as governments are often forced to act under mounting fiscal pressures.

Beyond spending rigidity, we find that macroeconomic conditions play a crucial role in both the decision to consolidate and the probability of success. In line with Barrios et al. (2010) and Drazen and Grilli (1993), we find that fiscal consolidations are more likely to be undertaken and more successful when the economy is in a recovery phase - characterised by negative output gap and positive GDP growth. Expansionary phases of the business cycle (positive output gap and positive GDP growth) are also conducive to higher success rates, whereas economic downturns (positive output gap and negative GDP growth) point to a lower likelihood of consolidating. Moreover, similarly to von Hagen and Strauch (2001) and Ahrend et al. (2006), we do not find strong evidence of a significant relationship between monetary conditions and the success of fiscal consolidations. Nevertheless, we find limited evidence that tightening of monetary conditions increases the likelihood of a fiscal consolidation.

Institutional factors also play a significant role in fiscal consolidation decisions. Strengthening the fiscal rules framework - such as implementing a debt rule or increasing the number of fiscal rules - increases the likelihood of undertaking a fiscal consolidation (e.g. Guichard et al., 2007; Commission, 2007). Moreover, participation in an official financial assistance programme is associated with a greater likelihood of undertaking and successfully completing fiscal consolidations due to the external discipline imposed by such programmes - a common finding in the literature. In contrast, we find strong evidence that federal systems are less likely to perform successful fiscal consolidations (Foremny et al., 2017), likely due to the decentralisation of fiscal authority and the complexities of intergovernmental fiscal coordination.

Political economy factors also shape consolidation dynamics. In line with Molnar (2012), we find that left-leaning governments are less likely to undertake fiscal consolidations, reflecting ideological preferences for maintaining social expenditures. However, confirming the findings of Guichard et al. (2007), we find that fiscal consolidation plans are more likely to be adopted after elections, with consolidations following general elections a year later. This suggests that governments may use their early political capital to implement necessary but politically difficult measures.

Finally, financial crises introduce additional complexities. While we find that countries are more likely to consolidate during systemic financial crisis episodes, we also confirm that such consolidations are less likely to be successful, possibly due to the adverse macroeconomic environment in which they are implemented.

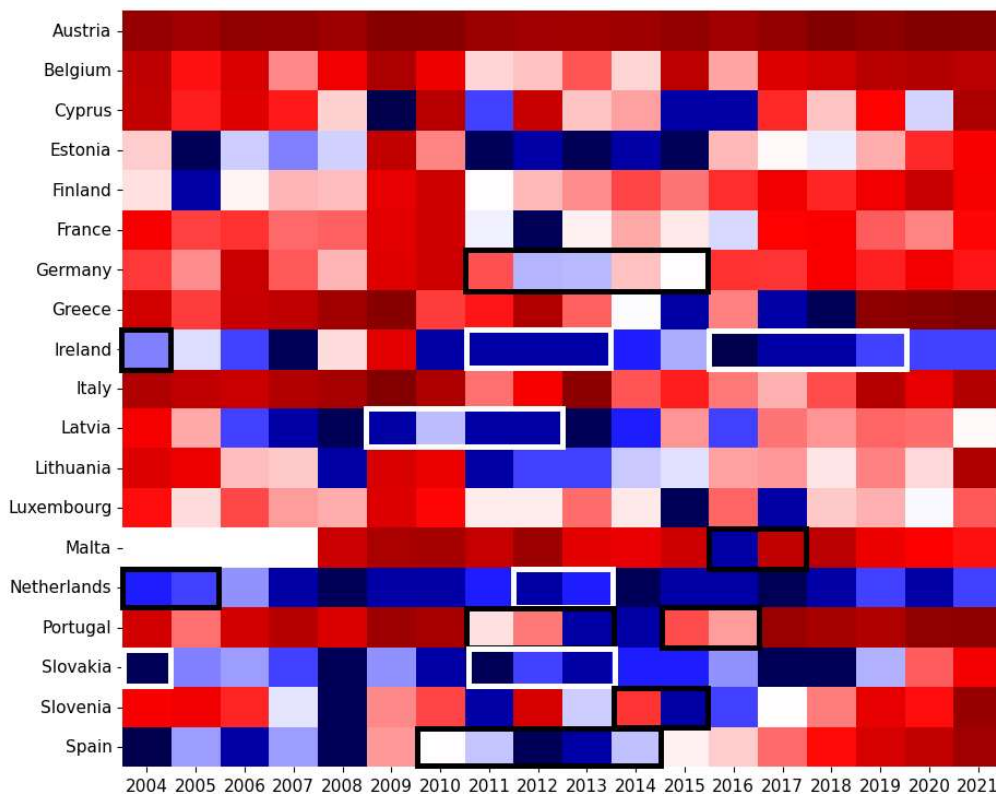
These results come with significant policy implications. Spending rigidity remains a key barrier to successful consolidation and countries with high rigid spending should adopt early, gradual spending composition adjustments rather than wait until fiscal pressures force abrupt consolidations. Policymakers should time consolidations during recovery phases rather than downturns, as consolidations undertaken in unfavourable economic conditions tend to fail. Given the observed trend of post-election consolidations, they may benefit from aligning major fiscal adjustments with the early years of an electoral cycle, when political capital is highest. If consolidations are undertaken during financial crises, policymakers should design them carefully

to avoid deepening economic distress, particularly by protecting investment spending and growth-enhancing measures.

Next, we investigate the likelihood of successful consolidation among EA countries in every year, starting from 2004 (Figure 5). This is assessed by comparing probability values from our preferred model (model 4 in Table 3) with the threshold indicating successful/unsuccessful consolidation. We present the likelihood visually using a heatmap (Figure 5). Red indicates a higher risk of an unsuccessful consolidation in a given year, while blue shows a favourable position to achieve a successful fiscal consolidation.

Recently, the macroeconomic and policy conditions do not seem supportive for a successful fiscal consolidations. As shown in Figure 5, risks of unsuccessful consolidation have been elevated since 2017 for most of the EA countries. The low likelihood of a successful fiscal adjustment in recent years is due to the adverse cyclical conditions and the loose monetary policy environment. The lack of a further strengthening of the fiscal framework (a key driver in the past) also plays a role.

Figure 5: *Risk of an unsuccessful fiscal consolidation*



Notes: The red colour shows elevated risk that a consolidation would not be successful, conditional on the fact that a country undertakes a fiscal consolidation in that year. The darker the red, the higher the risk of such an unsuccessful consolidation. On the other hand, the blue colour shows years when consolidating would be successful. The darker the blue, the higher the chance of a successful consolidation. The black and white rectangles denote historical periods of successful fiscal consolidations in EA19 countries according to our definition.

5.2 Local projections

5.2.1 The effect of fiscal consolidation on the economy

Using local projections, we estimate the dynamic effects of an unanticipated fiscal consolidation shock equivalent to 1% of GDP, identified using the fiscal policy rule in subsubsection 4.2.1. Macroeconomic variables are expressed in real terms, while fiscal variables (primary expenditure, revenues, and expenditure components) are in nominal terms. Impulse responses are reported as cumulative percentage changes, spanning from the pre-shock period ($h = -1$) to four years after the shock ($h = 4$) and distinguishing between high- and low-rigidity environments (Figure 6, full sample in Figure A.10 in Appendix A).

We find that consolidations in high-rigidity environments lead to deeper GDP contractions, more persistent employment losses and larger cuts in investment compared to low-rigidity cases. The debt ratio initially rises, with no significant reduction after four years. In low-rigidity settings, fiscal consolidation leads to a faster recovery and greater long-term debt reduction.

Figure 6: *State-dependent impulse response functions to an orthogonal consolidation shock of 1% of potential GDP to the CAPB. States are defined as high and low spending rigidity.*

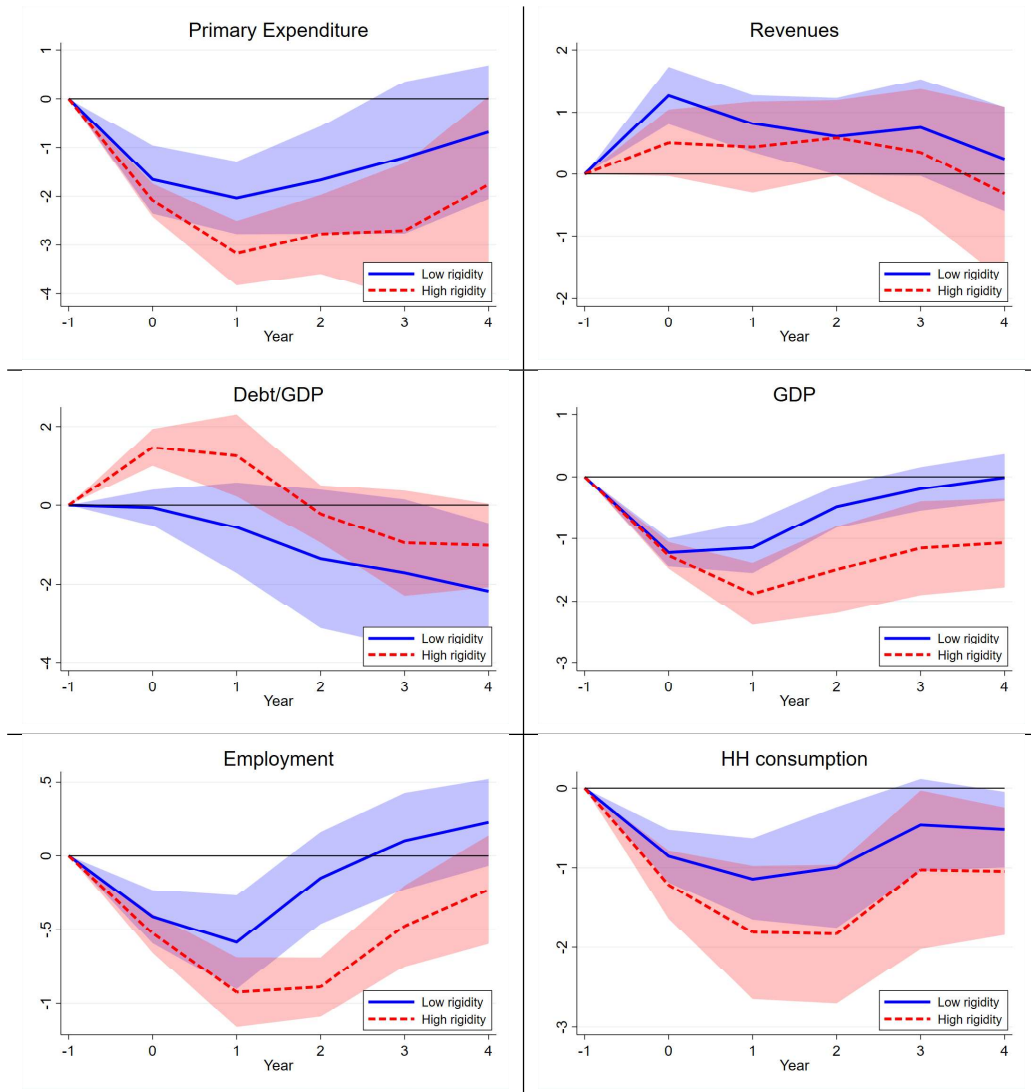
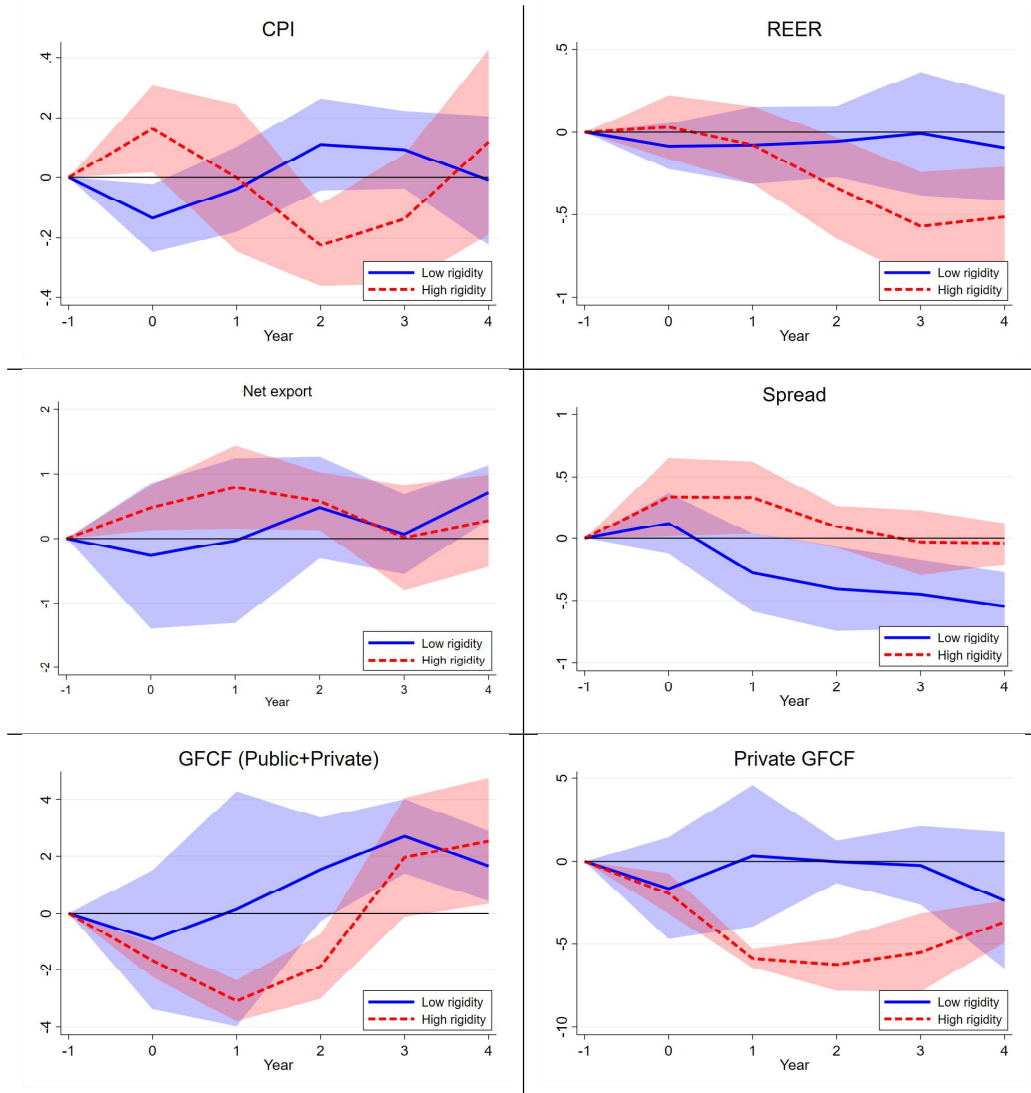


Figure 6: (continued)



Our results show that the macroeconomic impact of fiscal consolidation varies significantly, depending on a country's level of spending rigidity (Figure 6). In low-rigidity states, revenue increases are more pronounced following a shock, while the decline in primary spending is slightly smaller, though not significantly so. A key difference lies in the persistence of spending reductions: in the high-rigidity states, cuts last longer, likely reflecting greater difficulty in resuming halted expenditure (e.g., investment projects) or deliberate policy decisions.

These differences matter for debt outcomes. Confirming our initial hypothesis from the Heckman model, budget rigidity plays a crucial role in determining the success of fiscal consolidations, defined as their capacity to reduce the debt-to-GDP ratio in subsequent years. In low-rigidity states, the debt-to-GDP ratio declines sharply from the year following the consolidation shock, reaching a 2% reduction after four years. In contrast, high-rigidity countries often experience a temporary increase in the debt ratio post-consolidation, with no

significant improvement even four years later.

The underlying GDP response explains this divergence. In low-rigidity states, GDP recovers fully within four years. In high-rigidity cases, recovery is slower and incomplete - GDP remains about 1% below its pre-shock level on average even after four years. Employment follows a similar pattern, with deeper and more persistent losses in high-rigidity environments.

Private consumption declines more in a high-rigidity regime, the same as investment. In low-rigidity states, total (public and private) investment as well as private investment alone ⁴ rebounds quickly after an insignificant initial decline. In high-rigidity countries, investment suffers a pronounced decline of over 2%, reflecting reductions in both private and public investment.

The real effective exchange rate (REER) depreciates significantly and persistently only in the high-rigidity state, likely due to weaker aggregate demand, employment, and investment. This supports an improvement in the trade balance, which does not materialise in low-rigidity cases where the REER remains broadly stable.

Sovereign spreads respond more favorably in states with greater spending flexibility: They contract meaningfully in low-rigidity countries following a consolidation shock. In contrast, in high-rigidity states, spreads show a mild increase - which, however, gradually becomes statistically insignificant. ⁵

Taken together, these results emphasise the importance of building spending flexibility before fiscal adjustment becomes necessary. High-rigidity countries face higher economic costs from fiscal consolidation. Structural reforms that gradually reduce spending rigidity - particularly by protecting growth-enhancing investment - can help mitigate these costs and support more durable fiscal outcomes.

5.2.2 The decomposition of effects of fiscal consolidation on public spending

Countries with high rigid spending tend to rely disproportionately on investment cuts to meet consolidation targets, while low-rigidity countries are able to distribute the adjustment more evenly. We examine the dynamics of following individual components of government primary expenditure, as defined under the European System of National and Regional Accounts (ESA 2010): ⁶

- Compensation of employees,
- Intermediate consumption,

⁴The availability of data on private gross fixed capital formation is limited across countries. This leads to a significantly reduced sample size that underlies private investment impulse response functions, with data missing for several countries: Cyprus, Latvia, Lithuania, Luxembourg, Malta, Slovakia, and Slovenia. These data limitations could explain the large decline in private investment in response to a consolidation shock.

⁵Greece is excluded from the estimation sample for the impulse responses of the sovereign spread due to its excessive data volatility, potentially weakening precision and robustness of these impulse responses.

⁶We exclude capital transfers from total primary expenditure. For more details, please see subsection A in Appendix A.

- Subsidies,
- Social benefits,
- Other current expenditures,
- Capital investments.

Figure 7: *State-dependent impulse response functions to an orthogonal consolidation shock of 1% of potential GDP to the CAPB.*

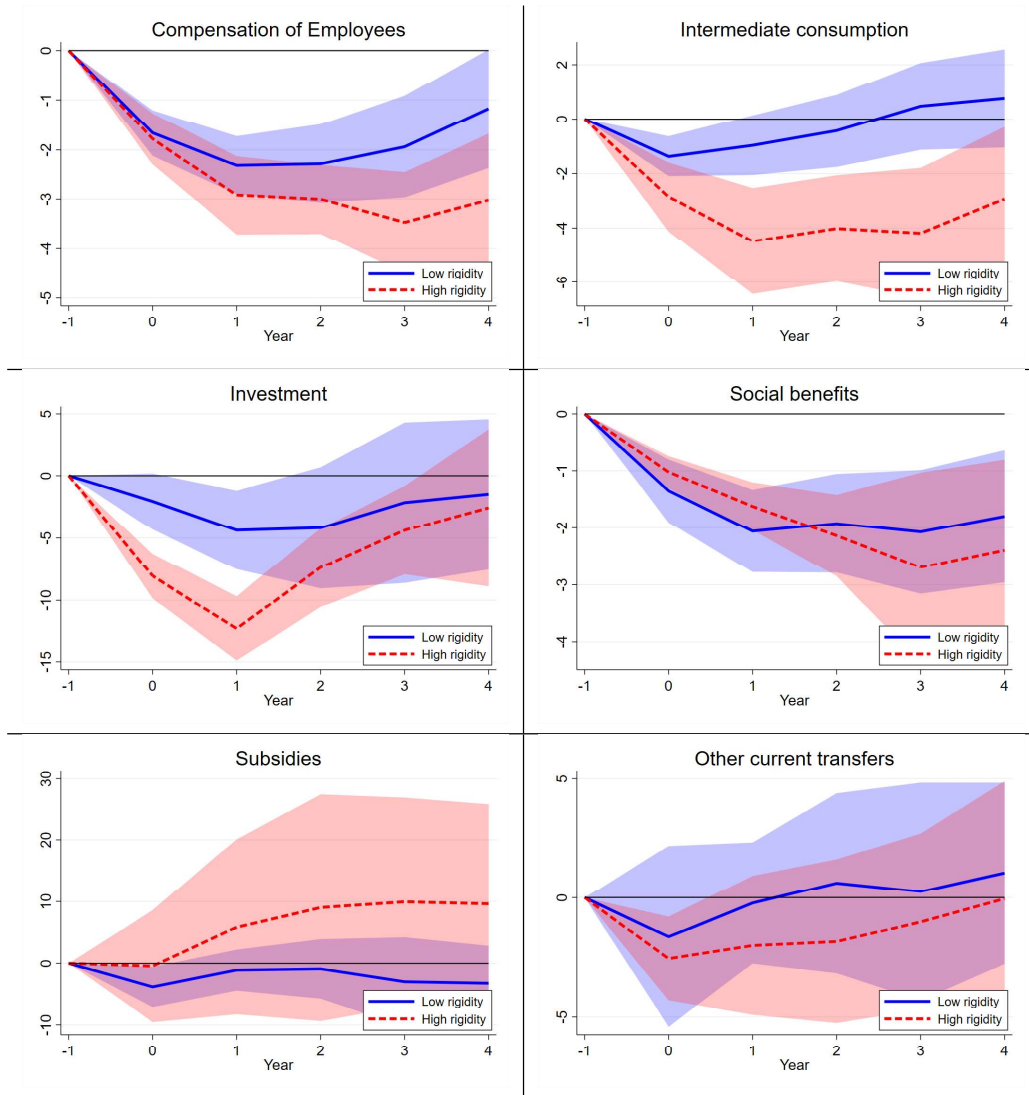


Figure 7 shows the response of these expenditure categories following the previously defined consolidation shock, distinguishing between high- and low-rigidity states. In high-rigidity countries, where pensions and wages comprise a larger share of total primary spending ⁷, cuts to flexible categories - especially public

⁷Here a broader definition of rigid spending could also encompass a significant portion of social benefits spending.

investment - are significantly deeper. More specifically, the share of investment in total primary expenditure decreases more substantially in the high-rigidity state.

Looking at the impact dynamics, the largest differences between the two states emerge in two categories typically regarded as more flexible: intermediate consumption and investment. Their reductions in high-rigidity states are more than twice as large as in low-rigidity countries. Other spending categories do not exhibit significant differences on impact between the two regimes. However, consistent with dynamics of total primary expenditure, the persistence of cuts is greater in the high-rigidity state – not only for investment and intermediate consumption, but also for compensation of employees.

Finally, to better compare the composition of adjustment, Figure 8 stacks the percentage contribution of each spending category to the reduction in total primary expenditure due to the unanticipated fiscal consolidation shock at time 0.⁸

Table 4 summarises the impact responses and relative contributions (in %) across both rigidity states:

- In low-rigidity states, cuts in compensation of employees, other current transfers, and social benefits contribute more to the overall adjustment;
- In high-rigidity states, in contrast, cuts in public investment account for a significantly higher share of the consolidation effort.

These results confirm that spending rigidity distorts the composition of fiscal consolidation, placing excessive pressure on productive spending – public investment. Consequently, this weakens the long-term growth outlook and may reduce the overall effectiveness of fiscal adjustment.

To enable a more balanced adjustment strategy, governments should explore gradual reforms of rigid expenditure, such as pension reforms or targeted wage bill measures. Reducing structural rigidity in public spending would allow for fairer, more efficient consolidations that protect growth-friendly expenditure.

6 Conclusions

In recent years, European economies have faced a series of significant shocks, including the COVID-19 pandemic, the energy crisis, and the war in Ukraine. These disruptions have led to a substantial rise in public debt across the EU, recently further compounded by the growing need to increase defence spending. Beyond these immediate challenges, medium-term pressures – particularly population ageing and the green transition – pose additional risks to fiscal sustainability. The new economic governance framework, finalised in 2024, emphasises medium-term debt sustainability while allowing some flexibility in fiscal responses to shocks. Ultimately, however, many countries will need to rebuild fiscal buffers, making the design of effective

⁸The impulse responses, point estimates of which individual bars depict, are available alongside their confidence intervals in Appendix A in Figure A.12 and Figure A.13

Figure 8: *State-dependent impulse response functions to an orthogonal consolidation shock of 1% of potential GDP to the CAPB. States are defined as high and low spending rigidity*

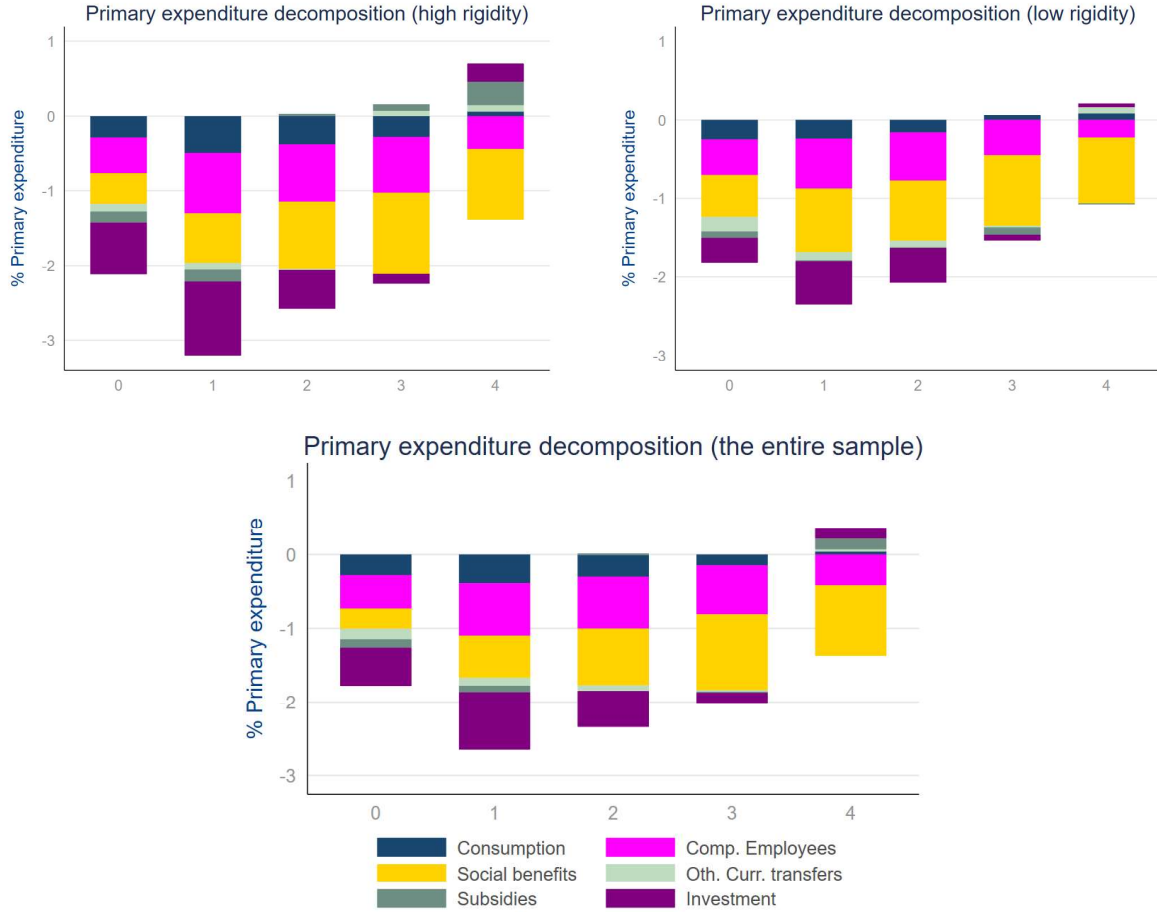


Table 4: *Contributions and point estimates of expenditure components to a fiscal consolidation shock on impact*

h = 0		Cons.	Comp. Empl.	Soc. Ben.	Oth. Transf.	Sub.	Inv.
High rigidity	P.E.	-0.293	-0.480	-0.407	-0.098	-0.152	-0.690
	%	0.138	0.227	0.192	0.0463	0.072	0.325
Low rigidity	P.E.	-0.251	-0.459	-0.510	-0.179	-0.111	-0.339
	%	0.136	0.248	0.276	0.097	0.060	0.183
Comparison of %		≈	LR	LR	LR	≈	HR

Notes: For each rigidity state, the first row (P.E.) refers to the point estimates (corresponding to the mean values of the impulse response functions and, therefore, to the height of the individual bars in Figure 8), while the second row (%) shows the percentage contribution of each spending component towards total primary expenditure reduction. The last row of the table (Comparison of %) compares contributions of individual spending categories to overall primary expenditure reduction between the two states, with **LR** standing for the low-rigidity state contributing more and **HR** indicating a given expenditure category contributes more to the spending reduction in the high-rigidity state. The ≈ signifies a given spending category contributes equally towards reduction in total primary expenditure in both rigidity states. The abbreviations for spending categories in the header of the table stand for, from left to right, intermediate consumption, compensation of employees, social benefits, other current expenditures, subsidies and public investment.

and politically viable consolidation strategies a pressing policy priority.

By analysing past fiscal adjustment episodes, our paper provides valuable insights into how a government could rebalance spending composition to improve its chances of carrying out a successful fiscal consolidation.

Our analysis highlights that a high share of rigid spending – comprising pension and wage expenditures – significantly reduces the probability of successful consolidations, even if it does not deter governments from initiating them. This rigidity constrains governments’ ability to adjust expenditures effectively, particularly in high-debt contexts, and often results in over-reliance on cuts to more flexible – but growth-enhancing – categories like public investment.

In contrast, countries with a more flexible spending structure are better positioned to implement balanced and effective consolidations, with smaller macroeconomic costs and more durable debt reduction. These countries experience faster GDP recoveries and are less likely to see investment bear the brunt of adjustment.

The policy implications are clear: To improve the chances of successful consolidations, governments should prioritise long-term reforms that enhance expenditure flexibility. Such rebalancing not only makes future adjustments less disruptive but can also signal fiscal responsibility to markets, potentially lowering risk premia and borrowing costs.

Rather than waiting until fiscal pressures become acute, a proactive fiscal approach – focused on improving budgetary flexibility in normal times – can help governments respond more effectively to future economic shocks. This would not only support long-term fiscal sustainability but also promote greater macroeconomic stability and resilience across the euro area.

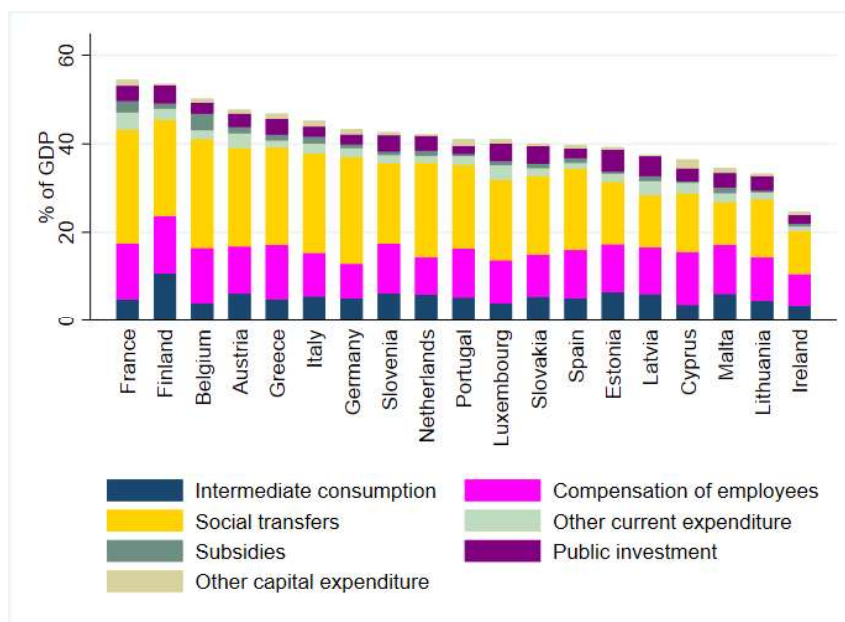
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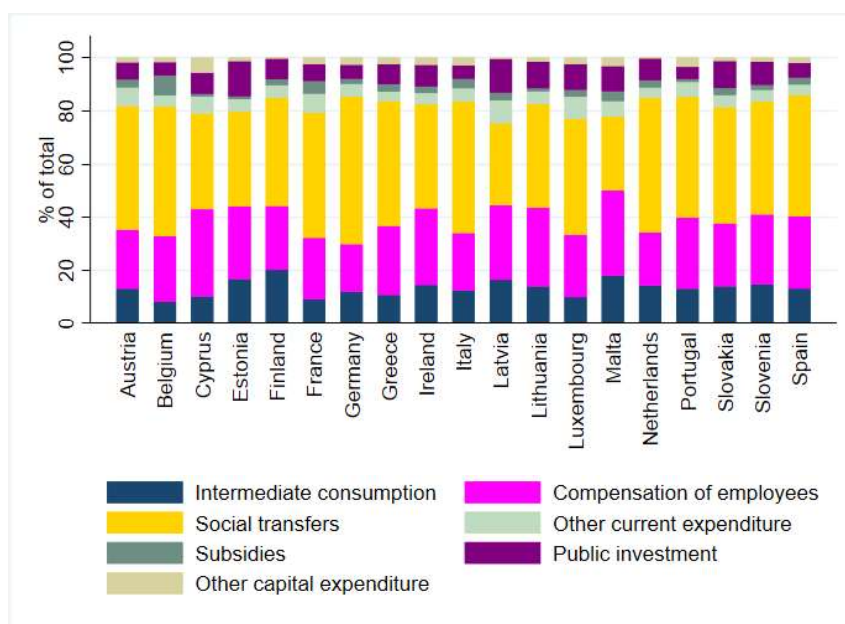
A Appendix

Figure A.1: *Primary public expenditure, % of GDP, 2015-2019 average*



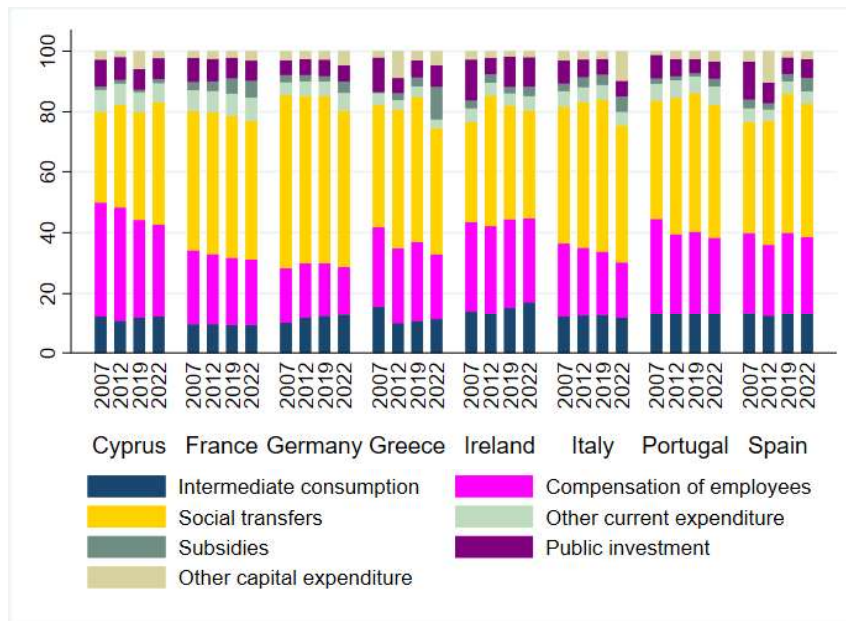
Source: Eurostat

Figure A.2: *Primary public expenditure, % of total, 2015-2019 average*



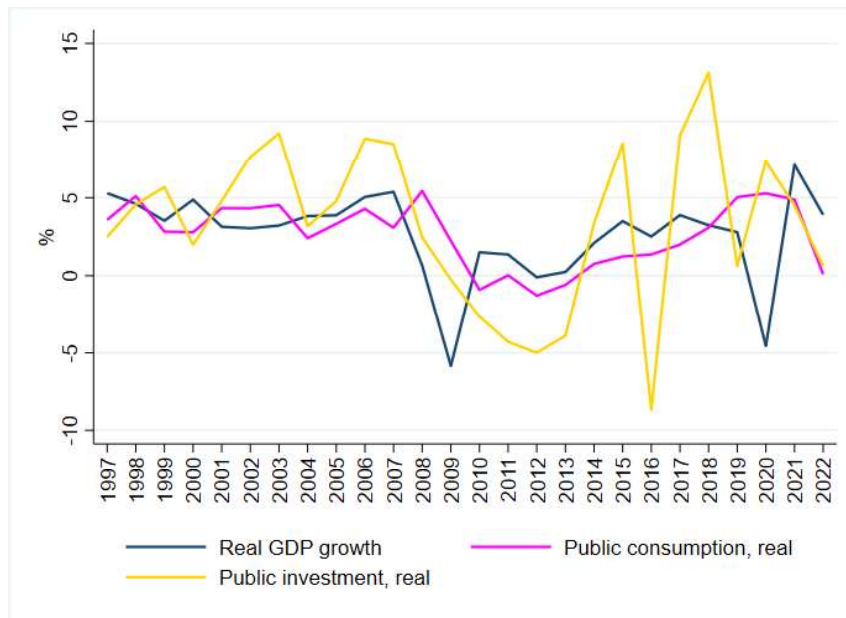
Source: Eurostat

Figure A.3: *Primary public expenditure in Big-3 and BMS, % of total*



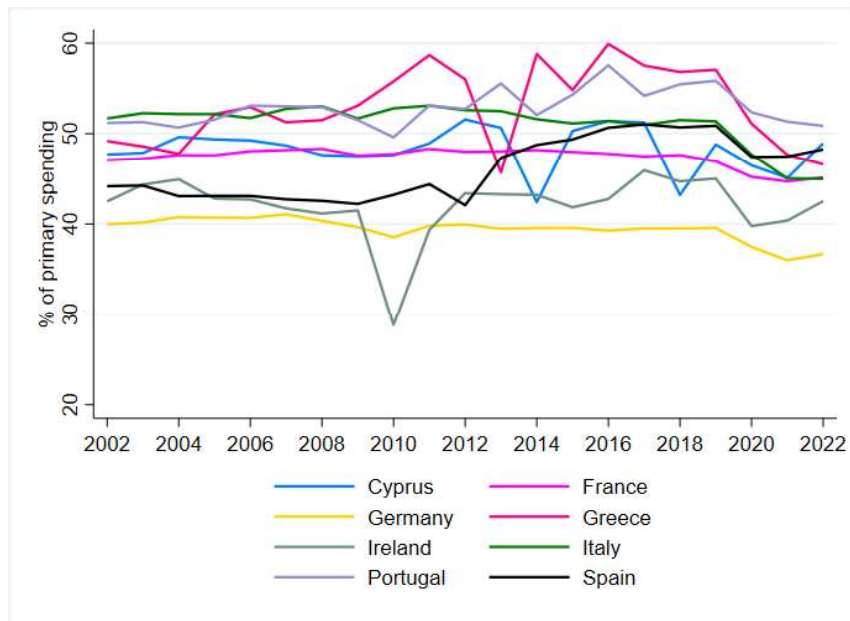
Source: Eurostat

Figure A.4: *Cyclicality of public expenditure, yoy %*



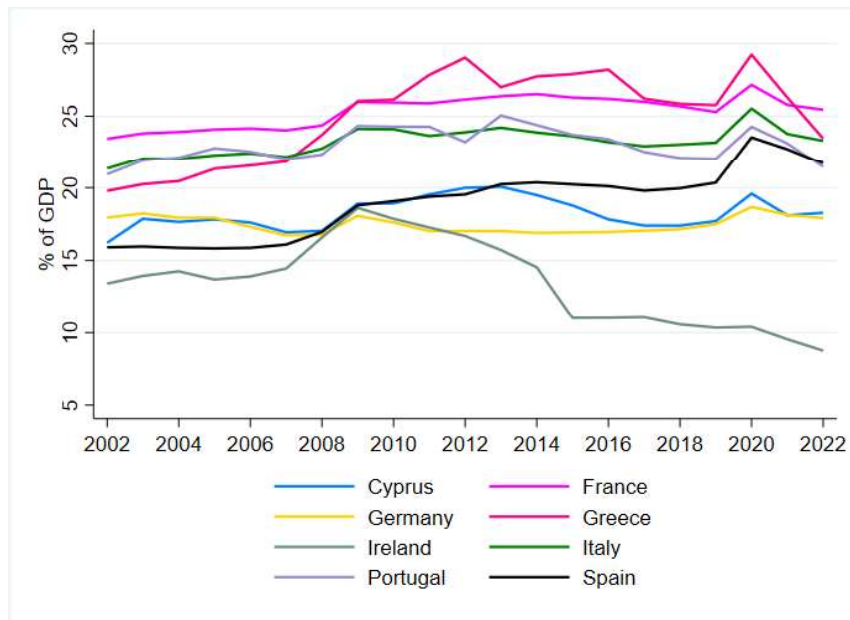
Source: Eurostat

Figure A.5: *Rigid spending by country, % of primary spending*



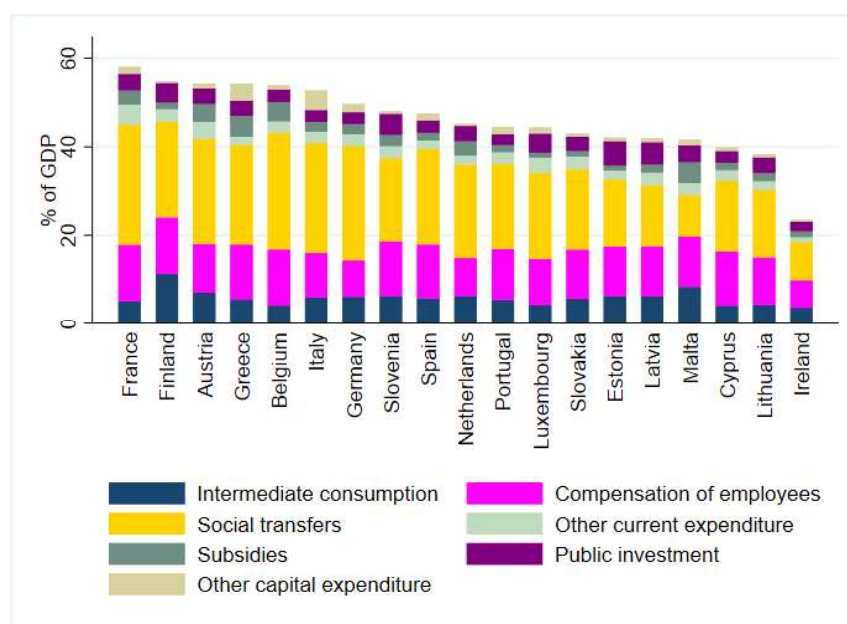
Source: Eurostat

Figure A.6: *Rigid spending by country, % of GDP*



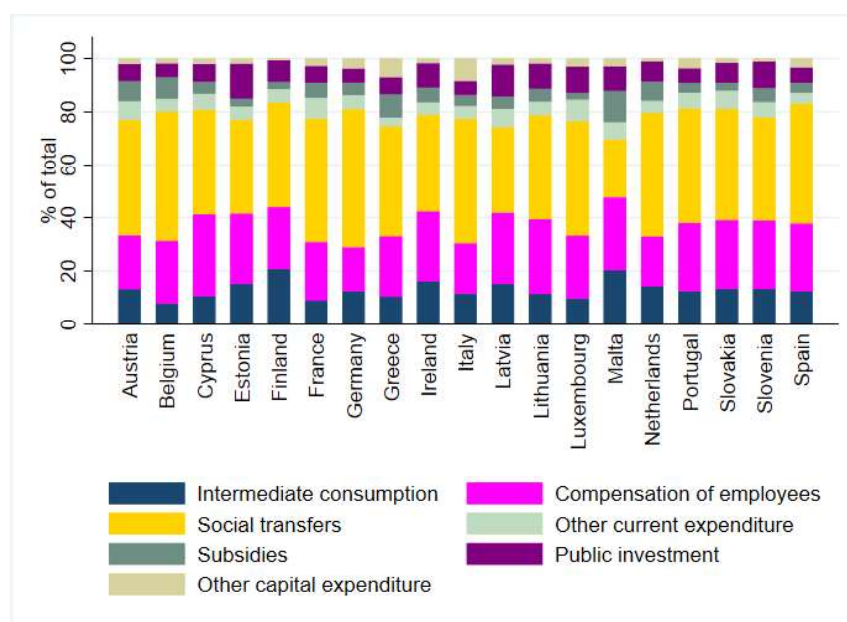
Source: Eurostat

Figure A.7: *Primary public expenditure, % of GDP, 2020-2022 average*



Source: Eurostat

Figure A.8: *Primary public expenditure, % of total, 2020-2022 average*



Source: Eurostat

Table A.1: *List of variables*

Variable	Source
Fiscal consolidations and successful fiscal consolidations	own calculations based on Eurostat and thresholds by Alesina and Ardagna (2013)
Old-age pensions spending in primary expenditure	Eurostat COFOG
Public wage bill in primary expenditure	Eurostat
Debt-to-GDP ratio	Eurostat
Primary expenditure-to-GDP ratio	Eurostat
Output gap	Eurostat
Real GDP	Eurostat
CPI	Eurostat
Trade openness	Eurostat
Net exports	Eurostat
Long-term interest rate	OECD, Refinitiv
Monetary Conditions Index (MCI)	own calculations based on von Hagen and Strauch (2001)
Regulatory quality index	World Bank
Budget balance rule	IMF
Debt rule	IMF
Expenditure rule	IMF
Revenue rule	IMF
Number of fiscal rules	IMF
Fiscal Rules Index (FRI)	European Commission
Phase of the business cycle dummy (expansion, recovery, downturn)	own calculations based on Eurostat
Federation dummy	IMF
Official program dummy	ESM, IMF
Financial crisis dummy	ESRB
Government composition (left/right leaning government)	Comparative Political Dataset
Election year dummy	Comparative Political Dataset

A Exclusion of capital transfers from CAPB

The category of capital transfers is one of public expenditure components classified under the European System of National and Regional Accounts (ESA 2010). Other categories include: compensation of employees, intermediate consumption, subsidies, social benefits, other current expenditures, and capital investment. Capital transfers generally constitute a small portion of public spending. Excluding the years corresponding to the Global Financial Crisis (GFC) and the COVID-19 pandemic, the average of capital transfers across euro area countries accounts for approximately only 3% of primary expenditure.

However, as shown in Figure A.11, fluctuations in this expenditure category (blue line in Figure A.11) are particularly pronounced during the GFC and the COVID-19 periods. A significant portion of these expenditures is associated with government interventions to support financial institutions during the financial

crisis (yellow line in Figure A.11) or targeted measures during the COVID-19 pandemic (vertical red line in 2020). These characteristics give rise to two key issues:

- **High Volatility and Estimation Challenges:** The significant volatility of capital transfers poses challenges for identification of consolidation episodes and estimation of impulse response functions. Therefore, the impulse responses exhibit extraordinarily large variations in this variable, far exceeding those observed for other expenditure categories. Moreover, these variations differ substantially across the two states of fiscal rigidity, complicating the comparison of responses for other expenditure categories between the two states.
- **Extraordinary Nature of Capital Transfers:** These expenditures represent extraordinary interventions aimed at safeguarding the financial system during the GFC or supporting household and firms incomes during the COVID-19 pandemic. Given the definition of fiscal consolidation episodes, which comprise measures to reduce deficits and stabilize public debt, the exclusion of capital transfers (for the reasons outlined in the previous point) does not pose issues, as their objective is fundamentally different.

By excluding capital transfers from the calculation of CAPB, we aim to reduce the impact of extraordinary and highly volatile interventions on CAPB, thus ensuring that fiscal consolidation episodes reflect measures aligned with deficit and debt stabilization rather than exceptional crisis-related expenditures. Moreover, this exclusion enables a clearer comparison of the composition of fiscal adjustment between the two fiscal rigidity states.

Figure A.9: *Other capital expenditures (million euro, lhs) and government interventions to support financial institutions in euro area countries (million euro, rhs)*

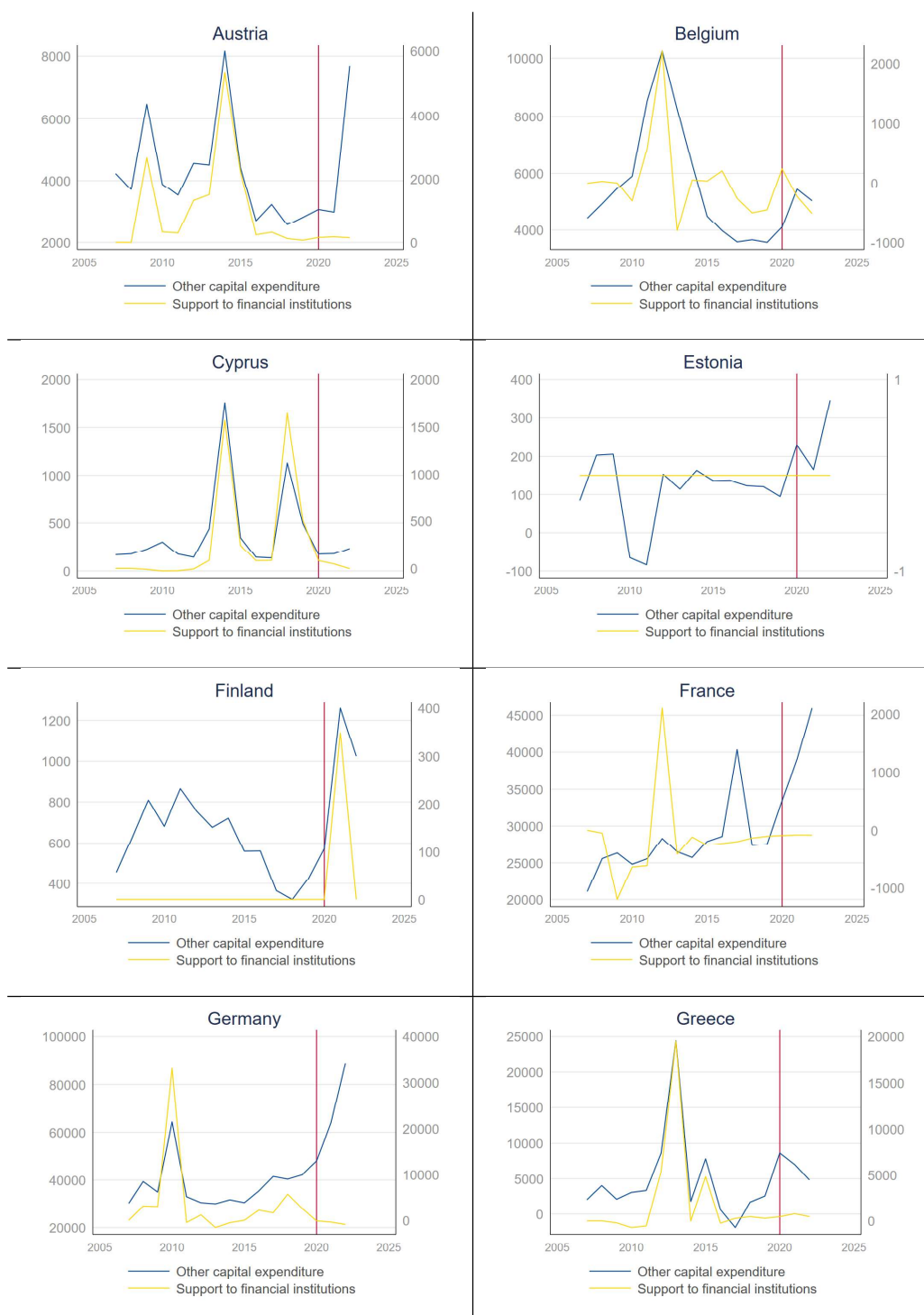


Figure A.9: (continued)



Figure A.9: (continued)

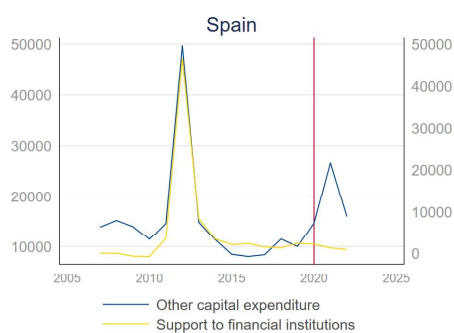
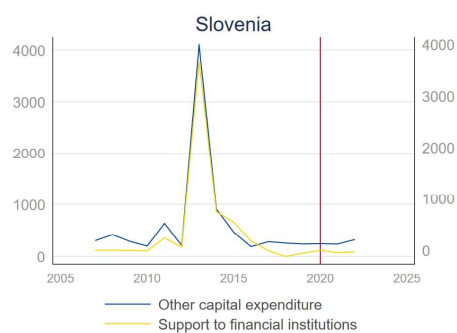


Table A.2: *Rigid spending plays an important role in the success of fiscal consolidations*

	(1) Successful consolidations	(2) Successful consolidations	(3) Successful consolidations	(3) Successful consolidations	(4) Successful consolidations	(4) Successful consolidations	(5) Successful consolidations	(5) Successful consolidations	(6) Successful consolidations	(6) Successful consolidations	(7) Successful consolidations	(7) Successful consolidations
Elections (t-1)	0.28* (0.14)	0.24* (0.14)	0.23* (0.12)	0.23* (0.12)	0.29** (0.14)	0.29** (0.14)	0.23* (0.13)	0.23* (0.13)	0.28** (0.14)	0.28** (0.14)	0.27** (0.13)	0.27** (0.13)
Rigid spending (t-1)	-20.33** (8.71)	-13.14** (6.11)	-11.34** (5.02)	-1.96 (2.14)	-23.61*** (8.92)	-2.41 (2.25)	-10.62** (4.64)	-2.07 (2.08)	-21.22*** (6.91)	-2.41 (2.27)	-14.28** (6.73)	-2.45 (2.21)
delta debt/GDP												-0.009 (0.01)
delta debt/GDP (t-1)	0.06** (0.03)		0.05** (0.03)	0.05** (0.03)	0.07** (0.03)	0.07** (0.03)	0.05** (0.02)	0.05** (0.02)	0.06** (0.02)	0.06** (0.02)		
expenditure/GDP (t-1)												
delta expenditure/GDP (t-1)	-0.20*** (0.05)	-0.06 (0.04)	-0.04** (0.02)	-0.01 (0.03)	-0.22*** (0.06)	-0.07 (0.05)	-0.003 (0.04)	-0.003 (0.04)	-0.22*** (0.05)	-0.07 (0.04)	-0.13 (0.10)	0.01 (0.06)
MCI												
delta MCI	-0.04 (0.18)	0.08* (0.05)	0.14 (0.13)	0.02 (0.07)	0.17* (0.10)	0.05 (0.06)	0.15 (0.10)	0.09 (0.07)	-0.08 (0.05)	0.06 (0.05)		
Regulatory quality	0.43* (0.26)	-0.05 (0.24)	-0.05 (0.24)	-0.05 (0.24)	0.36 (0.24)	0.36 (0.26)	0.35 (0.24)	0.35 (0.24)	0.38 (0.26)	0.38 (0.26)	0.15 (0.28)	0.15 (0.28)
Federation	-1.76** (0.75)	-0.18 (0.44)	-1.26** (0.49)	0.16 (0.43)	-0.83* (0.47)	-0.15 (0.46)	-0.78 (0.49)	-0.13 (0.46)	-1.79*** (0.53)	-0.15 (0.46)	-1.23** (0.53)	-0.10 (0.43)
Financial crisis	0.45 (0.28)	0.23 (0.19)	-0.24 (0.34)	0.38** (0.17)	0.17 (0.22)	0.54** (0.24)	0.16 (0.21)	0.09 (0.18)	0.51** (0.23)	0.22 (0.18)	-0.56 (0.37)	0.38** (0.19)

Continued on next page

Table A.2: *Rigid spending plays an important role in the success of fiscal consolidations (continued)*

	(1) Successful consolidations	(1) Con- solidations	(2) Successful consolidations	(2) Con- solidations	(3) Successful consolidations	(3) Con- solidations	(4) Successful consolidations	(4) Con- solidations	(5) Successful consolidations	(5) Con- solidations	(6) Successful consolidations	(6) Con- solidations	(7) Successful consolidations	(7) Con- solidations
Official programme	2.03** (0.97)	0.51 (0.33)	1.57** (0.78)	0.96*** (0.30)	2.14*** (0.58)	0.65* (0.35)	2.84*** (0.80)	0.48 (0.32)	2.09*** (0.66)	0.67* (0.35)	2.41*** (0.48)	0.51 (0.33)	1.57** (0.68)	0.79** (0.31)
expansion	0.28 (0.60)	-0.07 (0.30)	0.97** (0.45)	-0.22 (0.28)	0.56 (0.48)	-0.11 (0.30)	0.86 (0.57)	-0.005 (0.30)	0.59 (0.52)	-0.14 (0.30)	0.58* (0.34)	-0.05 (0.31)	0.71 (0.53)	-0.29 (0.34)
recovery	0.94 (0.63)	0.17 (0.27)	1.22** (0.52)	0.32 (0.29)	1.00** (0.49)	0.15 (0.30)	1.63* (0.88)	0.20 (0.27)	1.04** (0.52)	0.11 (0.30)	1.37*** (0.51)	0.17 (0.27)	1.04** (0.51)	0.06 (0.28)
downturn		-5.22*** (0.40)		-5.02*** (0.34)		-6.08*** (0.37)		-4.54*** (0.40)		-6.38*** (0.36)		-5.81*** (0.38)		-6.37*** (0.34)
delta FRI	0.46* (0.26)	0.22 (0.18)												0.40** (0.19)
delta no. of fiscal rules							0.77** (0.31)	0.21 (0.13)			0.62*** (0.23)	0.20 (0.13)		
Budget bal- ance rule					1.02 (0.65)	0.31 (0.50)			0.86 (0.59)	0.19 (0.57)				
Debt rule				1.14** (0.53)										
delta right leaning government	-0.01 (0.007)	-0.01 (0.005)	-0.004 (0.008)	-0.007 (0.005)	-0.008 (0.005)	-0.006 (0.005)								
delta left leaning government	-0.006 (0.01)	-0.01** (0.005)	0.003 (0.009)	-0.01** (0.004)	-0.006 (0.007)	-0.009* (0.005)								
delta right leaning gov- ernment (t-1)					0.01 (0.01)									

Continued on next page

Table A.2: *Rigid spending plays an important role in the success of fiscal consolidations (continued)*

	(1) Successful consolidations	(1) Con- solidations	(2) Successful consolidations	(2) Con- solidations	(3) Successful consolidations	(3) Con- solidations	(4) Successful consolidations	(4) Con- solidations	(5) Successful consolidations	(5) Con- solidations	(6) Successful consolidations	(6) Con- solidations	(7) Successful consolidations	(7) Con- solidations
delta left leaning gov- ernment (t-1)			0.003				-0.01***							
Constant	7.529* (4.07)	-0.850 (1.22)	6.296** (2.70)	0.350 (1.30)	2.162 (2.48)	-1.019 (1.29)	8.442** (3.68)	-0.672 (1.20)	1.946 (2.27)	-0.802 (1.29)	7.551** (3.01)	-0.633 (1.22)	6.949** (3.04)	-0.178 (1.27)
No. of obser- vations	410	410	415	415	410	410	410	410	410	410	410	410	421	421

Notes: The table presents coefficient estimates from different specifications of the two-step Heckman probit model in Equation 2 and Equation 3. Robust standard errors in parentheses. Significance levels: *** p-value < 0.01, ** p-value < 0.05, * p-value < 0.1.

Figure A.10: *The impulse response functions reflect cumulative changes (in percent) to an orthogonal consolidation shock of 1% of potential GDP to the CAPB. 90% confidence interval bands with robust standard errors clustered on country level.*

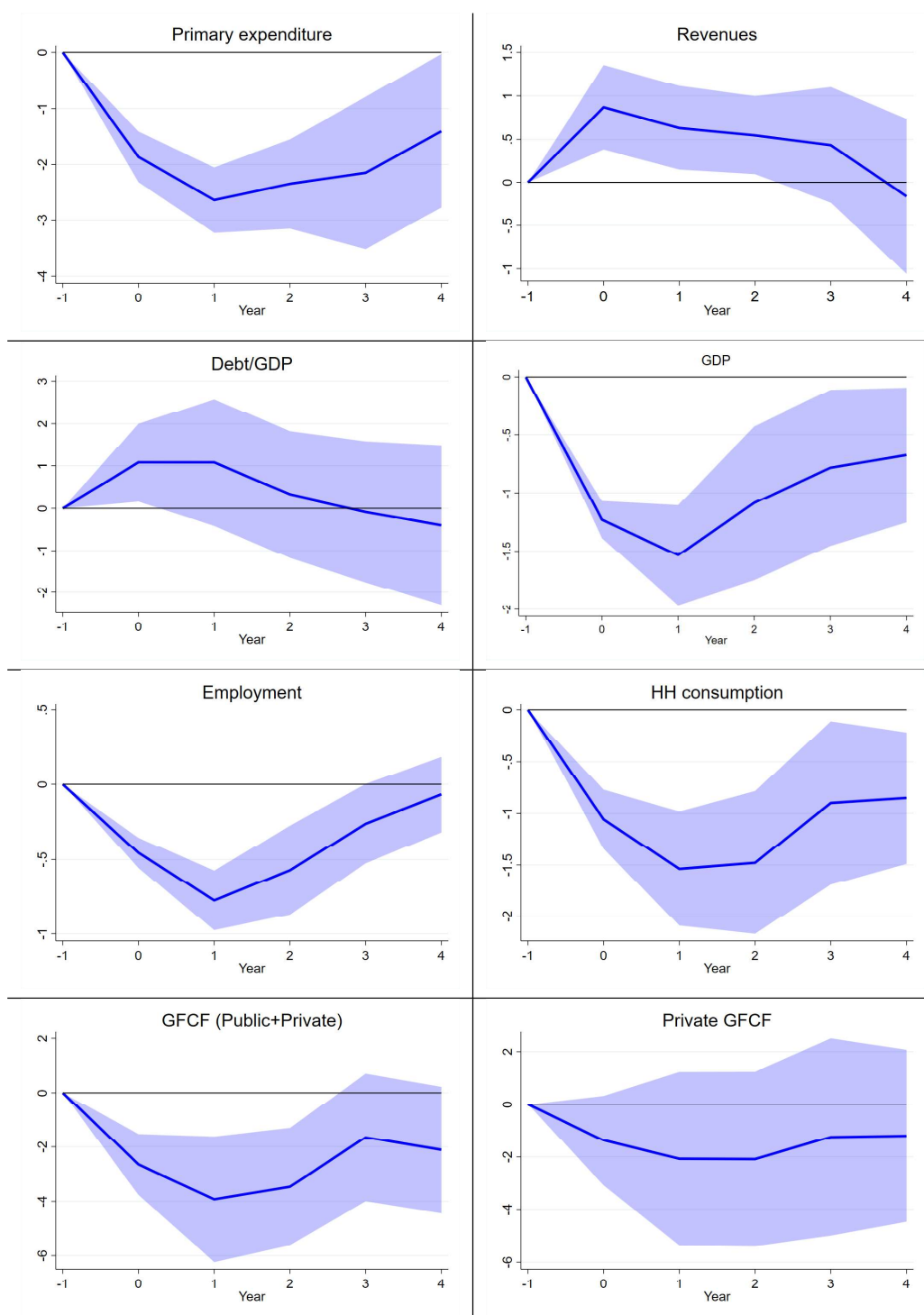


Figure A.10: (continued)

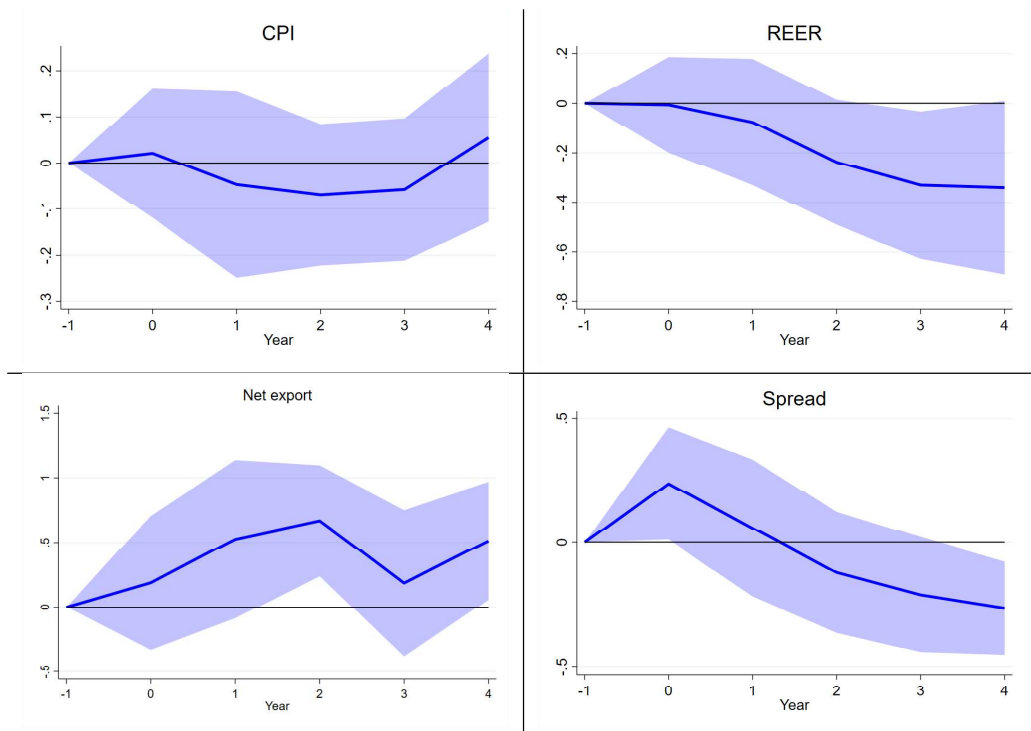


Figure A.11: *Impulse response functions to an orthogonal consolidation shock of 1% of potential GDP to the CAPB.*

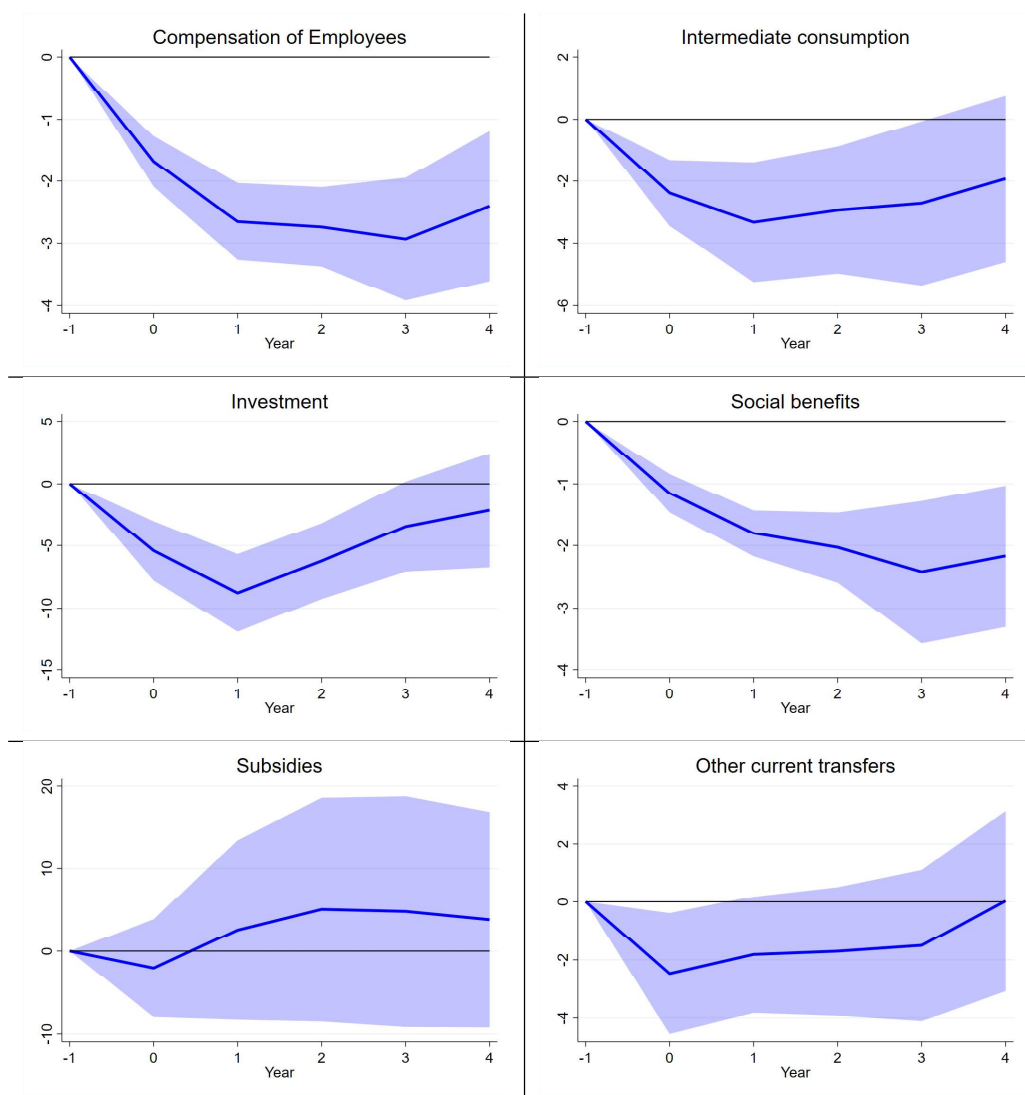


Figure A.12: *Impulse response functions to an orthogonal consolidation shock of 1% of potential GDP to the CAPB. Dependent variable is: $(Y_{t+h} - Y_{i,t-1})/(Cyc.Adj.Prim.Exp.)_{t-1}$*

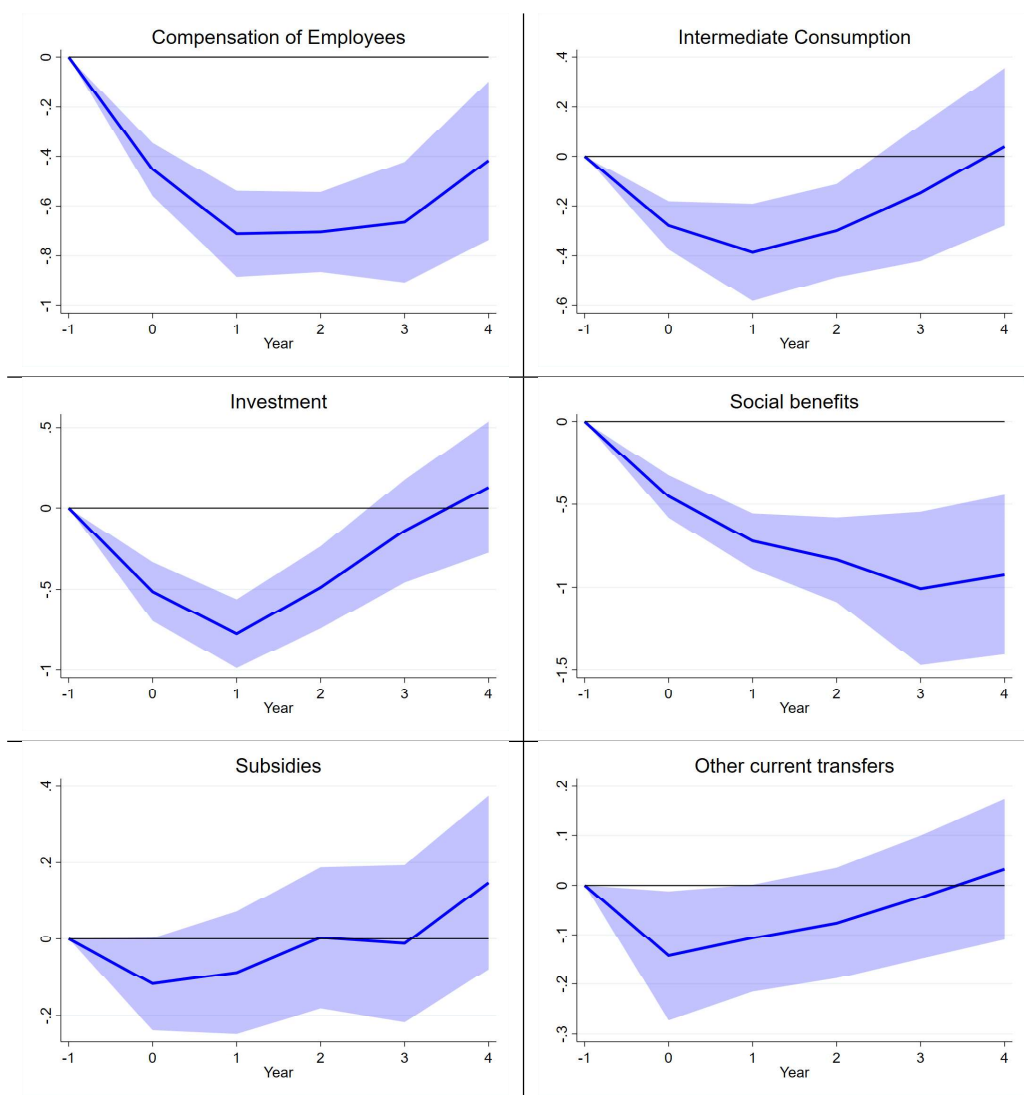
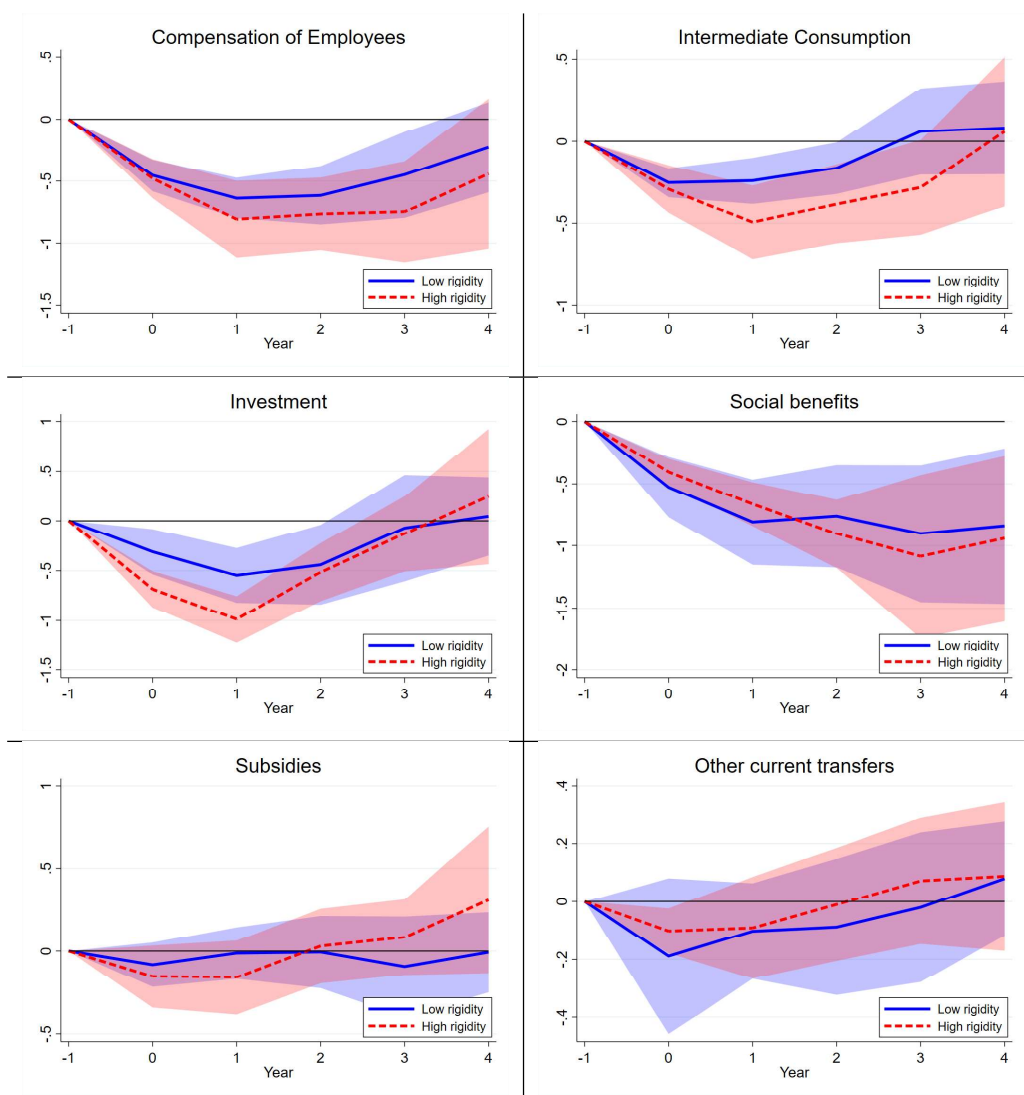


Figure A.13: *Impulse response functions to an orthogonal consolidation shock of 1% of potential GDP to the CAPB. Dependent variable is: $(Y_{t+h} - Y_{i,t-1})/(Cyc.Adj.Prim.Exp.)_{t-1}$*



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