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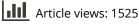
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How much is a lot? The maximum size of fiscal adjustments

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ABSTRACT

The sizeable fiscal consolidation required to stabilize the debt-to-GDP ratios in several countries in the aftermath of the global crisis raises a crucial question on its feasibility. To answer this question, we propose a methodology to identify historical fiscal adjustment episodes for countries that both needed and wanted to adjust in order to stabilize debt to GDP. We identify 91 adjustment episodes in 49 countries during 1945–2014. We find that countries typically improved their cyclically adjusted primary balances by close to 5 percent of GDP. We also observe that countries make substantial efforts to stabilize debt, but ease their primary balances once this objective is achieved, without getting back to their initial lower debt-to-GDP ratio. Consolidations were larger when sustained over time and the initial deficit was high. Fiscal adjustments were also larger when accompanied by monetary easing and, to a lesser extent, by an improvement in credit conditions.

ARTICLE HISTORY

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KEYWORDS

Deficit; debt; primary balance; size of adjustment; fiscal consolidation; fiscal sustainability

1. Introduction

Several countries currently face the challenge of restoring debt sustainability by implementing ambitious fiscal adjustment plans. Average debt-to-GDP ratios for advanced economies jumped by 36 percent of GDP between 2007 and 2012, to a peak of 110 percent of GDP. In 2013, 24 out of 32 advanced economies still faced rising debt-to-GDP ratios (International Monetary Fund, 2014a). The credibility of such fiscal adjustment plans hinges on the realism of the path for the primary balance.¹ Public debt can be regarded as sustainable when the primary balance needed to at least stabilize debt is economically and politically feasible, such that the level of debt is consistent with an acceptably low rollover risk and a satisfactory potential GDP growth rate. Conversely, if no realistic adjustment in the primary balance - i.e., one that is both economically and politically feasible - can bring debt to below such a level, public debt would be considered unsustainable (International Monetary Fund, 2013b).² Therefore, the level and trajectory of the debt need to be underpinned by feasible primary balance adjustments.

²Cottarelli and Escolano (2014) discuss various practical methodologies to assess the sustainability of fiscal policy, such as gap measures, estimates of fiscal policy reaction functions, and fiscal vulnerability indicators.

B Supplemental data for this article can be accessed the here.

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CONTACT Carlos Mulas-Granados 🖾 CMulasGranados@imf.org 🖃 1900 Pennsylvania Ave NW, Washington, DC 20431 ¹The primary balance is the result of public revenues minus public expenditures (excluding interest payments).

The sizeable fiscal consolidation needed to stabilize high and rising debt-to-GDP ratios in several countries in the aftermath of the global crisis raises a crucial question on its feasibility. To answer this question, we take stock of past consolidation episodes in order to provide insights into what has been the historical experience in terms of the size of fiscal adjustment, its duration, and the factors that have accompanied such adjustments.

Our approach adds to the existing literature in several ways. First, we draw lessons from a broad set of consolidation episodes by looking at both advanced and developing countries, and including a time period that spans from 1945 to 2014. Second, we make a very careful selection of the relevant episodes by choosing consolidation episodes where countries needed and wanted to adjust in order to stabilize debt to GDP. The combination of these two criteria eliminates possible biases from the behavior of primary balances in countries that in the past did not have to make any additional efforts to stabilize debt (for example countries that saw a sharp reduction in interest rates after joining the euro area) or in countries where the authorities did not have any intention of pursuing fiscal adjustment (for example in years of stimulus policies in several countries after the Lehman collapse). Third, we look at all the years of consolidation for each episode as opposed to only the initial years. This allows us to capture the full extent of adjustment that is sustained over several years, even if the deficit improvement is small in a single year. Fourth, we inform our assessment on the feasible size of fiscal adjustment through an analysis of the accompanying factors that are of key concern in today's policy debate, in particular the fiscal policy strategy, the monetary and exchange rate environment, and credit conditions.

We find that in most cases fiscal adjustment is sizeable and the debt-to-GDP ratio stabilizes by the end of the episode, albeit at higher levels. In at least half of the episodes, countries managed to improve their primary balance by 5.4 percent of GDP (4.8 percent of GDP in cyclically adjusted terms). The sample distributions of the levels and changes in the primary balance (actual and cyclically adjusted) show that, while there are significant differences across advanced and developing countries in terms of the levels of primary balances achieved, the changes in primary balances are comparable across the two groups.

The fiscal adjustment implemented was enough to close the primary gap in twothirds of the episodes. This implies that debt stabilized, and in most cases was put on a downward trend. This does not however imply that debt returned to initial levels. While countries kept primary balances well above those observed before the adjustment episode, they did not sustain primary balances at the highest levels for prolonged periods of time. This suggests that countries make substantial efforts to stabilize debt but, once this is achieved, they see room to ease primary balances and do not necessarily seek to get back to the lower initial debt-to-GDP ratio.

Several factors are found to be significantly associated with the size of fiscal adjustments. Based on a cross-section OLS model, we find that fiscal adjustment was larger the greater the initial deficit, and that a sustained approach to deficit reduction increases the size of total consolidation. The results also show that fiscal adjustment tended to be higher when accompanied by an easing of monetary conditions (as measured through a reduction in short-term interest rates) and, to a lesser extent, an improvement of credit conditions (measured as the change in credit to the private sector as a percent of GDP), especially in advanced economies.

The remainder of the paper is structured as follows. Section II provides an overview of the state of the debate. Section III describes the methodology used to select the relevant episodes, followed in Section IV by a discussion of the characteristics of fiscal adjustment in these episodes. Section V presents the econometric model specification to identify the factors that accompanied sizeable fiscal consolidations, and discusses the empirical results. Section VI attempts to answer the question "how much is too much?" based on the empirical results. Section VII concludes.

2. State of the debate

Although the literature on fiscal adjustment is extensive, relatively few studies have focused specifically on the size of consolidation episodes and the difficulty of achieving large fiscal adjustments. Most studies have focused on whether fiscal adjustments were successful in significantly reducing debt-to-GDP ratios (Alesina & Ardagna, 2009; Barrios, Langedijk, & Pench, 2010; Heylen & Everaert, 2000; Lambertini & Tavares, 2007) or on whether they were associated with changes in real GDP growth (Alesina & Ardagna, 1998; Ardagna, 2009; Baldacci, Gupta, & Mulas-Granados, 2013; Giavazzi & Pagano, 1990; Guajardo, Leigh, & Pescatori, 2014; Roberto, 2012).

Among the few studies that have focused on the size of fiscal adjustment and its determinants, some have looked at the change in the primary balance while others have looked at the level of the primary balance achieved. The selection of fiscal adjustment episodes varies considerably according to the different criteria and thresholds set by each author; Table A1 in the online appendix provides an overview of the relevant studies in this area, including the different definitions of fiscal consolidation used. Guichard, Kennedy, Wurzel, and André (2007) find that the median improvement of the cyclically adjusted primary balance (CAPB) across 85 OECD fiscal consolidation episodes was 2.8 percent of GDP. Their results show that large initial deficits and high interest rates were important in boosting the overall size. In a sample of 902 episodes of fiscal adjustment across 165 countries, Tsibouris, Horton, Flanagan, and Maliszewski (2006) report that, within 5 years, primary balances improved by more than 3 percent of GDP in 424 episodes, and by more than 5 percent of GDP in 366 episodes. They find large adjustments to be associated with higher debt ratios and inflation at the outset, as well as more sluggish growth of GDP. Molnar (2012) shows an average fiscal tightening of 3 percent of GDP for OECD countries, but finds that the size of the deficit and debt do not determine the size of consolidation.

Only a handful of papers have focused on the levels of the primary balances achieved. International Monetary Fund (2013a) looks at the distribution of maximum sustained primary surpluses for 43 countries. Since the 1950s, the distribution shows a median of about 6½ percent of GDP for advanced economies and 6¼ for emerging market economies. Using 5-year averages, the median falls to 3½–4 percent of GDP. Zheng (2014) shows that out of the 87 sample countries, only 14 recorded an average primary fiscal surplus higher than 5 percent of GDP over a 5-year period. Among the 14, most were facing public debts exceeding 60 percent of GDP at the time when they ran large primary surpluses. Eichengreen and Panizza (2014) work with a sample of 54

emerging and advanced economies and show that in only 8 percent of cases countries managed to maintain an average primary surplus of 4 percent for 5 years. Based on high debt country experience, International Monetary Fund (2013b) finds that the average CAPB exceeded 3.5 percent of GDP for any consecutive 3-year period in only 25 percent of observations. Similarly, in only 25 percent of observations did the change in the CAPB exceed 3 percent of GDP over a 3-year period.

As mentioned above, beyond the debate about the size of fiscal adjustments, the existing literature has mainly focused on the determinants of successful fiscal consolidations, including macroeconomic conditions, the design of fiscal consolidation, institutional changes, and political factors. The overview provided below focuses on the aspects of fiscal consolidation most prominent in the current policy debate, namely the fiscal consolidation strategy (duration, composition), the role of monetary and exchange rate conditions, and the impact of credit conditions.

A frequent finding of the literature is that the composition and duration of fiscal consolidations affect the likelihood of success. Alesina and Perotti (1995), Alesina and Ardagna (1998), Tsibouris et al. (2006), Kumar, Leigh, and Plekhanov (2007), and Molnar (2012) have found that expenditure reductions are more likely to be successful in reducing deficits and debt than tax increases, as spending cuts would have a smaller negative impact on output. However, for countries with large adjustment needs after a banking crisis, Baldacci, Gupta, and Mulas-Granados (2010) report that revenue-raising measures increased the likelihood of successful consolidation, reflecting the fall in effectiveness of spending cuts when deficit reduction needs are sizeable. The duration of fiscal consolidation has also been found to contribute positively to the probability of success of a fiscal consolidation episode (Von Hagen and Strauch 2001; Baldacci, Clements, Gupta, and Mulas-Granados 2004; Guichard et al. 2007; Barrios et al. 2010).

Fewer studies have attempted to control for the effects of changes in monetary stance during the consolidation episodes. Fiscal consolidation can be assisted by shifts in monetary stance insofar as lower interest rates contribute to offset the contractionary short-term effects of fiscal tightening on demand. However, monetary expansion can also ease the government's task by stimulating short-term revenue growth and lowering interest payments on public debt, which decreases the size of consolidation needed to achieve a given debt reduction. Ahrend, Catte, and Price (2006) find evidence that consolidation efforts are more likely to be pursued and to succeed if the monetary policy stance is eased in the initial stages of the episode. Molnar (2012) finds that an easing of monetary conditions increases the probability for a consolidation to stabilize debt. Baldacci et al. (2010) also report that successful debt reductions have been accompanied by supportive monetary policy stance. Nonetheless, Von Hagen and Strauch (2001) show that, while easier initial monetary conditions increase the likelihood that a fiscal consolidation is undertaken, they have no impact on the probability of success. Also, Von Hagen and Strauch (2001) and Ardagna (2004) find no evidence that episodes accompanied by monetary easing were more likely to be successful.

The effect of exchange rate depreciation on fiscal consolidation efforts is unclear. Exchange rate depreciation can support fiscal adjustment to the extent that it improves competitiveness, thereby boosting net exports and output. This would make the consolidation more acceptable politically and thus easier to sustain. However, competitiveness does not depend solely on the exchange rate but also hinges on structural policies that increase productivity and the export market structure. In addition, for countries with foreign currency-denominated public debt, exchange rate depreciation could complicate the fiscal consolidation effort through the adverse impact on debt and debt servicing costs. Also, a depreciation could be showing a sharp deterioration in confidence in the economy.

Findings in the empirical literature are mixed with respect to the effect of exchange rate depreciation on fiscal consolidation. Based on statistical association and case study analyses, Alesina and Perotti (1997), Alesina and Ardagna (1998), and Giavazzi and Pagano (1990) demonstrate that successful fiscal consolidations were sometimes preceded by, or coincided with, a sizeable devaluation. Hjelm (2002) finds that fiscal contractions associated with favorable macroeconomic outcomes have been preceded by significantly larger real depreciations. Lambertini and Tavares (2007) report a small increase in the probability of success if fiscal adjustment is preceded by exchange rate depreciation, while Molnar (2012) finds a positive effect of exchange rate depreciation only for very large consolidations. Heylen and Everaert (2000) find a preceding devaluation to have had a positive impact only when the adjustment comprised cuts in transfers and taxes and increased public investment. However, Ahrend et al. (2006) show that the real exchange rate depreciation favors the start and continuation of fiscal consolidation but does not favor debt reduction significantly. McDermott and Wescott (1996) and Barrios et al. (2010) do not find any conclusive evidence regarding the effect of the exchange rate devaluation in facilitating successful fiscal consolidations. In the case of emerging economies, Mati and Thorton (2008) suggest that exchange rate depreciation increases the probability of success of consolidation. In contrast, Gupta, Baldacci, Clements, and Tiongson (2005) find that exchange rate depreciation in emerging economies is associated with a higher probability of ending a spell of fiscal adjustment.

The literature on the interplay between credit conditions and fiscal consolidations remains very limited. As outlined by Bénétrix and Lane (2011), credit growth would affect fiscal revenues through several channels, over and above their influence on output. First, the positive impact of credit growth on domestic asset and property prices improves revenues through direct and indirect channels. Second, credit growth may fuel a greater volume of asset market turnover, which raises revenues from transactions. Third, credit growth could shift the composition of production toward more tax-rich activities. In addition, if credit to the private sector supports an increase in consumption good imports, this could improve revenue collection even though it would not contribute to real GDP growth. Thus far, only Barrios et al. (2010) have explored the issue of fiscal consolidation where the credit channel is hampered. They argue that in the presence of a systemic financial crisis, the repair of the banking sector is a pre-condition for a fiscal consolidation to succeed in reducing debt levels.

3. Selection of episodes

To serve as an adequate benchmark for proposed fiscal adjustments, relevant historical episodes must be carefully selected. The distribution of primary balances in a sample that includes all countries and all years as separate observations could be biased downward as it would include a large amount of countries that did not make at the

time any efforts to adjust, either because they did not need to do so or because they did not have the intention to do so. For example, between 1998 and 2002, in euro area countries debt declined on average by 3½ percent of GDP, even as primary balances worsened by over 1½ percent of GDP as they benefitted from positive debt dynamics due to falling interest rates. Similarly, G20 advanced economies pursued expansionary policies in the aftermath of the Lehman collapse even though debt ratios were on the rise, and introduced about 6.4 percent of GDP in stimulus measures between 2008 and 2010 (International Monetary Fund, 2011).

Therefore, in order to avoid this potential bias, relevant episodes are selected based on the combination of two criteria: (i) the country faces a fiscal adjustment need; and (ii) the country is willing to address this imbalance through discretionary policy.³ These criteria are applied to a group of 83 countries (23 advanced and 60 developing countries) between 1945 and 2014, for which data are available.⁴ Data on fiscal variables and real GDP growth are from the WEO where available, and IFS and Mauro, Romeu, Binder, and Zaman (2013) for the historical series.

3.1. Criterion 1: A fiscal adjustment need exists

Debt sustainability hinges on the stability of the debt-to-GDP ratio. Therefore, a country with fiscal adjustment needs is one whose debt-to-GDP ratio is on a rising path and consequently is facing a positive primary gap. This primary gap approach has been widely used in the literature (Blanchard, 1993; and Cottarelli & Escolano, 2014).⁵ The primary gap (Equation 1) is the difference between the country's debt-stabilizing primary balance (Equation 2) and its present primary balance⁶:

$$gap = p^* - p, \tag{1}$$

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

where *d* is a constant debt-to-GDP ratio (here, we use as the constant debt ratio the debt-to-GDP ratio of the current year); *p* is the actual primary balance ratio to GDP; p^* is the debt-stabilizing primary balance ratio to GDP, *r* is the effective interest rate; *g* is the GDP growth rate (with the latter two rates expressed either both in nominal terms or both in real terms); and *gap* is the primary gap.

A country is considered to have a sizeable fiscal need if it exceeds a certain threshold within the distribution of countries with a positive primary gap. We define this threshold as the cut-off for the 50th percentile among all observations with a positive primary gap. Based on this methodology, thresholds are defined for advanced economies at 2

³The paper that comes closest to this one in terms of selecting relevant episodes is Lavigne (2011), who chooses country episodes based on the existence of an adjustment need (defined as whenever the cumulative central government deficits over the past 5 years is greater than or equal to 20 percent of GDP) matched by a fiscal adjustment in the same year or the following year (defined as a continuous positive change in the primary balance amounting to at least 1.5 percent of GDP over a 5-year period).

⁴The number of developing countries with available data is considerably smaller before the mid-1990s.

⁵By construction, this criterion excludes fiscal consolidations that start when debt is high but stable (when the primary gap is closed).

⁶For a derivation of the formulas, see Escolano (2010).

percent of GDP and for developing countries at 1.8 percent of GDP. In order for an observation to be included as a relevant episode, the primary gap has to remain above the threshold for at least two consecutive years. The relatively high threshold attempts to filter out the cases of countries with very low initial levels of debt, but does not do so fully. Removing such cases from our sample does not significantly alter our findings, as discussed in the robustness checks below.

3.2. Criterion 2: There is the intention to implement discretionary fiscal adjustment

A country that has the intention to implement discretionary fiscal adjustment is defined as one that shows an improvement in its CAPB in two consecutive years.⁷ By adjusting for the economic cycle, the CAPB strips out the effect of automatic stabilizers from actual balances.⁸ To avoid biasing the sample toward large successful adjustments (but still requiring some demonstrable determination to adjust), the episodes selected are those that show at least a minimal positive annual change in the CAPB of 0.1 percent of GDP for two consecutive years. An episode is deemed to continue for as long as the CAPB continues to increase. Following a similar approach as Ahrend et al. (2006) and Guichard et al. (2007), the episode is also deemed to continue if – after at least two consecutive years of 0.1 percent of GDP in 1 year is followed by an increase of more than 0.5 percentage points of GDP in the following year. This approach, less stringent than that in several of the papers listed in Table A1 of the online appendix, allows us to keep those episodes that are small in each year but sustained over several years.

In the literature, fiscal adjustment has typically been measured using two methodologies. The "quantitative" approach identifies discretionary fiscal policy as changes in the CAPB, while the "policy-action" approach relies on fiscal plans as announced in budgets, as well as other official documents (Romer & Romer, 2010; Devries, Guajardo, Leigh, & Pescatori, 2011). The main drawbacks of using the change in the CAPB are that: (i) it attributes all residual changes in the CAPB to fiscal policy instruments, hence possibly overestimating discretionary fiscal policy changes if other non-discretionary factors are at play, for example due to a commodity boom or a real estate bubble or one-off events (Riera-Crichton, Vegh, & Vuletin, 2012); (ii) the estimation of potential output, crucial for the cyclical adjustment, varies considerably depending on the statistical technique used; and (iii) revenue and expenditure elasticities are usually assumed to be time invariant. An additional shortcoming is that the "quantitative" approach only signals adjustment when there is an improvement with respect to the previous year, and therefore misses those cases in which an adjustment is implemented to avoid a further deterioration of the fiscal position under a no-policy change baseline.

⁷CAPB has traditionally been used as an indicator of discretionary fiscal policy. For a seminal discussion on fiscal indicators, see Blanchard (1993).

⁸CAPB calculations are based on data from WEO, IFS, and Mauro et al. (2013), assuming elasticities of 1 and 0 for revenue and expenditure, respectively. When potential GDP is not available, it is calculated using a Hodrick–Prescott filter.

Despite its shortcomings, the approach of using changes in the CAPB to identify fiscal adjustment provides several important advantages for the analysis in this paper. First, it provides a uniform methodology across countries that measures changes with respect to the previous year instead of a baseline put forward by the authorities and for which there is limited information. Second, it captures the fiscal adjustment that was actually implemented, rather than announced measures which may not have been fully executed, or the impact of which may not have been accurately measured. Third, it provides broad coverage across countries and time in a consistent manner, as combining different sources of data based on the "policy-action" approach may pool information based on methodologies not entirely compatible. Lastly, possible mismeasurement problems could also easily arise in the "policy-action" approach if not all official announcements and plans (i.e., supplementary budgets) are taken into account (Roberto, 2012).

Regardless of whether one uses the "quantitative" or the "policy-action" approach to identify episodes of fiscal adjustment, surrounding political conditions are always important. For example, fiscal policy may be decided by a single fiscal authority in authoritarian regimes but this is not so typical in constitutional democracies. In countries with a presidential system, when there is unified government the "will" or intention to adjust might be clearly identified with the president, especially if the political party has a tight leadership; otherwise, congress and the president need to agree. In countries with a parliamentary system, the "will" to consolidate the budget is identified with the prime minister when there is single-party rule; otherwise minority parties in the governing coalition can block changes. Hence, the "will" or "decision" to adjust might involve "agreements" between different parties in constitutional democracies. The literature points out that fiscal adjustments are harder with divided government.⁹

3.3. Relevant episodes

The combination of the two selection criteria mentioned above yields 91 relevant episodes. These episodes span across 49 advanced and developing economies, and across several decades. Most fiscal adjustment episodes had duration of 3–4 years, and tended to be longer for advanced economies than developing countries. Consolidations that were still ongoing in 2014 are assumed to end in 2015, though these are dropped later on, as part of robustness tests of the econometric analysis. Table 1 describes the sample coverage, while Table A2 in the online appendix provides a list of the selected episodes.^{10,11}

⁹For the political economy of fiscal adjustments and the impact of political divisions, see Roubini and Sachs (1989), Mulas-Granados (2006), Streb and Torrens (2013), and Gaspar, Gupta, and Mulas-Granados (2017).

¹⁰The list of episodes groups advanced and developing countries following the country-grouping criteria established by the IMF for its official flagship publications (e.g., *World Economic Outlook, Fiscal Monitor, Global Financial Stability Report, etc.*)

¹¹The list of episodes identified will not correspond exactly with those identified in other studies if they do not meet one of the two criteria used in this paper. Episodes may not qualify to be selected in our sample if they occurred when the countries *did not need* a fiscal adjustment to stabilize debt-to-GDP, where the initial primary gap was not sufficiently large according to the threshold set above for two consecutive years (for example Denmark in 1986 and Turkey in 2000) or when countries *did not want* to adjust as evidenced by a minimal improvement of the CAPB over two consecutive years (for example Ireland in 1982 and Japan in 1997).

	Advanced	Developing	Total
Number of countries and adjustment episodes			
Total number of countries in the sample	23	60	83
Number of countries with adjustment episodes	19	30	49
Number of adjustment episodes	48	43	91
Number of countries with adjustment episodes, by	decades		
(total number of countries in parenthesis)			
1940s	1 (9)	(1)	1 (10)
1950s	3 (22)	1 (8)	4 (26)
1960s	1 (22)	2 (10)	3 (28)
1970s	3 (22)	2 (14)	5 (32)
1980s	11 (17)	7 (16)	18 (34)
1990s	13 (18)	8 (39)	21 (61)
2000s	8 (18)	16 (60)	24 (82)
2010s	5 (18)	4 (60)	9 (82)
Number of adjustment episodes, by decades			
1940s	1		1
1950s	4	1	5
1960s	2	2	4
1970s	3	3	6
1980s	12	7	19
1990s	13	10	23
2000s	8	16	24
2010s	5	4	9

Table 1. Sample coverage.

In this sample, fiscal positions deteriorated notably ahead of the adjustment effort. Within the 5 years prior to the consolidation episode, the median CAPB deteriorated by 3.1 percent of GDP both for advanced and developing countries. Also within the 5 years prior to the consolidation episode, the median debt-to-GDP ratio jumped by 16½ percent of GDP in advanced economies and 9½ percent of GDP in developing countries.

The results of the selection process using the "quantitative" and "policy-action" approaches, in combination with the criterion on the existence of a fiscal need to stabilized debt-to-GDP, are comparable. Comparing our results with a "policy-action" approach dataset for advanced economies compiled from different sources for 1980–2010,¹² there is considerable overlap in the selected episodes: 22 of the episodes coincide out of 29 episodes identified using the "quantitative" approach and 25 identified using the "policy-action" approach. Furthermore, for those 22 coinciding episodes, at the median, the "policy-action" approach estimates that 4 percent of GDP in measures were implemented, compared with an estimated change in the CAPB of 4.7 percent of GDP using our methodology.

4. Characteristics of fiscal adjustments

Based on these selected episodes, we find that both advanced and developing countries were able to implement sizeable fiscal consolidation. This is assessed by looking at the level of the primary balance (actual and cyclically adjusted) achieved at the end of the episode, the change in the primary balance during the episode, and whether the adjustment was enough to stabilize debt by the end of the episode.

¹²For advanced economies, discretionary fiscal adjustment is as identified by Devries et al. (2011), Mauro (2011), and Roberto (2012).

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4.1. What level of primary balance was achieved?

By the end of the episode, most countries achieved primary surpluses, significantly higher for advanced economies than for developing countries. Table 2 shows that in half of advanced economy episodes, countries were able to achieve a primary balance of at least 1.6 percent of GDP (CAPB of 2.2 percent of GDP) by the end of the episode, and a quarter achieved 4.5 percent of GDP (CAPB of 5.3 percent of GDP). For developing country episodes, one-half reached at least a primary balance of 1.8 (CAPB of 0.8 percent of GDP), and a quarter 2.1 percent of GDP (CAPB of 2.8 percent of GDP). See Table A1 to compare these results with the findings from other studies in the literature.

Table 3 maps the sample distribution of the actual and CAPBs. For example, the table shows that a CAPB of 1.1 percent of GDP – which corresponds to the estimated CAPB needed to stabilize debt to GDP at 2013 levels in advanced economies, based on data in International Monetary Fund (2014) – is at the 40th percentile of the sample distribution for advanced economies. This means, that countries were able to achieve this CAPB or more in 60 percent of advanced economy episodes. Table 3 also maps the sample distribution of the changes in the actual and CAPBs. The table shows that a change in the CAPB of 5.5 percent of GDP – which corresponds to the difference between the estimated CAPB needed to stabilize debt to GDP at 2013 levels and the CAPB observed in 2009 for advanced economies – is just below the 50th percentile of the sample distribution for advanced economies. This implies that countries were able to achieve this CAPB or higher in more than half of advanced economy episodes.

Tabl	e 2.	Characteristics	of fiscal	adjustment.	

	Percer	ntile cut-	off 1/		
	25	50	75	Min	Max
Full sample					
Actual primary balance at end of episode (percent of GDP)	-1.0	0.3	3.4	-3.8	10.9
Change in actual primary balance at end of episode (percent of GDP)	3.3	5.4	7.4	0.4	17.0
Average annual change in the actual primary balance (percent of GDP)	1.0	1.7	2.2	0.2	7.0
CAPB at end of episode (percent of potential GDP)	-0.4	1.1	4.1	-4.9	10.4
Change in the CAPB, t to end of episode (percent of potential GDP)	3.1	4.8	7.8	0.9	18.6
Average annual change in the CAPB (percent of potential GDP)	1.1	1.6	2.1	0.4	6.0
Debt at t (percent of GDP)	30	53	69	13	264
Duration (years)	2	3	4	2	8
Advanced					
Actual primary balance at end of episode (percent of GDP)	-0.8	1.6	4.5	-3.8	10.6
Change in actual primary balance at end of episode (percent of GDP)	3.5	5.5	8.2	1.5	15.5
Average annual change in the actual primary balance (percent of GDP)	1.1	1.6	2.0	0.5	6.0
CAPB at end of episode (percent of potential GDP)	0.2	2.2	5.3	-2.9	9.0
Change in the CAPB, t to end of episode (percent of potential GDP)	3.1	5.1	7.4	1.1	18.6
Average annual change in the CAPB (percent of potential GDP)	1.2	1.5	1.8	0.4	4.6
Debt at t (percent of GDP)	39	61	84	13	170
Duration (years)	3	4	4	2	8
Developing					
Actual primary balance at end of episode (percent of GDP)	-1.2	0.0	2.1	-3.7	10.9
Change in actual primary balance at end of episode (percent of GDP)	2.9	5.0	6.9	0.4	17.0
Average annual change in the actual primary balance (percent of GDP)	0.9	1.8	2.3	0.2	7.0
CAPB at end of episode (percent of potential GDP)	-0.6	0.8	2.8	-4.9	10.4
Change in the CAPB, t to end of episode (percent of potential GDP)	2.7	4.7	8.0	0.9	14.3
Average annual change in the CAPB (percent of potential GDP)	0.9	1.7	2.3	0.5	6.0
Debt at t (percent of GDP)	28	37	55	13	264
Duration (years)	2	3	4	2	7

1/Based on the cumulative distribution function for each variable, the percentile cut-off indicates the value at which the percentile bracket begins.

Actual pillialy balance at the end of the episone	sua or the episode				CAPB at the end of the episode	the episode	
		Percentile				Percentile	
Actual PB level (percent of GDP)	Full Sample	Advanced	Developing	CAPB level (percent of GDP)	Full Sample	Advanced	Developing
7.0	92.5	89.8	96.2	7.0	92.5	90.2	95.4
6.5	6.06	87.0	95.5	6.5	89.5	86.3	94.4
6.0	87.3	82.1	94.4	6.0	88.2	83.8	93.3
5.5	86.0	79.7	93.0	5.5	85.4	80.6	92.2
5.0	83.9	77.6	91.8	5.0	81.6	73.6	90.9
4.5	81.4	72.9	90.6	4.5	79.7	71.9	89.2
4.0	77.4	67.4	89.4	4.0	72.6	64.6	82.7
3.5	76.6	66.0	88.2	3.5	70.4	62.0	80.4
3.0	69.8	61.4	80.1	3.0	66.7	57.4	78.0
2.5	65.4	56.9	76.0	2.5	61.1	52.2	71.4
2.0	63.8	54.2	74.7	2.0	56.9	49.1	65.5
1.5	60.5	49.6	73.0	1.5	53.0	45.6	61.3
1.0	56.5	48.1	66.3	1.0	47.9	39.6	57.4
0.5	55.6	47.0	64.5	0.5	39.4	30.8	48.4
0.0	40.0	31.9	50.0	0.0	32.2	23.5	40.6
Change in the actual primary balance from t to the		end of the episode		Change in	Change in the CAPB from t to the end of the episode	he end of the episode	4
		Percentile				Percentile	
Actual change in the PB (percent of GDP)	Full sample	Advanced	Developing	Change in the CAPB (percent of GDP)	Full Sample	Advanced	Developing
12.0	91.2	91.8	91.7	12.0	91.4	90.5	93.5
11.5	90.1	8.9.8	90.6	11.5	89.0	89.0	906
11.0	87.8	87.4	0 U	11.0	SK R	88.3	86.0
10.5	86.7	85.3	89.6	501	86.0	87.7	85.0
10.0	85.1	82.1	80.1	10.0	85.3	86 8	843
9.5	84.4	80.8	88.7	9.5	84.6	85.4	83.6
0.0	83.6	79.4	88.2	0.6	7.67	80.4	80.3
8.5	80.8	76.0	86.9	8.5	78.5	79.6	7.77
8.0	78.5	74.1	84.7	8.0	77.0	78.8	74.8
7.5	76.7	72.6	81.1	7.5	73.8	75.5	72.5
7.0	70.8	67.6	75.5	7.0	69.2	70.8	68.5
6.5	64.0	63.0	66.3	6.5	63.8	61.8	66.6
6.0	59.6	58.8	60.8	6.0	58.6	52.7	65.3
5.5	52.4	50.4	55.0	5.5	56.7	51.3	62.1
5.0	48.1	46.2	50.1	5.0	52.6	49.5	55.7
4.5	40.8	42.1	39.8	4.5	43.7	44.9	42.3
4.0	37.0	36.9	36.9	4.0	39.4	41.2	36.9
3.5	30.1	25.8	34.6	3.5	31.4	30.4	31.3
3.0	19.9	13.1	26.1	3.0	24.2	20.9	26.9

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4.2. What was the total size of fiscal consolidation?

Changes in the actual primary balance and CAPB during the consolidation episodes were similar for advanced and developing countries. For advanced economy episodes, half reached a change in the actual primary balance of 5.5 percent of GDP (5.1 percent of GDP in cyclically adjusted terms), and a quarter reached 8.2 percent of GDP (7.4 percent of GDP in cyclically adjusted terms) (Table 2). For developing country episodes, half reached a change in the actual primary balance of 5 percent of GDP (4.7 percent of GDP in cyclically adjusted terms), and a quarter achieved 6.9 percent of GDP (8 percent of GDP in cyclically adjusted terms). Table 4 confirms that the results would be comparable even if different criteria were used in the sample selection. The level and change in the CAPB would be broadly similar when looking only at episodes during 1980–2008 instead of 1945–2014, using only episodes with primary gaps for two consecutive years above 1 percent instead of 2 percent of GDP, excluding cases of debt default, focusing only on high debt episodes, including in the baseline episodes with 1 year of adjustment, and identifying the "need" to adjust by high credit default swaps (CDS) spreads.¹³

4.3. Was adjustment enough to stabilize debt?

In most episodes, countries were able to stabilize debt (i.e., closing the primary gap), and in many cases went beyond to put debt on a downward path. Figure 1 shows that in

	I	
	CAPB, end of episode	Change in the CAPB, t to end of episode
Median across episodes		
Baseline	1.1	4.8
Only episodes between 1980 and 2008	2.6	4.7
Episodes with primary gap above 1 percent	1.5	4.3
Excluding episodes of debt default 1/	1.0	4.7
Only high debt episodes 2/	1.9	5.6
Including episodes with only 1 year of adjustment	0.8	3.8
Episodes with high CDS spreads 3/	0.8	4.0
75th percentile		
Baseline	4.1	7.8
Only episodes between 1980 and 2008	5.3	7.1
Episodes with primary gap above 1 percent	4.1	7.1
Excluding episodes of debt default 1/	4.1	7.2
Only high debt episodes 2/	5.3	8.0
Including episodes with only 1 year of adjustment	3.3	6.6
Episodes with high CDS spreads 3/	3.5	6.8

Table 4. Level and changes in CAPB across alternative samples (percent of potential GDP).

1/Seven episodes are excluded from the sample because the country defaulted on its debt during the episode, as identified by Standard & Poor's.

2/Episodes with debt to GDP that is in the top half of the distribution: above 45.2 percent of GDP for advanced economies, and above 37.9 percent of GDP for developing countries at time *t*.

3/CDS spreads instead of the primary gap is used to identify adjustment need. Adjustment need is identified when CDS spreads are above the 75th percentile of the sample distribution, which corresponds to 235 basis points at time *t*. Data on CDS spreads are only available starting in 2000, therefore only 17 episodes are identified.

¹³CDS spreads instead of the primary gap is used to identify adjustment need. Adjustment need is identified when CDS spreads are above the 75th percentile of the sample distribution, which corresponds to 235 basis points at time t. Data on CDS spreads are only available starting in 2000, therefore only 17 episodes are identified. See Hatchondo, Martínez, and Roch (2012) for the relationship between sovereign risk premia, debt default, and the need for fiscal adjustment.

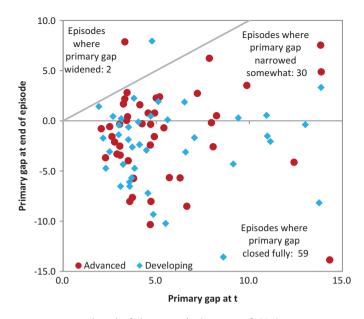


Figure 1. Primary gaps at t and end of the episode (percent of GDP).

two-thirds of the episodes, primary gaps were negative by the end of the episode, indicating that primary balances were high enough not only to stabilize debt but to start reducing it. These successful episodes of subsequent debt reduction took place in countries as different from each other as Congo, Ethiopia, Honduras, Bolivia, Argentina, Thailand, India, Belgium, Finland, Denmark, Canada, Sweden, the United Kingdom, or the United States. This does not however imply that debt returned to initial levels. Indeed, debt-to-GDP ratios for the majority of episodes remained some 15 percent of GDP above the levels observed before the adjustment episode (Figure 2). While countries kept primary balances well above those observed before the adjustment episode, they did not sustain primary balances at the highest levels for prolonged periods of time.¹⁴ This suggests that countries make substantial efforts to stabilize debt but, once this is achieved, they see room to ease primary balances and do not necessarily seek to get back to the lower initial debt-to-GDP ratio.¹⁵

In most cases, the improvement in the primary balance was the main contributor to closing the primary gap, though favorable interest rate-growth differentials also contributed. Figure 3 reveals that changes in the debt-stabilizing primary balances were relatively small as compared to improvements in the primary balances.¹⁶ Indeed, changes in the primary balance explain about 80 percent of the change in the primary gap across episodes.

¹⁴This result is in line with International Monetary Fund (2013a), which finds that high primary surpluses may be easier ______to achieve than to maintain.

¹⁵Our analysis focuses on the size of fiscal consolidation implemented when countries have faced an adjustment need, and not on the factors that drive successful debt reduction. The analysis of Abbas et al. (2013) – based on 26 episodes of large debt reversals in advanced economies since the 1980s and other empirical evidence – suggest that periods of decreasing debt were often associated with higher growth rates and strong primary balances. They also find that only about a third of all fiscal consolidation spells – defined as a large adjustment in the CAPB – are successful in reducing debt levels.

¹⁶In some cases, debt restructuring helped to close the primary gap (for example Ghana in 1982 and Argentina in 2002).

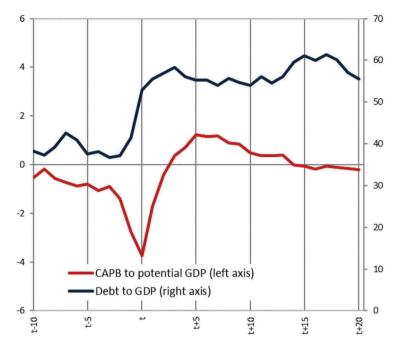


Figure 2. Debt and CAPB, median across episodes.

Figure 3 also shows that improvements in the interest rate-growth differential were not negligible, with a reduction of 2.9 percentage points between the beginning and the end of the episode, though only 1.4 percentage points in advanced economies. In advanced economies the improvement in r-g was driven in most part by a recovery in real GDP growth, while developing countries benefitted from a sharp decline in real interest rates (due to both a moderate decline in nominal interest rates and some rebound in inflation rates).

5. Empirical model

5.1. Model specification and data sources

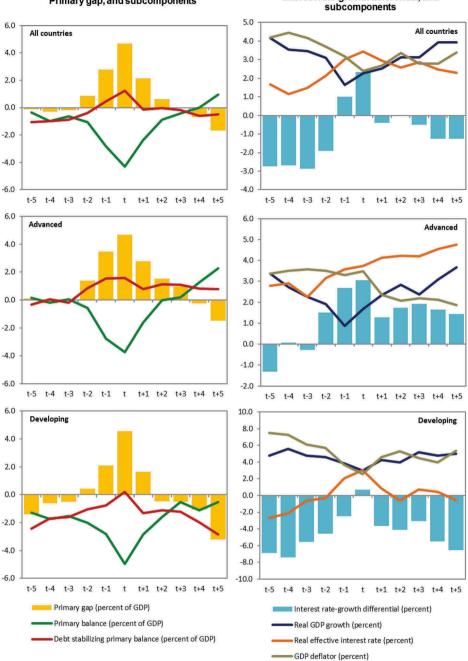
This section explores the conditions that accompanied fiscal adjustment across episodes, with special focus on the characteristics of fiscal adjustment, monetary and exchange rate conditions, and credit availability. Given the relative paucity of relevant episodes, our focus is not on a causal analysis. Rather, the exercise below allows us to present conditional correlations in order to identify the factors commonly associated with adjustment.

We estimate the following linear model by OLS using 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 vector of initial budgetary conditions (CAPB, debt, and primary gap), *ECO* is a vector of macroeconomic and global conditions (real GDP growth, inflation, and U.S. long-term interest rates), *FISC* is a vector of variables that characterize the fiscal adjustment strategy (duration and primary expenditure cuts as a percent of the total adjustment), *MON* captures monetary conditions proxied by the change in short-

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Primary gap, and subcomponents

Figure 3. Primary gap and the interest rate-growth differential (percent of GDP).

term interest rates, EXR includes exchange rate movements (before and during the episode), and FIN proxies credit availability by growth in domestic credit to the private sector as a percent of GDP.

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The regression analysis is based on a cross-sectional dataset of 91 episodes over the period 1945–2014. Data are drawn from several databases. Fiscal variables and real GDP growth are from the WEO where available, and IFS and Mauro et al. (2013) for the historical data. Inflation and trading partner real GDP growth are from WEO. Real effective exchange rates (REERs) are from the OECD, BIS, and IFS. Short-term interest rates and U.S. long-term interest rates are from the IFS and WEO. Credit to the private sector as a percent of GDP is from the World Development Indicators.

5.2. Results

Table 5 shows the results of the empirical analysis for all episodes, separating advanced and developing countries. In some cases, results for advanced and developing countries differ, but general conclusions can be extracted from the analysis of the joint exercise.¹⁷ For example, initial conditions are found to be significantly associated with the size of fiscal adjustments: a higher CAPB decreases the size of adjustment, but larger levels of debt increase the size of the adjustment. This result is in line with the findings of Kumar et al. (2007), Ardagna (2009), Barrios et al. (2010). For every additional percentage point in the initial CAPB, the size of the fiscal adjustment is 0.7-0.8 percent of GDP lower. This may indicate that large deficits made it more necessary to consolidate given possible financing constraints, and, at the same time, raised public awareness of the extent of the fiscal imbalance problem, making it easier to act. For every additional percentage point in the initial debt-to-GDP ratio, the subsequent size of the adjustment increases by 0.02 for the full sample (column 1), and doubles to 0.04 percentage points of GDP for developing countries (column 6), though it is no longer significant for advanced countries in the simplified specification (column 4).¹⁸ This implies that a developing country that started the episode with debt of 60 percent of GDP could be expected to adjust by 1¼ percentage point of GDP more than a country that started with a 30 percent of GDP debt ratio. Although the primary gap is significant when all countries are included (columns 1 and 2), it ceases to be significant when the sample is split.

Accompanying macroeconomic conditions show weaker significance than expected. For developing countries, average real GDP growth between the beginning and the end of the episode is found to be significant, with a negative sign. This could have several alternative interpretations. The result suggests that developing countries tend to follow procyclical policies, as countries can afford to reduce their fiscal adjustment effort if growth is strong without compromising their objective of stabilizing debt. The negative relationship between growth and adjustment could also be related to availability of financing, as weak growth prospects could constrain developing countries' access to

¹⁷The main differences between advanced and developing countries in Table 5 are as follows. For developing countries, having initial high debt levels are a more important determinant of the size of fiscal adjustment than for advanced economies. On the contrary, the initial size of the primary gap, the duration of the fiscal adjustment episode, or the change in accompanying credit conditions are less important factors for developing countries than for advanced economies.

¹⁸This result is consistent with Mendoza and Ostry (2008) who find that the response of the primary balance to debt in advanced and emerging market economies with a history of high debt (median debt ratio exceeding 57.8 percent and 64.5 percent of GDP, respectively) is not statistically different from zero. In our sample, 60 percent of advanced economy episodes have debt above the corresponding threshold, while only 20 percent of developing country episodes exceed the threshold.

I able 3. Determiniants of the size of instal adjustment.						
	(1)	(2)	(3)	(4)	(5)	(9)
	All countries	All countries	Advanced	Advanced	Developing	Developing
CAPB as percent of potential GDP, at t	-0.560***	-0.572***	-0.544**	-0.698***		-0.768***
	(-4.808)	(-5.026)	(-2.218)	(-4.614)		(-3.738)
Debt as percent GDP, at t	0.0220*		0.0229*			0.0414***
	(1.916)		(1.948)			(5.679)
Primary gap as percent of GDP, at t	0.0987*	0.188***	-0.00457		0.0760	
	(1.709)		(-0.0207)		(0.789)	
Real GDP growth, average $t + 1$ to the end of the episode, percent	-0.288***		0.0357		-0.279	-0.340**
	(-2.943)	(-3.485)	(0.113)		(-1.655)	(-2.616)
Inflation, average $t + 1$ to the end of the episode, percent	-0.00278		0.275*		-0.0414	
Real GDD revouth in tradium nattner countries average t ± 1 to the and of the anicode nervent	(-0.105) 0.0740		(1.938) 0.337		(-0.848) -0.0195	
וורמו כבו ההמאוו זו הממווה למווורי הממווורה מכומלה ב ב היה הוה כוומ הו הור בלוסמה להרבוור	(0.389)		(0.771)		(-0.0631)	
U.S. long-term interest rate, average $t + 1$ to the end of the episode, percent	-0.0584		-0.212		0.0646	
	(-0.568)		(-1.421)		(0.301)	
Duration of the episode, years	0.889***	0.871***	1.029***	0.953***	0.751	0.632*
	(4.030)		(4.533)	(4.213)	(1.638)	(1.713)
Primary expenditure cuts as a share of total fiscal adjustment, percent	0.00279		0.0184*		-0.00344	
	0.409)		(1 CU.Z)		(-0.200)	
Change in the short-term interest rate between t and the end of the episode	-0.196*** / 2823)	-0.240***	-0.291*	-0.423***	-0.106	-0.19/***
(horace in the nominal archance rate hotocon t and the and of the onicode (Lanaraciation)	(00000)	(c&n.c-)	(016.1–)	(160.0-)	(-0.924)	(0/07-)
כוומוואב ווו נווב ווטוווווומו בארוומוואב ומנה שבנואבכוו נימות נווב בוות טו נווב באואטתב (דמאטוברומנוטון)	(0.0512)		(-1.047)		(=0.573)	
Change in the nominal exchange rate between $t-3$ and t (+appreciation)	0.0213**		-0.0142		0.0312	
	(2.132)		(-0.858)		(1.136)	
Change in credit to GDP between t and the end of the episode	0.0484*** (2.976)	0.0567*** (3.236)	0.0676** (2.260)	0.0509** (2.039)	0.0314 (1.309)	0.0298* (1.737)
Dummy = 1 if there was a financial crisis as defined by Laeven and Valencia (2012)	0.175		1.927		0.974	
Dummy = 1 for advanced countries	-1.400**		(0+7.1)		(0000)	
· · · · ·	(-2.187)					
Constant	-0.464 (-0 337)	-0.177 (-0.223)	-5.320** (-2 116)	-0.701 (-0.863)	0.125 (0.0695)	-0.511 (-0.379)
Observations	81	83	43	44	38	39
R-squared	0.723	0.671	0.784	0.702	0.769	0.735
0-1						

Table 5. Determinants of the size of fiscal adjustment.

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

international capital markets at a time of still emerging domestic markets, requiring them to run lower deficits. However, given that each episode spans over a number of years, the result could also be picking up some reverse causality, where a large fiscal consolidation takes a toll on economic activity.^{19,20} Interestingly, average real GDP growth is not significant for advanced countries, consistent with Molnar (2012) who finds economic growth to be insignificant except for very small consolidations. This finding implies that experience across advanced economies has been diverse, perhaps reflecting differences in terms of financing constraints or in terms of the impact of consolidation on economic activity. Inflation and U.S. long-term interest rates were not found to be significant.²¹

The design of the fiscal adjustment instead plays a crucial role. The duration of the adjustment is a clear factor associated with larger adjustments, in line with and Molnar (2012). For every additional year of adjustment, the size increases by 1 percentage point in advanced countries and 0.6 percentage points in developing countries. This likely reflects the fact that it takes longer to achieve larger consolidations. Primary expenditure cuts as a percent of total fiscal adjustment are found to be significant in the case of advanced countries (column 3), consistent with the findings of previous studies. However, we find the coefficient to be relatively modest, and it loses significance in the simplified specification (column 4). The composition of adjustment is not found to be significant in the case of developing countries. This could be related to relatively lower initial revenue-to-GDP ratios that provided more room to implement tax reforms in the case of large adjustments, as found by Baldacci et al. (2010) and Gupta et al. (2005). Overall, the results suggest that the ability to implement large fiscal adjustment is affected more by how long the effort is sustained rather than the balance between expenditure cuts and revenue-raising measures.

Changes in the short-term interest rates during the episode were found to be an important factor for both advanced and developing countries. For every one percentage point reduction in short-term interest rates, fiscal adjustment was found to be 0.4 percentage points of GDP higher in the case of advanced economies, and 0.2 percentage points of GDP higher in the case of developing countries. Changes in real short-term interest rates (defined as nominal rates minus the GDP deflator) were also found to be significant, but the nominal measure provided a better fit of the model.²² This suggests that monetary policy

¹⁹To reduce as much as possible any simultaneity bias, we lagged the initial values of the key variables on the righthand side, so that it is the initial value in t of those independent variables what would explain the subsequent level of the dependent variable (between tand t + n). Also, the Durbin–Watson test confirms that endogeneity is not a problem in our baseline regressions. Finally, we also rerun the baseline model using Two-Stage Least Square estimation and results remain robust (see Table A4 in the online appendix).

²⁰Note that while our econometric strategy tried to control for all the observable variables, some endogeneity problems may nevertheless still be present (since there may be a factor that is not controlled for), and therefore the estimates reported in Table 5 have to be interpreted as relationships rather than effects.

²¹Trading partner real GDP growth, average U.S. real GDP growth and average world real GDP growth rates were also used as alternative proxies for real GDP growth, but were not significant. The Goldman Sachs financial conditions index was used as another measure of global liquidity instead of the U.S. long-term interest rate, but it was not significant either.

²²The change in the monetary policy stance relative to what would be expected to occur under a Taylor rule was not found to be significant. This could be due to the simplifying assumptions used to calculate the Taylor rule across episodes or to different nominal anchors used by countries over the time frame of the sample. As in Ahrend et al. (2006), the Taylor rule was constructed only for changes in real short interest rates, assigning a 0.5 percent weight to both changes in inflation and in the output gap. Unlike calculating the interest rate levels prescribed by a Taylor rule, this does not require assumptions regarding the levels of the neutral real interest rate and the inflation target.

helped consolidation efforts by supporting economic activity through lower interest rates, as also found in Ahrend et al. (2006) and Baldacci et al. (2010).

In contrast, exchange rate depreciations were not found to be significant, whether preceding or during the episode. Several alternative measures were used but all were insignificant: nominal exchange rate against the U.S. dollar (NER); nominal effective exchange rate (NEER); REER; a dummy variable equal to 1 if there was an appreciation of the exchange rate (NER, NEER, or REER); and a dummy variable equal to 1 if the REER was above a long-term average. The results are not surprising given that the literature is inconclusive regarding the effects of exchange rate developments on fiscal consolidation, with several studies reporting no effect (Barrios et al., 2010; McDermott & Wescott, 1996). The role of exchange rates in the regression could also be subdued to the extent that its effect on competitiveness and exports is mainly picked up through the real GDP growth variable.

Credit conditions are found to be a significant factor in fiscal consolidation, though the size of the coefficient is small. A one percentage point increase in credit to the private sector as a percent of GDP is associated with a 0.05 percent of GDP higher adjustment for advanced economies and 0.03 percent of GDP higher adjustment for emerging economies. This effect of credit expansion on fiscal consolidation is above and beyond its indirect impact through real GDP growth. Two alternative measures to capture the ability of the financial sector to extend credit were also tested, but were not found to be significant: a dummy equal to 1 if the country experienced a financial crisis between the beginning and the end of the episode (as identified by Laeven & Valencia, 2012; and Carmen & Rogoff, 2008) and a dummy equal to 1 if there was a credit boom in the previous 5 years to the episode (estimated in line with Dell'Ariccia et al., 2012). These results suggest that what matters for fiscal consolidation is not whether a country has faced financial sector stress but how much this impairs its ability to extend credit to the private sector.

5.3. Robustness

The results were robust to alternative specifications. Table A3 (see online appendix) shows that the results of the simplified specifications remain broadly the same when the sample is limited to episodes between 1980 and 2008, which removes the fiscal consolidation episodes of the most recent crisis that may still be ongoing and the earlier episodes where data may be less reliable.²³ Only the coefficient on duration appears to be somewhat lower for both advanced and developing countries. The last column of Table A3 shows the results limiting the sample to only episodes with high debt – defined as countries with debt to GDP in the top half of the distribution of the entire sample (all country/years, not only those corresponding to selected episodes) – which corresponds to debt to GDP above 45.2 percent for advanced countries and above 37.9 percent for developing countries. In this case, the sample is not split among advanced and developing countries because of the lower number of observations. Again, the results are very similar to the baseline specification.

²³Including additional variables to these simplified specifications does not materially alter the significance and size of coefficients.

6. Conclusions

This paper attempts to respond to the question: "How much is a lot?" by drawing on historical experiences of fiscal adjustment in both advanced and developing countries, and across a wide time span. Past consolidation episodes show that when countries faced a fiscal adjustment need in order to stabilize debt to GDP and were willing to address this imbalance, they were able to implement sizeable fiscal consolidation: at least half managed to improve their primary balances by about 5 percent of GDP, and a quarter of countries improved by 7½ percent of GDP.

The analysis also finds that most countries stabilized their debt-to-GDP ratios by the end of the episode, albeit at higher levels. While countries closed their primary gaps and kept primary balances well above those observed before the adjustment episode, they did not sustain primary balances at the highest levels for prolonged periods of time. This suggests that countries make substantial efforts to stabilize debt but, once this has been achieved, they see room to ease primary balances and do not necessarily seek to get back to the lower initial debt-to-GDP ratio.

We also find that the size of fiscal adjustment is significantly associated with several important factors. Fiscal adjustment was larger the greater the initial deficit and when adjustment efforts were sustained in time. The results also show that fiscal adjustment tended to be larger when accompanied by an easing of monetary conditions and, to a lesser extent, an improvement in credit conditions.

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Disclosure statement

No potential conflict of interest was reported by the authors.

Notes on contributors

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