

A Work Project, presented as part of the requirements for the Award of a Master's degree in
Economics from the Nova School of Business and Economics.

**Sizing fiscal adjustments:
Evidence from advanced countries in 2000-2021**

BARBARA VIGNATO

Work project carried out under the supervision of:

Prof. Dr. Francesco Franco

Prof. Dr. João Moreira Rato

13/01/2023

Abstract: The question on the feasibility to implement a sizeable fiscal consolidation in advanced countries becomes central again in the aftermath of the Covid-19 crisis. As such, we expand the analysis of Escolano et al. (2014), identifying 19 fiscal adjustment episodes for advanced economies that both needed and wanted to consolidate during period 2000-2021. We find that cyclically adjusted primary balances improved by at least 5.4 percent of GDP during most episodes, with most countries achieving debt stabilization. We then investigate the accompanying factors and their correlations with the size of consolidations, suggesting some improvements to the methodology in terms of econometric technique and possible further areas of analysis.

Keywords: Fiscal adjustment; fiscal consolidation; size of adjustment; fiscal sustainability; public debt; deficit; primary balance.

This work used infrastructure and resources funded by Fundação para a Ciência e a Tecnologia (UID/ECO/00124/2013, UID/ECO/00124/2019 and Social Sciences DataLab, Project 22209), POR Lisboa (LISBOA-01-0145-FEDER-007722 and Social Sciences DataLab, Project 22209) and POR Norte (Social Sciences DataLab, Project 22209).

1. Introduction

The Covid-19 pandemic forced several countries to implement ambitious discretionary fiscal plans, reviving the discussion over the role of fiscal bodies in promoting sound fiscal policies and pursuing debt sustainability. Average debt levels of advanced economies soared from 71 percent of Gross Domestic Product (GDP) before the Lehman collapse, to a peak of 105% in 2012 and 123% in 2021 (International Monetary Fund (IMF) data). The pandemic hit when several advanced countries especially in the Eurozone were experiencing steadily increasing primary deficits, relatively slow growth and low interest rates, close to the lower bound. In this context, fiscal policy finds an increased stake to operate as an alternative macroeconomic tool in case of adjustment need.

Debt sustainability per se is a probabilistic statement and the question regarding the design of fiscal consolidation rules is complex, with no single and time-country-invariant solution (Christofzik et al. 2018). The credibility of fiscal adjustment policies is strictly associated with the path of the primary balance, which can be considered sustainable as long as the probability of a debt explosion, and thus of eventual debt default, remains (very) low (Blanchard, Leandro and Zettelmeyer 2021). A realistic adjustment in the primary balance is one that is economically and politically feasible given initial conditions such as debt levels and composition (Escolano et al. 2014).

One question related to the study of fiscal consolidations regards the feasible size of the episodes, especially deriving from past experiences. We add to the discussion by extending the analysis presented in the IMF working paper by Escolano, Jaramillo, Mulas-Granados and Terrier (2014), referred as “original paper” from here onwards. The research takes stock of historical adjustment episodes to bring insights into past experience in terms of size, duration, and accompanying factors for advanced countries. We depart from their analysis by expanding

the dataset to cover the period 2000-2021 (originally ending in 2012). Furthermore, we reflect on the possible limitations especially referred to the selected econometric method.

Our results add to the existing literature by developing a punctual analysis for advanced countries in the last two decades, discussing whether relationships across accompanying factors vary over time. The selected episodes combine situations in which countries i) needed and ii) wanted to adjust the balances and stabilize debt. By combining two criteria related to the primary gap and Cyclically Adjusted Primary Balance (CAPB), we identify and evaluate the episodes focusing on the feasible size of adjustment; we then substantiate the assessment by discussing key factors in the current policy debate, such as the fiscal policy strategy, and conditions related to monetary policy, exchange rates and credit to private sector. Importantly, we also highlight limitations and proposed improvements especially put in the context of the 2008 crisis.

Our results show that, in most episodes, countries achieved a sizeable fiscal adjustment, bringing the debt-to-GDP ratio close to stabilization, albeit at higher levels. Most countries successfully improved their primary balance by at least 4.3 percent of GDP, but failed to close the deficit although the significant improvements virtually approaching the zero level. Debt was stabilized in virtually most episodes, and put on a descending trend in one-in-four cases. Based on a cross-section OLS regression, we find that several factors are significantly correlated with the size of the consolidations. The size of consolidation tended to increase the larger the initial deficit and primary gap levels, and if accompanied by sustained efforts to reduce the deficit. The fiscal adjustment strategy moderately affected the adjustment, with primary expenditure cuts contributing positively. The results also show that increased short-term interest rates tend to significantly favour larger adjustments, contrary to the original paper. However, resulting correlations by construction may be affected by econometric biases caused by further

exogenous factors and interdependencies not currently captured in the regression – for example, in our sample, 85% of the episodes coincide with the 2008 crisis.

In what follows, we review the existing literature focusing on the different proposed methods to identify adjustment episodes. By combining the selection criteria as described in Escolano et al. (2014), we present the resulting episodes and the factors correlating with fiscal consolidations, discussing the result in face of the existing literature. In conclusion, we highlight limitations of the analysis, and opportunities for further research.

2. Literature review

Fiscal adjustments are extensively present in the literature, and analysed from different standpoints. One field of research focuses on the prediction of the consolidation episodes in terms of size and expectations given some initial conditions. This forward-looking approach is especially relevant to forecast the feasibility of the consolidation and expected consequences in the sovereign budget and beyond. Which is, if a country faces a need to adjust its finances, how the discretionary fiscal policy should ideally be designed to achieve the fiscal objective, given some economic conditions¹. On the other hand, a different and more restricted field of the literature emphasizes the analysis of historical consolidation episodes to provide insights into

¹ This strain of the literature addresses the research question through macroeconomic modelling. Several authors elaborate on key concepts and models along these lines; amongst others, some pivotal papers requiring mentioning are those presented by Keynes; Blanchard and Watson; Sims; Alesina and Tabellini; Blanchard, L'Huillier and Lorenzoni (1937, 1986, 1986, 1990, 2009). Bernanke, Boivin, and Elias (2005) and others investigate the Dynamic Factors (DFM) and Dynamic Stochastic General Equilibrium models (DSGE). The basic equation for debt dynamics, used by most of the literature, is as follows: $d_t - d_{t-1} = \left(\frac{r-g}{1+g}\right) d_{t-1} - p$, where d_t is the debt-to-GDP ratio at period t , d_{t-1} is its lagged value, r is the interest rate on public debt, g is the GDP growth rate, and p is the ratio of primary balance to GDP, all in period t (Blanchard, Leandro and Zettelmeyer 2021).

earlier experiences in terms of success rates, size, duration, and factors accompanying such adjustments. Historical data can be informative of the predictable size and circumstances for fiscal adjustments, and in particular of changes in the trends over time as a consequence of varying macroeconomic contexts. Such analyses propose methods to identify historical episodes, and describe associations across factors that are found significant in accompanying the consolidations and predicting their size and successfulness. For the sake of precision, below we will focus on the literature related to historical adjustment episodes only for advanced countries, noting that methods and conclusions vary widely depending on the level of economic development.

Table 1 offers a non-exhaustive summary of the literature selecting episodes in advanced countries focusing on the adjustment size. To identify episodes, authors rely on criteria that are often, though not always, similar. Many authors designed criteria that evolve around the definition of fiscal adjustment, which is, a significant discretionary (cyclically-adjusted) improvement in the general government fiscal balance, translatable in the data using the CAPB or the Cyclically Adjusted Balance (CAB). Depending on the criteria (strictness and thresholds) to select episodes set by each author, the results vary considerably (see Table 1). CAPB and CAB yet also carry drawbacks: Persson (1996) highlights that their estimates could lead to inclusion of events other than planned fiscal policy adjustments also causing shifts in the government balance, such as changes in the private sector behaviour and a rise in inflation combined with a progressive non-indexed tax system. The cyclical adjustment also requires challenging calculations of potential output – see also Blanchard; Perotti; Riera-Crichton, Vegh and Vuletin (1990, 2012, 2016) for discussion.

Once the episode is identified, a key question is whether the fiscal efforts were enough to stabilize debt. The success of fiscal adjustments can be assessed using different parameters. Most studies associate it with a significant reduction in the debt-to-GDP (Heylen and Everaert

2000, amongst others), or with a significant positive change in real GDP growth (Giavazzi and Pagano 1990, amongst others). Relatively fewer studies focus on the size of fiscal adjustment, usually expressed as either the level of primary balance achieved by the end of the episode or its change.

Table 1 below provides a detailed overview on the criteria used by other authors to identify the fiscal adjustment episodes and the resulting sizes. Discussion on factors usually associated with fiscal adjustments is detailed in the section on *Results and discussion* below.

Table 1. Literature Review on Fiscal Adjustment episodes investigating size

Paper	Definition of fiscal adjustment episode	Selected countries (number)	Selected Years	Episodes (number)	Size of adjustment (%GDP)
Afonso and Jalles (2011)	≥ 2 pp change in CAPB in one year; or ≥ 1.5 pp average change over two years; or change in CAPB is >1.5 standard deviation in one year.	18, AE/EU	1970-2010	59-79	0.7 to 2.3
Alesina and Perotti (1997)	≥ 1.5 pp change in CAPB in one year; or ≥ 1.5 pp in two years with each >1.25 pp.	20, OECD	1960-1994	62	2.57
Ahrend, Catte and Price (2006)	≥ 1 pp change in CAPB in one year; or ≥ 1 pp change in two years with ≥ 0.5 pp in first year.	24, OECD	1980-2005	81	>8
Alesina and Ardagna (2010)	≥ 1.5 pp change in CAPB in one year.	21, OECD	1970-2007	107	1.85
Alesina and Ardagna (2013)	≥ 2 pp change in CAPB over two years with improvement in each year; or ≥ 3 pp change in three years with improvement in each year.	21, OECD	1970-2010	52	>4.5
Ardagna (2009)	≥ 2 pp change in CAPB in one year; or $\geq$ change in two years with each >1.5 pp.	25, OECD	1970-2006	86	2.9
Baldacci, Gupta and Mulas-Granados (2013)	Reduction in the debt-to-GDP for at least 2 consecutive years, with increases in CAPB of ≥ 0.5 pp per year sustained for two years or more.	107, AE	1980-2012	79	3.9
Escolano et al. (2014)	≥ 0.1 pp change in CAPB for two consecutive years; and primary gap $>2\%$ GDP.	39, OECD	1945-2012	19	5.5
Guichard et al. (2007)	≥ 1 pp change in CAPB in one year; or ≥ 1 pp change in two years with each >0.5 pp.	24, OECD	1978-2006	85	2.8

Heylen and Everaert (2000)	≥ 2 pp change in CAPB for two consecutive years with >0.25 pp in the first year.	18, OECD	1975-1995	39	3.2
Kumar, Leigh and Plekhanov (2007)	≥ 1 pp change in CAPB in one year.	24, OECD	1972-2006	81	1.7
McDermott and Wescott (1996)	≥ 1.5 pp change in CAPB in two years with improvement in each year.	20, AE	1970-1995	74	>3.2
Molnar (2013)	≥ 1.5 pp change in CAPB in one year.	31, AE	1960-2009	108	3
Tsibouris et al. (2006)	Uninterrupted improvement in the primary budget balance.	165, AE	1971-2001	366	>5
Von Hagen, Hallett and Strauch (2001)	≥ 1.25 pp change in CAB for two consecutive years; or ≥ 1.5 pp in one year and CAPB improvement in the preceding and subsequent year.	20, OECD	1960-1998	65	2.29

Source: Escolano et al. (2014), McDermott and Wescott (1996) and own adaptations. *Note:* pp: percentage point of potential GDP; AE: advanced economies; EU: European Union.

3. Methodology

3.1 Selection of episodes

The prolific literature on the topic suggests that there is no unique solution to identify fiscal consolidation episodes. An adequate benchmark should rule out historical adjustment episodes that were produced simply by a favourable economic environment, in favour of those originating from a clear intention to address the imbalances through appropriate fiscal policies. Which is, two criteria need to be fulfilled simultaneously: i) the country is facing fiscal adjustment need, and ii) the country is making substantial efforts to stabilize debt through discretionary policy. Escolano et al. (2014) interpret these two criteria using quantifiable factors as described below. These criteria are then applied to a sample of 39 advanced economies between 2000 and 2021. This constitutes the core of the analysis.

A. Criterion 1: need for fiscal adjustment

Because debt sustainability is related to debt stability, the need for fiscal adjustment arises when the of debt-to-GDP ratio is deteriorating or, in other words as explained below, when the primary gap is positive. Looking at the primary gap is preferable as the debt-to-GDP itself likely includes stock-flow adjustments affecting the level of debt, which may not necessarily be linked to discretionary fiscal policies, sometimes reflecting short-term changes that do not improve the underlying government balance sheet (Von Hagen, Hallett and Strauch 2001).

By construction, this method excludes adjustment episodes departing from high but stable debt levels, for which the primary gap is closed². The primary gap (*gap*) is the difference between the country's debt stabilizing primary balance (p^*) and its present primary balance (p) as described in equations 1 and 2 below (Escolano et al. 2014):

$$gap = p^* - p \quad (1)$$

$$p^* = \frac{(r-g)}{(1+g)} d \quad (2)$$

where d is the debt-to-GDP ratio of the current year; r is the real effective interest rate³; g is the real GDP growth rate.

The authors define a country facing a sizeable fiscal need as one for which the primary gap is greater than the median of all observations with a positive primary gap. According to such methodology, the cut-off of the 50th percentile corresponds to 2.5% in our sample (increased

² See also Blanchard (1990), Baldacci Clements and Gupta (2004), Guichard et al. (2007).

³ Own calculations. In line with Cottarelli and Escolano (2014), the average effective interest rate (nominal EIR) in year t is computed as the quotient between budgetary interest payments in t and the debt outstanding at the end of year $t-1$, such that $i_t = \frac{I_t}{D_{t-1}}$. Next, the real EIR is obtained by discounting for inflation.

from 2% in the original paper)⁴. Furthermore, an observation is considered relevant only if the primary gap remains above such threshold for at least two years consecutively.

B. Criterion 2: intention to implement discretionary fiscal adjustment

The original paper defines the intention to implement discretionary policies for fiscal consolidation as an improvement in the CAPB for at least two consecutive years. The CAPB decomposes a given change in the headline deficit into a discretionary component and a cyclical component and is therefore widely used in the analysis of fiscal policies to assess their sustainability and the related fiscal impulse. The CAPB provides a uniform methodology to quantitatively compare changes across countries and time in a consistent manner. However, the CAPB also entails some shortcomings, as by construction it depends on non-observable variables (such as potential GDP) that are likely subject to the statistical technique used. Moreover, attributing all changes in the CAPB to the discretionary fiscal policy may lead to an overestimation of the fiscal efforts, as such approach disregards the non-discretionary elements generally associated to an economic boom.

An episode is selected if the minimum annual change of CAPB is greater than 0.1 percentage points. Importantly, this requirement is more relaxed compared to the literature, aiming to seize those episodes that are smaller yet consistent over time, on top of substantial adjustments (refer to Table 1 for comparison).

C. Relevant episodes

By combining and applying the two criteria to a group of 39 advanced countries between 2000 and 2020 (the original paper considers 30 advanced economies between 1945 and 2012), we obtain 19 relevant episodes from 17 countries (see Table 2). An episode continues for as long

⁴ Advanced countries from the late 1990s registered a trend of debt accumulation and expansion of fiscal budgets. Additionally, the financial crisis created by the Lehman collapse forced sovereigns to reach unprecedented debt levels that remained high in the 2010s.

as the change in CAPB remains positive. Moreover, it continues if a year-to-year decrease of the CAPB of less than 0.3 (pp of potential GDP) is followed by an increase of at least 0.5 (pp of potential GDP) in the subsequent year⁵.

For a detailed list of episodes including countries and years, please see Table A1 in the Annex.

Table 2. Sample Coverage

	<i>Original paper</i>		<i>Own calculations</i>	
	Number of episodes	Number of countries	Number of episodes	Number of countries⁶
Total	49	19	19	17
Decades				
1940s	1	1		
1950s	3	2		
1960s	2	1		
1970s	3	3		
1980s	12	11		
1990s	13	13		
2000s	5	5	3	3
2010s	8	8	16	16

Source: Escolano et al. (2014) and own results.

3.2 Empirical model

Following the identification of relevant episodes, which is the core of the analysis, we identify conditional correlations of variables commonly associated with fiscal consolidation. As in the original paper, the following OLS is estimated with robust standard errors:

$$\Delta CAPB = \alpha + \beta_1 INI + \beta_2 ECO + \beta_3 FISC + \beta_4 MON + \beta_5 EXR + \beta_6 FIN + \mu \quad (3)$$

where *INI* is a matrix on initial budgetary conditions (CAPB, debt-to-GDP, primary gap), *ECO* captures macroeconomic conditions (real GDP growth, inflation, U.S. long-term interest rates), *FISC* proxies the fiscal adjustment strategy (duration, primary expenditure cuts), *MON* accounts

⁵ Example: Czech Republic experienced a decrease of the CAPB from -1.57 in 2011 to -1.71 in 2012 (<0.3pp decrease), to then increase to 1.39 in 2013 (>0.5pp increase). All in all, the last year of adjustment was 2013.

⁶ Differences due to data availability (for example, Japan). The sample considers also events corresponding to the bailouts of Greece (2010, 2012), Ireland (2010), and Portugal (2011).

for monetary conditions via the short-term interest rates, *EXR* includes exchange rate movements (before and during the episode), and *FIN* attains domestic private credit availability. The cross-sectional dataset is built with data from different sources. Table A1 in the Annex details the relevant countries and years; Table 3 below shows the descriptive statistics. No data transformations were performed, in line with the original paper.

Table 3. Descriptive statistics

Variable	Mean	St. Dev.	Median	Obs	Source
Change in CAPB**, t to eoe	0,0637	0,0442	0,0540	19	IMF and own calc.
CAPB**, at t	-0,0490	0,0302	-0,0460	19	IMF
Debt*, at t	0,6555	0,2956	0,6175	19	IMF
Primary gap*, at t	0,0857	0,0578	0,0701	19	IMF and own calc.
Inflation, average t+1 to eoe	0,0142	0,0133	0,0100	19	World Bank
GDP growth, average t+1 to eoe	0,0036	0,0246	0,0084	19	IMF
GDP growth in trading partner countries, average t+1 to eoe	0,0117	0,0149	0,0082	19	IMF
U.S. long-term interest rate, average t+1 to eoe	0,0278	0,0077	0,0253	19	FRED
Duration of the episode, years	4	1,3333	4	19	Own calculations
Primary expenditure cuts, % of Δ CAPB	0,5694	0,5790	0,2983	19	IMF
Change in the short-term interest rate, t to eoe	-0,0027	0,0133	-0,005	19	OECD
Change in the nominal exchange rate, t to eoe	0,1662	0,4704	0	19	FRED
Change in the nominal exchange rate, t-3 to t	-0,1762	0,8347	-0,0430	19	FRED
Change in credit*, t to eoe	-0,0927	0,3142	-0,0201	19	World Bank

Note: * Percent of GDP; ** Percent of potential GDP; eoe: end of episode; FRED: Federal Reserve Economic Data; OECD: Organisation for Economic Cooperation and Development.

4. Results and discussion

4.1 Characteristics of fiscal adjustments

The identified episodes exhibit marked improvements in the level of primary balance (both actual and cyclically adjusted), showing that countries were virtually able to implement sizeable fiscal consolidations as in Escolano et al. (2014). By the end of the episode, the actual primary balance was very close to zero but still negative for most countries, suggesting that the adjustment efforts were insufficient but very near to closing the primary deficit. Although this is a key difference compared to the original paper where most countries achieved primary surpluses, this result is in line with several other analyses as in Guichard et al. (2007).

Table 4 shows that countries achieved a level of actual primary balance of at least -0,3% of GDP (CAPB of 1.0% of potential GDP), with a quarter reaching at least 1.7% of GDP (CAPB of 3.3% of potential GDP). The total size of fiscal consolidation for the majority of episodes consisted of at least 4,3% of GDP (CAPB of 5,4% of potential GDP), whereas a quarter achieved a change of at least 7,5% of GDP (CAPB of 9,8% of potential GDP). The median duration of the episodes was 4 years, in line with the original paper, whilst one-in-four lasted for at least 5 years. The median CAPB level at the end of the episode equals 1.0% of potential GDP, below the finding of the original paper of 2.2%. However, the average yearly change of the CAPB is higher in the sample 2000-2020, suggesting that initial fiscal conditions were significantly lower in our sample. The average annual change in the CAPB for the majority of episodes was at least 1.4%, very much alike the original paper, with three-in-four episodes exhibiting at least a value of 0.8% (minimum in the sample is 0.4%). This latter figure is significantly higher than the requirement of a minimum yearly CAPB increase of 0.1%, which allows to seize consolidations that are consistent over the years. Considering that the CAPB needed to stabilize debt-to-GDP in advanced economies at 2013 levels is estimated at 1.1% of GDP by Guerguil and Keen (2014), we conclude that a sufficient level of the CAPB was achieved in virtually half of the cases by the end of the episode. As expected, levels of CAPB are higher than the actual primary balance as they describe the country's fiscal position net of the negative impacts of macroeconomic developments on the budget, which are especially important for the 2010s period. In fact, particularly in the context of economic downturns, the fiscal balance that would be registered if output was at full potential is expected to be higher than the actual balance.

By comparing the results to the original paper (see Table 4 in parenthesis), we find that our sample overall depicts ranges (min-max) that are smaller and shifted towards the left (lower values for all the relevant percentiles). The factors that could explain such differences may be

Table 4. Characteristics of fiscal adjustments

	Percentile cut-off			Min	Max
	25	50	75		
Full sample (advanced)					
Actual primary balance at end of episode*	-1.7 (-0.8)	-0.3 (1.6)	1.7 (4.5)	-4.7 (-3.8)	3.2 (10.6)
Change in actual primary balance at end of episode*	3.1 (3.5)	4.3 (5.5)	7.5 (8.2)	-0.3 (1.5)	12.8 (15.5)
Average annual change in the actual primary balance*	0.8 (1.1)	1.4 (1.6)	2.3 (2.0)	-0.1 (0.5)	2.6 (6.0)
CAPB at end of episode**	-0.3 (0.2)	1.0 (2.2)	3.3 (5.3)	-2.4 (-2.9)	8.6 (9.0)
Change in the CAPB, t to end of episode **	2.9 (3.1)	5.4 (5.1)	9.8 (7.4)	1.3 (1.1)	18.7 (18.6)
Average annual change in the CAPB**	0.8 (1.2)	1.4 (1.5)	1.9 (1.8)	0.4 (0.4)	4.7 (4.6)
Debt at t*	53.3 (39)	61.8 (61)	90.6 (84)	13.0 (13)	127.8 (170)
Duration (years)	3 (3)	4 (4)	5 (4)	2 (2)	7 (6)

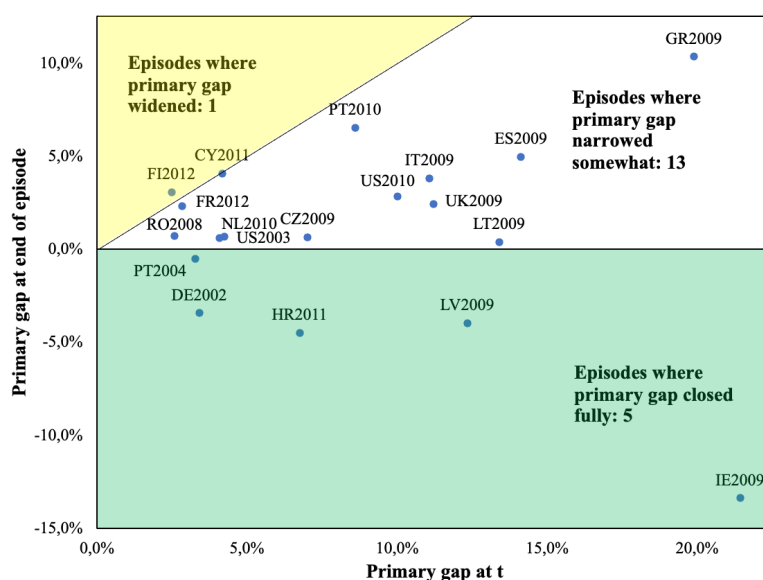
* Percent of GDP, ** Percent of potential GDP. In parenthesis, the results from Escolano et al. (2014).

inherently correlated to the 2008 financial crisis, which likely triggered 85% of our sampled episodes. In particular, it may be worth recalling that, although a big share of consolidation episodes already started in the immediate years after the Lehman collapse (2009 and 2010), negative financial consequences came in waves – the so-called “double dip” (Reinhart and Rogoff 2014; Barthélémy, Binet and Pentecôte 2020). As such, the impact of a second financial hit while economies had already committed efforts to tackle the worsening finances could explain the more limited achievements as compared to the period 1945-2012, as also recalled by Elwell (2012) and Heimberger (2017). Secondly, the circumstances of the 2008 financial crisis were responsible for systemic consequences to the global economy and especially to the banking sector, requiring sovereigns to restructure the economy by its fundamentals. This characteristic, as opposed to the analysis of the original paper where the need for fiscal adjustment was generally specific to a country or group of countries and accompanied by

favourable global conditions, suggests that comparable efforts to adjust may produce an underperforming adjustment during a financial crisis, as discussed in Bullard, Neely and Wheelock (2009), and Schich and Kim (2011). Thirdly, the pervasive and long-lasting effects of the Lehman collapse when framed together with the trend for increasing economic integration and harmonization, especially in the Eurozone, can explain a more homogeneous response (see also Badinger 2005). As a last remark, one could consider that advanced countries since the beginning of the 2000s experienced a progressive accumulation of debt in favour of a larger welfare state at the expense of primary balances (Taylor-Gooby 2004; Bonoli and Natali 2012).

In virtually all episodes, countries managed to stabilize debt by reducing the primary gap, with one-in-four closing the gap fully or, in other words, going beyond debt stabilization by achieving debt reduction (Figure 1).

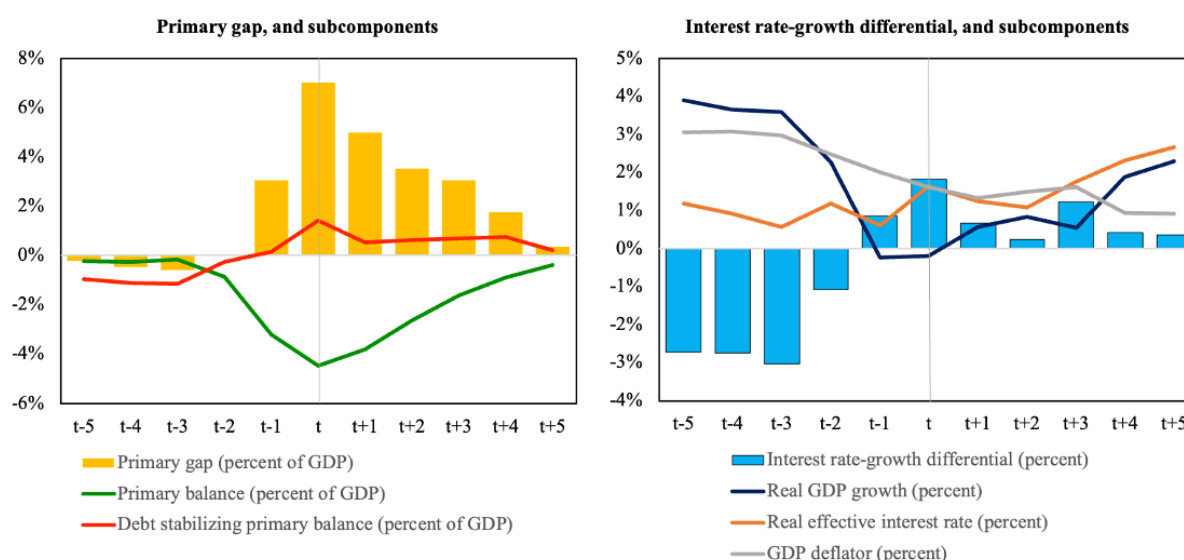
Figure 1. Primary Gaps at t and End of the Episode (*Percent of GDP*)



The majority of countries experienced a harsh increase in debt levels starting about 3 years before the adjustment and persisting in the long run after the episode, in line with Escolano et al. (2014). The debt-to-GDP ratios of most countries increased ahead of the adjustment and remained above the pre-adjustment levels by about 40% of GDP (Figure A1, Appendix).

Figure 2 shows that for the majority of episodes, the primary gap improvement during the consolidation is mainly attributable to increasing primary balances, with debt stabilizing primary balances also contributing to a minor share. This result is in line with the original paper, which finds that improvements in the actual primary balance explain 80% circa of the change in the primary gap across episodes. The resulting level of primary balance 5 years after the start of the episode is significantly lower, showing that in most episodes the primary gap was virtually closed, but without achieving debt reduction as in the original paper. Although most countries achieved primary balance levels that were significantly higher up to 5 years after the start of the adjustment, they refrained to sustain high efforts for a prolonged period as the primary balance returned to pre-consolidation levels after about 8 years. The result that primary surpluses are easier to achieve than to preserve is consistent with the original paper, as well as supported by IMF (2013).

Figure 2. Primary Gap and the Interest Rate-Growth Differential (*Percent of GDP*)



Note: Graphs present the median across episodes.

The differential between the interest rate and economic growth (r-g differential) remained negative before the episode and increased sharply from 2 years before the adjustment ($t-2$), to reach a peak in the initial year of adjustment at around 2% (t). The fiscal efforts brought

significant changes in the $r-g$ differential already in the first year of adjustment ($t+1$), to then remain positive and low in the medium term. Figure 2 also shows a peak in the third year following the start of the episode. By the end of the episode, most countries achieved levels of primary balance and debt stabilizing primary balance similar to those registered about 5 years before the start of consolidation, whereas inflation reached lower levels, and the real GDP growth and real effective interest rate remained high even after the end of the adjustment.

The $r-g$ differential carries implications that differ if it is positive or negative. In both cases, debt sustainability is achievable, but different policy designs are required. If one considers a stable level of debt such that $d_t = d_{t-1}$, then equations 1 and 2 above can be simplified to the following:

$$p = d \left(\frac{r - g}{1 + g} \right) \quad , \text{ or equivalently, } \quad d = p \left(\frac{1 + g}{r - g} \right) \quad (4)$$

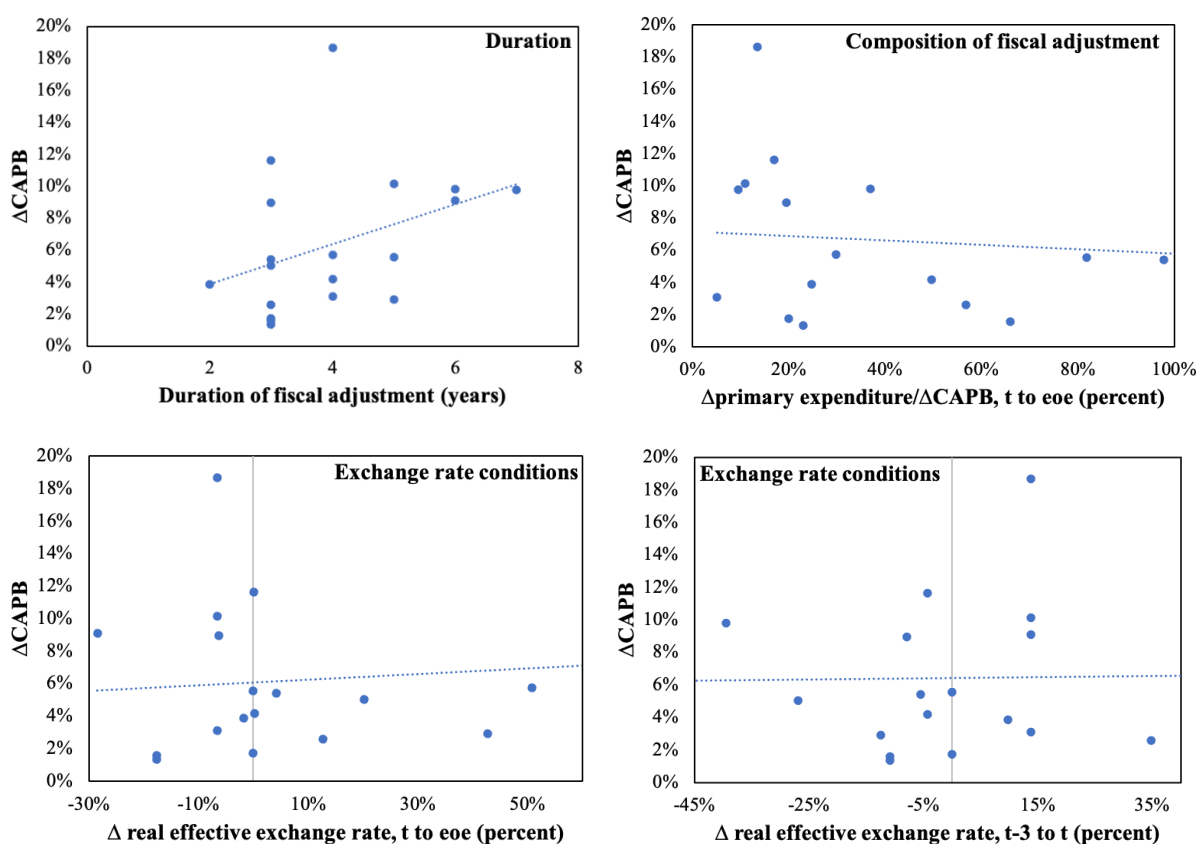
For any level of the primary balance p , there is a maximum feasible level of debt d such that, if exceeded, debt explodes. Equivalently, for any debt level d , there is a level of the primary balance p such that if the primary balance is lower than p , debt explodes (Blanchard, Leandro and Zettelmeyer 2021).

With a negative differential ($g > r$), countries can endure primary deficit to maintain a constant positive debt ratio. In our sample, this was the case until 2 years before the start of consolidations. As long as the primary deficit remains constant in size, debt will be non-explosive and will converge to some finite value. In the case of a country maintaining a primary surplus, debt will steadily decline and eventually converge to a negative number (Blanchard, Leandro and Zettelmeyer 2021). However, debt-explosion might still happen, considering that the macroeconomy is subject to several interplays departing from the pure finance view. Unexpected shock can come at play (Lehman collapse). In fact, we observe a sudden increase in the primary gap and widening of the primary deficit starting 2 years before the discretionary consolidation, reaching the peak on the selection year. When r exceeds g ($g < r$), as depicted

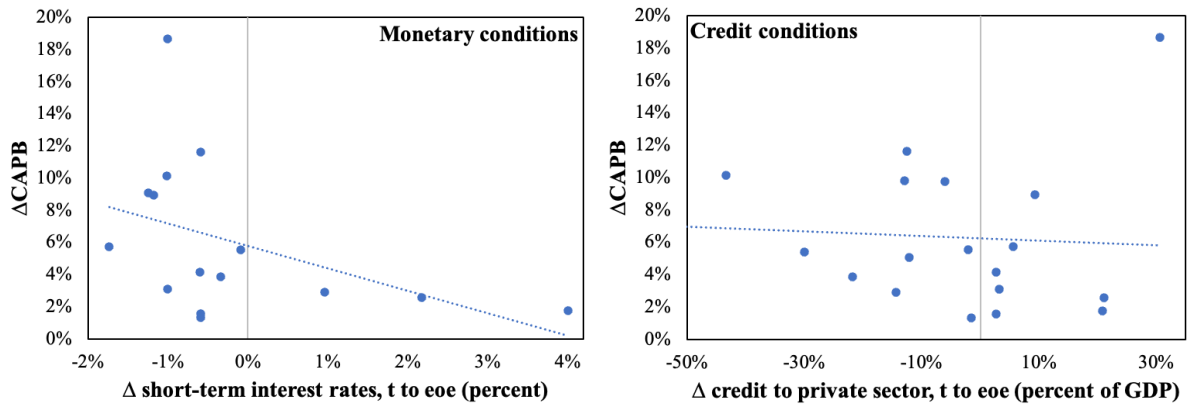
in our sample from $t-1$, countries will be required to achieve and maintain primary surpluses to stabilize debt. In fact, primary deficit moved towards zero during the episodes, with most countries closing the primary gap about 5 years after the start of the episode.

The analysis can be further substantiated considering accompanying factors depicting bilateral associations (correlations) between the fiscal adjustment and fiscal policy, exchange rate, monetary, and credit conditions. Figure 3 shows the results for sample years 2000-2021, confirming that fiscal adjustments tend to be larger the longer the duration, and the bigger the reduction of short-term interest rates. The composition of fiscal adjustment and credit conditions shows a weak negative relationship with the change of CAPB. Lastly, the correlation with exchange rate movements does not show significance.

Figure 3. Accompanying Factors



(continued)



Note: Outliers are i) composition of fiscal adjustment for Lithuania (2009, 170%), Germany (2002, 154%), and Ireland (2009, 196%); ii) exchange rate conditions t to end of episode for Romania (2008, 149%), and t-3 to t for the Czech Republic (2009, -353%); and iii) credit conditions for Ireland (2009, -116%).

4.2 Regression Results

By running the regression as in (3), we obtain the econometric results illustrated in Table A2, where column 1 corresponds to the full specification, and column 2 shows the robustness checks using a simplified specification. The following analysis is presented in line with the original paper; however, we depart from the original interpretation by discussing possible biases inherent in the proposed econometric methodology which may create difficulties in interpreting the results. This remark is recalled below and especially in the research limitations (see next section).

In line with the findings from many earlier analyses (Ahrend, Catte and Price 2006; Guichard et al. 2007, among others), budgetary conditions prevailing just before the start of the episodes are considered to impact the size of fiscal adjustments. In line with Escolano et al. (2014) and others⁷, the initial CAPB level shows a negative correlation with the size of adjustment, contrary to the initial primary gap. This may indicate that large cyclically adjusted deficits make the

⁷ See also Kumar, Leigh and Plekhanov (2007); Barrios, Langedijk and Pench (2010); and Afonso and Jalles (2012).

adjustment more necessary and that countries tend to respond positively to the economy being not at full potential by reducing the primary gap. Initial debt-to-GPD is found to be not statistically significant.

Macroeconomic conditions show significant correlations with the size of fiscal adjustments, particularly with the average real GDP growth suggesting a negative relationship with the size of adjustments (however, no significant correlation is found in the original paper). This result may suggest that countries that achieved significant economic growth during the financial crisis were also those that suffered mitigated impacts and thus that required a lower adjustment. At the same time, the result could also be explained with reverse causality, in that a large fiscal consolidation takes a toll on economic performance as explained in Escolano et al. (2014), especially in a period when investment opportunities are limited. Inflation and U.S. long-term interest rates were found to be weakly statistically significant.

The fiscal adjustment strategy, including duration and primary expenditure cuts, marginally contribute to the size of the adjustment. Overall, the result suggests that i) countries take longer to achieve larger consolidations; and that ii) current expenditures cuts are associated with overall larger consolidations – both findings are in line with the original paper and the literature (see for example, Guichard et al. 2007; Afonso and Jalles 2012; Molnar 2013; Agnello, Castro and Sousa 2013). Further discussion on possible addition and improvements to the analysis are discussed in the next section.

Changes in the short-term interest rates appear as important factor, showing a positive relationship with the size of adjustment. Interest rates, which have been steadily decreasing since the mid-1980s, remained low during the 2000s and 2010s. Interest rates usually fall during a recession, whereby low short-term interest rates flag an intent to keep an accommodative monetary policy. However, during the 2008 crisis, advanced countries were maintaining interest rates at levels even lower than the GDP growth rates, and very close to the lower bound.

In this context, and deriving from this result, it can be argued that countries facing higher rates could also be those that needed a bigger fiscal adjustment (bank runs) – hence the positive correlation. Or alternatively, countries that afforded to maintain higher rates levels were also those less impaired by the crisis that show a sizeable positive adjustment. Lastly, the efforts of some countries to qualify for Euro area membership by aligning the rates to those prescribed by the EU also significantly increased the probability of starting consolidation as suggested by Guichard et al. (2007).

Exchange rate depreciations are found to be significant only during the episode and not in the years preceding it. This suggests that the financial crisis was not anticipated with exchange rate fluctuations and the finding is supported by several studies reporting no effect (McDermott and Wescott 1996; Barrios, Langedijk and Pench 2010). It may be important to also note that the vast majority of selected countries are intertwined by the same currency in the period under investigation (Eurozone).

Credit conditions do not show a correlation with fiscal consolidation. Nevertheless, intuitively, it can be argued that, during financial crises, banks in affected countries are most likely impaired in their ability to extend credit to the private sector, in line with the experience of many countries such as Greece, Portugal, Italy and Ireland – the latter registering a striking decrease in the credit to private sector of 116% by the end of the episode.

4.3 Limitations and future research

As previously highlighted, the core of the original paper evolves around the analysis of the size of fiscal adjustment episodes. In particular, the original paper is one of the few cases in the literature that combines two criteria, first one being the intention to implement a fiscal consolidation measured by improvements in the CAPB as for the rest of the literature, and the second one capturing the need for an adjustment proxied by significantly high primary gaps. The threshold for the CAPB criteria, although much less stringent compared to the literature,

allows to seize and discuss small but consistent consolidations over time. Some further discernment is needed on the second part, covering the econometric methodology proposed by Escolano et al. (2014). Discussing such limitations helps providing indications on the suitability of the analysis, and ideas for future research.

By construction, the selected econometric technique (OLS with robust standard errors) entails suspicion of biases. Exogeneity is one of the fundamental assumptions of OLS (Gauss-Markov theorem), for which no explanatory variable x_j should be correlated with the error term μ . If endogeneity occurs, such that $E(x_j\mu) \neq 0$, for some $j = 1, \dots, k$, the OLS-estimated parameters may result biased and inconsistent. As argued in previous sections, the model proposed by the authors is suspected of reverse causality or simultaneity between some variables (not discussed in the original paper). For instance, this bias can occur when the explanatory variable is jointly determined with the dependent variable. The selection criteria may imply that, for certain historical periods, common external root causes trigger the episodes – for example, amongst others, the 2008 crisis, the 2010s Eurozone crisis, the 1990s Gulf crisis, or also the establishment of the European Monetary Union⁸. Even more, if one considers that advanced economies are often characterized by strong financial integration, increasing the risk of spillovers. On one hand, analysing analogous episodes may add value, as compared to pooling episodes belonging to entirely different historical and economic periods. Yet, on the other hand, it intensifies econometric complexities as further external factors may possibly explain both the decision to consolidate and the policy design simultaneously. This is further sustained by the notion that p , g and r are not independent but rather determined in the macroeconomy – so-called Lucas critique, see Ericsson and Irons (1995), Rudebusch (2005) and Blanchard, Leandro and Zettelmeyer (2021). All in all, the simplified econometric model

⁸ Guichard et al. (2007) show that the prospect of EMU membership more than doubled the probability to adjust.

implemented in the proposed analysis may be non-exhaustive as some additional factors are likely interfering both with the dependent and independent variables. This may be the case for the average real GDP growth during the episode, as previously discussed, but also of several other variables. For example, the delta short-term interest rate between t and the end of episode appears to be strongly positively correlated to the size of fiscal adjustment, suggesting that countries facing higher rates were also those requiring bigger adjustments; however, one could also argue that in turn increased national fiscal efforts could create higher credit risk and consequently higher short-term interest rates.

Possible omitted variables can constitute another possible source of endogeneity. Because numerous factors determine the size of fiscal adjustments, formulating a model able to capture the intricate dynamics is cumbersome. One way to mitigate the issue could regard the inclusion of proxy variables depicting the political environment, which is strictly intertwined with the fiscal policy designs. For instance, one may control with an index of political credibility, as well as for structural reforms in labour and product markets, and for single-party against coalition governments. Amongst others, Alesina and Ardagna (1998) find that coalition governments entail a significantly lower likelihood to succeed in consolidating the budget and that union behaviour is also determinant. Alesina and Ardagna (2013) also explore the regulation of goods market and the composition of the government balance. Moreover, the analysis could be enhanced by including some controls related to economic medium-term expectations, for instance, the expected GDP and expected inflation. This would allow controlling and partially anticipating the economic downturn by embedding it in the econometric exercise. A larger sample size could also help mitigate biases, as a large sample yields more reliable results (asymptotic unbiasedness). Lastly, as already previously discussed, some minor measurement errors could possibly stem from data relating to non-observable variables (e.g., potential GDP) and lead to attenuation bias. Other variables proposed in the

literature are: i) the change in primary balance (Baldacci, Clements and Gupta 2004; Tsibouris et al. 2006; Lambertini and Tavares 2005; and Mati and Thornton 2008); ii) the level of primary balance (IMF 2013; Zeng 2014); iii) the change in the overall deficit (Gupta et al. 2005); and iv) the “policy-action approach”, consisting of deriving the definitions of fiscal adjustments from the policy documents, nevertheless carrying some challenges with the consultations and issues of compatibility across methodologies (Devries et al. 2011; Guajardo, Leigh and Pescatori 2011; Perotti 2012). An available methodology to address endogeneity consists of the Instrumental Variables (IV) estimation as in Ravallion (2004), Beetsma and Guiliodori (2010), Wang, Fidrmuc and Ghosh (2015), and many others. Alternative specifications could also be selected to analyse factors accompanying adjustments. Several authors propose a different approach that considers probabilities of consolidation success. For this, some authors implement a Logistic Probability or Probit Models to estimate a binary outcome (1 if the consolidation is successful, and 0 otherwise), see McDermott and Wescott (1996), and Barrios, Langedijk, and Pench (2010).

A further proposal for improvement regards the investigation of the quality and sustainability of the adjustment, which is virtually missing in the original analysis. In particular, future research may draw considerations on the role of expenditure- as opposed to revenue-based consolidations and their trade-offs. Evidence from the literature shows that spending restraints (especially related to government consumption and transfers) have been associated with higher probabilities of long-lasting and greater fiscal adjustments⁹. Ahrend et al. (2006) find that consolidations based on current expenditure cuts likely yield falling policy rates and long-term

⁹ See for example analyses with dynamic general equilibrium model with overlapping generations (Ardagna 2004), which show that adjustments driven by tax increases are likely to be significantly more costly compared to spending restraints. Interestingly, Wierds (2007) highlights a possible bias for which governments implementing expenditure-based policies are also those more committed to achieving a substantial consolidation.

interest rates, lower household savings, and higher economic growth. Reductions in capital expenditures tend to play a marginal role in the adjustment and are relevant especially when they compensated for increases in current spending. Von Hagen, Hallett and Strauch (2001) also find positive duration effects for consolidation episodes if governments promote politically sensitive agendas such as subsidies and transfers. Sacchi and Salotti (2015) recall that fiscal rules with expenditure targets are correlated with larger, longer and more successful adjustments, and the size of the adjustment improves with some key design features such as transparency and flexibility to economic cycles, coverage across different budget items, and effective enforcement mechanisms. Overall, performing an analysis of the policy design could be informative on the quality of the selected episodes and could support a deeper understanding of the results.

A similar analysis could be interestingly replicated for the period corresponding to the Covid-19 pandemic, which understandably forced heavy attempts to adjust the fiscal stances. Presenting an analogous analysis for the consolidations starting following 2020 would be valuable to explore whether fiscal adjustment trends are changing and the peculiarities of each historical period. When combining the two criteria to the most recent years, it is found that virtually all advanced countries already initiated fiscal adjustments, nevertheless it would be premature to draw conclusions at the current stage as episodes are ongoing.

5. Conclusions

By combining the two selection criteria as in Escolano et al. (2014), we obtain 19 consolidation episodes from a sample of 39 advanced countries between 2000 and 2021, with a median adjustment in the primary balance of 4.3% of GDP (5.4% of potential GDP for the CAPB), and median duration of 4 years. About 85% of the sampled episodes commenced in the aftermath of the Lehman crisis. Episodes show a strong increase in debt levels starting about 3 years before the adjustment and persisting in the long run after the episode, and debt-to-GDP ratios

tended to increase ahead of the adjustment and remain above pre-adjustment levels by 40 pp circa. All in all, in virtually all episodes, countries managed to stabilize debt by reducing the primary gap, with one-in-four closing the gap fully and achieving debt reduction.

The analysis is further substantiated with bilateral associations between the change in the CAPB and some additional factors that intuitively participate in the adjustment, such as the fiscal policy, exchange rate, monetary, and credit conditions. By regressing an OLS with robust standard errors as in the original paper, we find that several accompanying factors are significantly correlated with the size of adjustment. On one hand, factors that are identified as statistically significant with negative correlation are: the CAPB level at the beginning of the episode; the average real GDP growth across the episode for the country itself and the trading partners; the average U.S. long-term interest rate across the episode; the duration of the episode itself. On the other hand, factors identified as positively contributing to the size of the consolidation are: the primary gap level at the beginning of the episode; the change in short-term interest rates from start to end of the episode; the change in the nominal exchange rate between beginning and end of episode. We also detail possible economic intuitions behind this result. Moreover, we add to the proposed methodology elaborating on possible econometric biases, with suspicion of endogeneity affecting the consistency of estimates, and at proposed methods to address the issue, namely instrumental variables, additional controls (e.g., political factors) and other models from the same area of the literature (e.g., probit).

The identification of some elements that are possibly correlated to fiscal consolidation, and the analysis over their relative importance, can help assess the feasible size. The Covid-19 pandemic left advanced economies with huge needs for consolidation. Understanding their dynamics can be useful to anticipate implications.

Appendix

Table A1. List of Episodes

Country	Selection year (t)	First Year of Adjustment (t+1)	Last Year of Adjustment
Croatia	2011	2012	2017
Cyprus	2011	2012	2014
Czech Republic	2009	2010	2013
Finland	2012	2013	2015
France	2012	2013	2015
Germany	2002	2003	2007
Greece	2009	2010	2013
Ireland	2009	2010	2015
Italy	2009	2010	2013
Latvia	2009	2009	2012
Lithuania	2009	2010	2012
Netherlands	2010	2011	2014
Portugal	2004	2005	2007
Portugal	2010	2011	2013
Romania	2008	2009	2015
Spain	2009	2010	2014
United Kingdom	2009	2010	2011
United States	2003	2004	2006
United States	2010	2011	2015

Figure A1. Debt and CAPB, Median across episodes

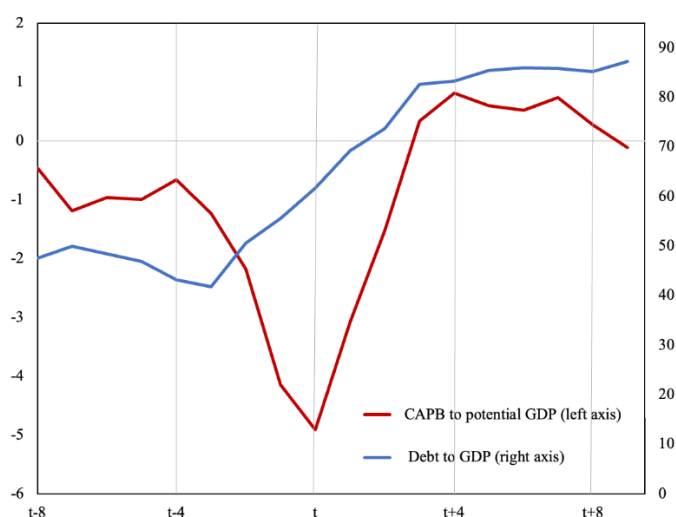


Table A2. Accompanying Factors to the Size of Fiscal Adjustment

	(1)	(2)
	Full specification	Robustness checks
CAPB as percent of potential GDP, at t	-0.492*** (0.0980)	-0.570*** (0.0852)
Debt as percent GDP, at t	-0.00707 (0.0109)	
Primary gap as percent GDP, at t	0.377*** (0.0543)	0.347*** (0.0463)
Real GDP growth, average t+1 to eoe, percent	-1.197*** (0.165)	-1.037*** (0.0752)
Inflation, average t+1 to eoe, percent	-0.508* (0.239)	-0.506** (0.207)
Real GDP growth in trading partner countries, avg t+1 to eoe, %	-0.00459** (0.00172)	-0.00396** (0.00148)
U.S. long-term interest rate, average t+1 to eoe, percent	-1.950*** (0.371)	-1.541*** (0.411)
Duration of the episode, years	-0.00647* (0.00310)	-0.00479** (0.00189)
Primary expenditure cuts as a share of total fiscal adjustment, %	0.00770* (0.00343)	0.00892** (0.00285)
Change in the short-term interest rate between t and the eoe	1.867*** (0.300)	1.437*** (0.303)
Change in the nominal exchange rate between t and eoe	0.0506*** (0.00984)	0.0445*** (0.00522)
Change in the nominal exchange rate between t-3 and t	-0.00114 (0.00215)	
Change in credit to GDP between t and eoe	-0.0143 (0.0156)	
Constant	0.102*** (0.0203)	0.0767*** (0.0152)
Observations	19	19
R-squared	0.993	0.990

Robust t-statistics in parentheses; *** p<0.01, ** p<0.05, * p<0.1

References

- Afonso, António, and Joao T. Jalles. 2012. "Measuring the success of fiscal consolidations." *Applied Financial Economics*, 22(13), 1053-1061.
- Agnello, Luca, Vitor Castro, and Ricardo M. Sousa. 2013. "What determines the duration of a fiscal consolidation program?." *Journal of International Money and Finance*, 37, 113-134.
- Ahrend, Rudiger, Pietro A. Catte, and Robert Price. 2006. "Interactions between monetary and fiscal policy: How monetary conditions affect fiscal consolidation." *OECD Economics Working Paper*, No. 2006/49.
- Alesina, Alberto, and Silvia Ardagna. 1998. "Tales of fiscal adjustment." *Economic policy*, 13(27), 488-545.
- Alesina, Alberto, and Silvia Ardagna. 2010. "Large changes in fiscal policy: taxes versus spending." *Tax policy and the economy*, 24(1), 35-68.
- Alesina, Alberto, and Silvia Ardagna. 2013. "The design of fiscal adjustments." *Tax policy and the economy*, 27(1), 19-68.
- Alesina, Alberto, and Roberto Perotti. 1997. "Fiscal adjustments in OECD countries: composition and macroeconomic effects." *Staff Papers*, 44(2), 210-248.
- Alesina, Alberto, and Guido Tabellini. 1990. "A positive theory of fiscal deficits and government debt." *The Review of Economic Studies*, 57(3), 403-414.
- Ardagna, Silvia. 2009. "Determinants and consequences of fiscal consolidations in OECD countries." *European Commission: European Economy*.

- Ardagna, Silvia. 2004. "Fiscal stabilizations: When do they work and why." *European Economic Review*, 48(5), 1047-1074.
- Badinger, Harald. 2005. "Growth effects of economic integration: evidence from the EU member states." *Review of World Economics*, 141(1), 50-78.
- Baldacci, Emanuele, Benedict Clements, and Sanjeev Gupta. 2004. "Front-Loaded or Back-Loaded Fiscal Adjustments: What Works in Emerging Market Economies?." *IMF Working Paper* No. 04/157
- Baldacci, Emanuele, Sanjeev Gupta, and Carlos Mulas-Granados. 2013. "Debt reduction, fiscal adjustment, and growth in credit-constrained economies." *International Monetary Fund*.
- Barrios, Salvador, Sven Langedijk, and Lucio R. Pénch. 2010. "EU fiscal consolidation after the financial crisis Lessons from past experiences." *Bank of Italy Occasional Paper*.
- Barthélémy, Sylvain, Marie-Estelle Binet, and Jean-Sébastien Pentecôte. 2020. Worldwide economic recoveries from financial crises through the decades. *Journal of International Money and Finance*, 105, 102204.
- Beetsma, Roel, and Massimo Giuliodori. 2010. "Fiscal adjustment to cyclical developments in the OECD: an empirical analysis based on real-time data." *Oxford Economic Papers*, 62(3), 419-441.
- Bernanke, Ben S., Jean Boivin, and Piotr Elias. 2005. "Measuring the effects of monetary policy: a factor-augmented vector autoregressive (FAVAR) approach." *The Quarterly journal of economics*, 120(1), 387-422.

- Blanchard, Olivier (1990). "Suggestions for a New Set of Fiscal Indicators." *The New Political Economy of Government Debt. Amsterdam, The Netherlands: Elsevier Science Publishers.*
- Blanchard, Olivier, Alvaro Leandro, and Jeromin Zettelmeyer. 2021. "Redesigning EU fiscal rules: From rules to standards." *Economic Policy*, 36(106), 195-236.
- Blanchard, Olivier, Jean-Paul L'Huillier, and Guido Lorenzoni. 2009. "News, noise, and fluctuations: An empirical exploration." *American Economic Review*, 103(7), 3045-70.
- Blanchard, Olivier, and Marc Watson. 1986. "Are business cycles all alike?." *The American business cycle: Continuity and change* (pp. 123-180). University of Chicago Press.
- Bonoli, Giuliano, and David Natali. 2012. "The politics of the new welfare state." *Oxford University Press.*
- Bullard, James, Christopher J. Neely, and David C. Wheelock. 2009. "Systemic risk and the financial crisis: a primer." *Federal Reserve Bank of St. Louis Review*, 91(September/October 2009).
- Christofzik, Désirée, Lars P. Feld, Reuter Wolf Heinrich, and Mustafa Yeter. 2018. "Uniting European fiscal rules: How to strengthen the fiscal framework." *Arbeitspapier* (No. 04/2018).
- Cottarelli, Carlo, and Javier Escolano. 2014. Debt dynamics and fiscal sustainability. *Post-crisis fiscal policy*, 31-47.
- Devries, Pete, Jaime Guajardo, Daniel Leigh, and Andrea Pescatori. 2011. "A new action-based dataset of fiscal consolidation." *IMF Working Paper* No. 11/128

- Elwell, Craig K. 2012. “Double-dip recession: Previous experience and current prospect.” *Library of Congress, Congressional Research Service*.
- Ericsson, Neil R., and John S. Irons. 1995. “The lucas critique in practice.” *Macroeconometrics* (pp. 263-324). Springer, Dordrecht.
- Escolano, M. Julio, Laura Jaramillo, Carlos Mulas-Granados, and Gilbert Terrier. 2014. “How much is a lot? Historical evidence on the size of fiscal adjustments.” *International Monetary Fund*.
- Giavazzi, Francesco, and Marco Pagano. 1990. “Can severe fiscal contractions be expansionary? Tales of two small European countries.” *NBER macroeconomics annual*, 5, 75-111.
- Guajardo, Jaime, Daniel Leigh, and Andrea Pescatori. 2014. “Expansionary austerity? International evidence.” *Journal of the European Economic Association*, 12(4), 949-968.
- Guerguil, Martine, and Michael Keen. 2014. “Fiscal Monitor, April 2014: Public Expenditure Reform: Making Difficult Choices.” *International Monetary Fund*.
- Guichard, Stéphanie, Mike Kennedy, Eckhard Wurzel, and Christophe André. 2007. “What promotes fiscal consolidation: OECD country experiences.” *OECD Economics Department Working Papers* No. 553
- Gupta, Sanjeev, Emanuele Baldacci, Benedict Clements, Erwin R. Tiongson. 2005. “What sustains fiscal consolidations in emerging market countries?.” *International Journal of Finance & Economics*, 10(4), 307-321.

- Heimberger, Philipp. 2017. "Did fiscal consolidation cause the double-dip recession in the euro area?." *Review of Keynesian Economics*, 5(3), 439-458.
- Heylen, Freddy, and Gerdie Everaert. 2000. "Success and failure of fiscal consolidation in the OECD: A multivariate analysis." *Public Choice*, 105(1), 103-124.
- International Monetary Fund. 2013. "Fiscal Monitor, April 2013: Fiscal Adjustment in an Uncertain World." *World Economic and Financial Surveys (Washington)*.
- Keynes, John Maynard. 1937. "The general theory of employment." *The quarterly journal of economics*, 51(2), 209-223.
- Kumar, Manmohan, Daniel Leigh, and Alexander Plekhanov. 2007. "Fiscal adjustments: determinants and macroeconomic consequences." *IMF Working Paper* No. 07/178.
- Lambertini, Luisa, and José A. Tavares. 2005. Exchange Rates and Fiscal Adjustments: Evidence from the OECD and Implications for the EMU. *Contributions in Macroeconomics*, 5(1).
- Mati, Amine, and John Thornton. 2008. The exchange rate and fiscal consolidation episodes in emerging market economies. *Economics Letters*, 100(1), 115-118.
- McDermott, C. John, and Robert F. Wescott. 1996. "An empirical analysis of fiscal adjustments." *Staff Papers*, 43(4), 725-753.
- Molnar, Margit. 2013. "Fiscal consolidation: What factors determine the success of consolidation efforts?." *OECD Journal: Economic Studies*, 2012(1), 123-149.
- Perotti, Roberto. 2012. "The "austerity myth": gain without pain?." *Fiscal policy after the financial crisis* (pp. 307-354). University of Chicago Press.

- Persson, Torsten. 1996. "Comment on Alberto Alesina and Roberto Perotti: Reducing Budget Deficits." *Swedish Economic Policy Review*, 3, 135-138.
- Ravallion, Martin. 2004. "Who is protected?: On the incidence of fiscal adjustment." *Macroeconomic Policies and Poverty Reduction* (pp. 149-169). Routledge.
- Reinhart, Carmen M., and Kenneth S. Rogoff. 2014. Recovery from financial crises: Evidence from 100 episodes. *American Economic Review*, 104(5), 50-55.
- Riera-Crichton, Daniel, Carlos A. Vegh, and Guillermo Vuletin. 2016. "Tax multipliers: Pitfalls in measurement and identification." *Journal of Monetary Economics*, 79, 30-48.
- Rudebusch, Glenn D. 2005. "Assessing the Lucas critique in monetary policy models." *Journal of money, credit and banking*, 245-272.
- Sacchi, Agnese, and Simone Salotti. 2015. "The impact of national fiscal rules on the stabilisation function of fiscal policy." *European Journal of Political Economy*, 37, 1-20.
- Sims, Christopher. 1986. "Are forecasting models usable for policy analysis?." *Quarterly Review*, 10(Win), 2-16.
- Schich, Sebastian, and Byoung-Hwan Kim. 2011. "Systemic financial crises: How to fund resolution." *OECD Journal: Financial Market Trends*, 2010(2), 1-34.
- Taylor-Gooby, Peter. 2004. "New risks, new welfare: the transformation of the European welfare state." *OUP Oxford*.

- Tsibouris, George, Mark A. Horton, Mark J. Flanagan, and Wojciech S. Maliszewski. 2006. "Experience with Large Fiscal Adjustments." *International Monetary Fund Occasional Paper* No. 246/2006. Washington, DC. *International Monetary Fund*, 51.
- Von Hagen, Jürgen, Andrew Hughes Hallett, and Rolf Strauch. 2001. "Budgetary consolidation in EMU." *Directorate-General for Economic and Financial Affairs, Commission of the European Communities* (Vol. 148).
- Wang, Weonho, Jan Fidrmuc, and Sugata Ghosh. 2015. "Macroeconomic effects of fiscal adjustment: A tale of two approaches." *Journal of International Money and Finance*, 57, 31-60.
- Wierds, Peter. 2007. "On Enforcement, Causality and Circumventing: Can Expenditure Rules Influence Expenditure Outcomes?." *9th Banca d'Italia Workshop on Public Finance*.
- Zeng, Li. 2014. Determinants of the primary fiscal balance: evidence from a panel of countries. *Post-Crisis Fiscal Policy*, 67-96.