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Why Do Governments Cut Their Deficits?

LESSONS FOR HIGH-DEBT COUNTRIES IN A POST-PANDEMIC WORLD

Benedict Clements, Sanjeev Gupta, João Tovar Jalles, and Victor Mylonas

Abstract

We construct a novel database covering more than 450 fiscal consolidation episodes in 185 countries during the period 1979–2019. Using discrete choice models, we then examine the (broader macroeconomic and political) factors motivating these fiscal consolidation episodes. In emerging and developing countries, consolidations are more likely during "good times": when growth is high, and countries experience positive terms of trade shocks with low inflation. In these countries, governments that have been in power longer, with a high margin of majority, are also more likely to consolidate fiscal accounts. The opposite seems to be the case in advanced economies, where new governments are more likely to implement fiscal consolidations and the consolidations themselves are more likely during "bad times." Evidence also suggests that tax-based consolidations may be relatively more politically challenging to implement. Finally, consolidations in advanced economies are relatively more likely to take place in the presence of fiscal rules.

Why Do Governments Cut Their Deficits? Lessons for High-Debt Countries in a Post-Pandemic World

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1. Introduction

Countries embark on fiscal consolidation (or adjustment/tightening) to lower their public debt to sustainable levels and address fiscal solvency concerns, particularly when interest rates are rising. There is considerable literature on fiscal consolidations in "advanced economies" (AEs)—reflecting greater availability of data—focused on the type of fiscal adjustment that is durable and more favorable to growth. By contrast, studies on "emerging market" (EM) and "low-income developing countries" (LIDCs), i.e., EMLIDCs are limited.[1]

Debt-to-GDP ratios rose in 2020 in all country groups (AEs and EMLIDCs) during the COVID-19 pandemic as governments expanded social programs to protect life and livelihood. In EMLIDCs, fiscal positions were further exacerbated by falling revenues. As a result, debt-to-GDP ratios grew in all countries, increasing the most in AEs (IMF, 2021). In 2021, higher-than-projected inflation reduced public debt-to-GDP ratios in advanced and emerging market economies (IMF, 2022). This reprieve is likely to be short- lived. If inflation expectations increase, government bonds would become less attractive to investors, and the costs of borrowing would rise. There are a considerable number of low-income countries that are in debt distress and would need to embark on fiscal consolidation in the foreseeable future, particularly if debt relief is not forthcoming (Clements et al., 2021).

This means that the issue of fiscal consolidation will remain pertinent in the foreseeable future for both domestic and international policymakers. What are the key macroeconomic considerations that induce countries to implement fiscal consolidations? Is it high debt, slowing growth, or worsening terms of trade? Are there any differences between countries that act to consolidate when they need to contrary to those that do not? Do AEs act differently from EMLIDCs? To what extent is proximity to elections a consideration in implementing consolidations? Do political ideology and margin of majority play a role? Does the presence of (given) fiscal rules matter? Are there meaningful differences in terms of the composition of fiscal adjustment (i.e., based on whether it is expenditure- or tax-based)?

The purpose of this empirical paper is to seek answers to these questions by assembling a new database of fiscal consolidation episodes covering 185 countries (37 AEs and 148 EMLIDCs) between 1979 and 2019. To our knowledge, this is the largest database ever assembled[2] to study the drivers of fiscal consolidation. A novel component of this database is the inclusion of a substantial number of low-income countries.

The remainder of this paper is organized as follows. Section 2 expands on the literature review. Section 3 develops the conceptual framework. Section 4 presents the data and stylized facts. Section 5 discusses the empirical results. The last section concludes and highlights key policy implications.

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1   For more information on income-based country classification lists, see: https://www.imf.org/external/pubs/ft/weo/2022/01/weodata/groups.htm#oem

2   Approximately 5,000 country-year observations for up to 452 (multi-year) episodes of fiscal adjustment in our preferred specification.

2. Literature review

Our focus is on the economic and political conditions that may lead countries to embark on fiscal consolidation. These conditions have been widely studied in AEs, but relatively few studies have examined them in EMLIDCs. In AEs, weak public finances have been found to trigger fiscal adjustment (Barrios et al., 2010; Guichard et al., 2007; European Commission, 2007; Von Hagen and Strauch, 2001).

In contrast to the view that fiscal actions take place only when the authorities are faced with a weak economic and fiscal outlook, Von Hagen and Strauch (2001) and the European Commission (2007) found that positive output gaps increase the probability of launching a retrenchment. Von Hagen and Strauch (2001) also found a negative impact for the international environment, which, combined with the positive coefficient on domestic cyclical conditions, implies that governments are more likely to undertake consolidation efforts when the domestic economy is doing well relative to other economies. There is evidence of peer pressure as well: an increase in the OECD structural government balance has a strong positive effect on the likelihood of new consolidations.

A related literature has examined what sustains fiscal consolidation episodes once they begin. The duration of fiscal consolidations is affected by the composition of adjustment, initial (macroeconomic) conditions, and consolidation fatigue. In AEs, "expenditure-based" fiscal consolidations centered on permanent spending cuts have been found by some to be more durable (Alesina and Ardagna, 2013).[3] The differential effect of spending cuts *vis-à-vis* tax increases is attributable to the positive reaction of investors who have more confidence in sustained improvements in fiscal accounts when expenditure-based consolidation is implemented. Such effects are different in EMLIDCs, where revenue (or tax)-based consolidation has in practice proven to be not only durable but also more supportive of growth (Gupta et al., 2004, 2006). The longer an episode lasts, *ceteris paribus*, the greater the likelihood that the adjustment process will be reversed. There are some differences when it comes to fiscal adjustment in EMLIDCs: the probability of ending a fiscal adjustment is affected by (the legacy of) previous fiscal failures, the size of the deficit, and level of total revenues (Gupta et al., 2004).

Institutional and political factors are important in explaining fiscal outcomes in both AEs and EMLIDCs (Gaspar et al., 2017), and may, thus, affect whether countries decide to enter fiscal consolidation episodes. Fiscal consolidations and budget composition are affected when elections are approaching (Mulas-Granados 2003, 2004; Klomp and de Haan, 2013; Hübscher and Sattler, 2017), when political fragmentation in a country is significant (Perotti, 1998; Von Hagen et al., 2001; Volkerink and de Haan, 2001; Perotti and Kontopoulos, 2002; Crivelli et al., 2016), and when ideological differences between a government and the opposition are strong (Mulas-Granados, 2006; Mierau et al., 2007; Potrafke, 2011; Wiese et al., 2018).

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3   However, there is also some evidence to the contrary (Mauro and Villafuerte, 2013).

Political ideology influences the composition of fiscal consolidations (Herwartz and Theilen, 2020). Right-wing governments tend to reduce spending more on categories containing a large share of public employee compensation (i.e., public consumption spending). In a similar vein, a right-wing government is more likely to increase the value-added tax (VAT) at the time of a banking crisis, while a left-wing government is more likely to increase the top personal income tax (PIT) rate (Angelopoulos et al., 2012). Tax-based fiscal consolidations have also been found to be led by sub-central governments experiencing low electoral competition and little party fragmentation (Marattin et al., 2022).

Fiscal rules are intrinsically linked to fiscal consolidations. For instance, in EMLIDCs, fiscal rules have often been adopted to guarantee that fiscal consolidations take place when they are most needed (Davoodi et al., 2022) or to reduce the uncertainty around fiscal consolidations in AEs (Caselli et al., 2022). Furthermore, well-designed fiscal rules have been shown to lead to lower deficits (Caselli and Reynaud, 2020). Finally, the presence and nature (stringent or flexible) of fiscal rules may influence the impact of fiscal consolidation on macroeconomic fundamentals (Ardanaz et al., 2021).

3. Methodology

3.1 Defining fiscal consolidation episodes

Fiscal consolidation episodes have been documented in the literature using one of two techniques. The first one adopts a narrative approach, while the second one relies on an *ad hoc* criterion based on changes in the Cyclically Adjusted Primary Balance (CAPB). Per the first approach, fiscal consolidation episodes are identified from approved budget plans and historical accounts of past fiscal policy. This approach was first popularized by Romer and Romer (2010) as well as Devries et al. (2011) who, subsequently, published a list of fiscal consolidation episodes for 17 advanced economies between 1978 and 2009. Proponents of this "policy action"-based approach argue that the fiscal measures identified are unaffected by the cycle (since their construction is "bottom-up"), thereby minimizing identification problems,[4] as well as risks of reverse causality (Guajardo et al., 2014). More recently, Alesina et al. (2020) updated the Devries et al. (2011) database for a subset of European countries to year 2014. The narrative approach does not come without a series of drawbacks: it relies on judgment calls and may not entirely eliminate endogeneity problems (i.e., fiscal policy reacting to changes in output and not the other way around). This "narrative" approach to identifying fiscal consolidation episodes cannot be considered in our study because: i) we examine a large, heterogeneous sample of countries, including low-income developing ones; ii) the publicly available dataset compiled by Devries et al. (2011) and Alesina et al. (2020) covers only 17 advanced economies, ending in 2014 (so it is, by now outdated). The more recent dataset for developing countries covers

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4   Nevertheless, as Jordà and Taylor (2016) argue, said fiscal shocks may not be exogenous and can be predicted by given macroeconomic covariates.

only selected Latin American and Caribbean countries (David and Leigh (2018); and iii) it would be a laborious task to mimic the same approach for our sample of 185 countries over the time span covered in our study while guaranteeing internal consistency among observations.

Hence, the analysis that follows relies on changes in the CAPB. In relation to this approach, the literature has adopted several alternative conventions. For instance, a high threshold for the minimum increase (or "improvement") in the CAPB-to-GDP ratio to reduce the probability of single-year fiscal consolidation episodes was applied by Giavazzi and Pagano (1996). They used an annual threshold of 3 percentage points (pp) of GDP. As an alternative to the above, they also proposed using cumulative changes in the CAPB-to-GDP ratio of 5, 4, and 3 pp over 4, 3 and 2 years respectively. Adding some flexibility regarding time horizons, Alesina and Ardagna (1998) allowed for more single-year fiscal consolidation episodes. However, they considered changes in the CAPB-to-GDP ratio of at least 2 pp in one year or 1.5 pp on average over two years. Afonso (2010), in turn, allowed for relative thresholds based on sample characteristics. Specifically, Afonso (2010) defined a fiscal consolidation episode when the annual change in the CAPB-to-GDP ratio is at least 1.5 times the sample standard deviation (or equal to one sample standard deviation, on average, over two years). As there is no single, agreed upon definition in the literature and aware of best practices reviewed above, we take a middle-ground approach in defining CAPB-to-GDP change thresholds for the determination of fiscal consolidation episodes. In particular, we opted for the Alesina and Perotti (1997) approach, under which a fiscal consolidation episode is defined as a minimum annual improvement in the CAPB-to-GDP ratio of 0.5 pp over two consecutive years.[5]

Another relevant issue is the CAPB measure of choice. CAPB data can be obtained either via a publicly available source (e.g., International Monetary Fund (IMF) World Economic Outlook (WEO) database) or computed using a filtering approach (by decomposing GDP and government revenues into their cyclical and trend components). In relation to this, there is no clear consensus in the literature regarding the "optimal" way to estimate potential output. According to Borio (2013), past studies have applied: i) univariate statistical approaches, usually consisting of filtering out the trend component from the cyclical one; or ii) structural approaches, deriving the estimates directly from a theoretical model. Aware of the shortcomings of using either of the two approaches[6] and the disadvantage of not maximizing the total number of observations in our panel dataset when using the WEO CAPB,[7] we apply a filtering technique.

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5   The start year of a fiscal consolidation episode is, therefore, the year in which there is a minimum annual improvement in the CAPB-to-GDP ratio of 0.5 pp, provided that there is also a minimum annual improvement in the CAPB-to-GDP ratio of 0.5 pp in the following year. Accordingly, the end year of a fiscal consolidation episode is the last year (in a sequence of years) with a minimum annual improvement in the CAPB-to-GDP ratio of 0.5 pp, after which the annual CAPB-to-GDP either improves by less than 0.5 pp or worsens (i.e., decreases).

6   Statistical methods suffer from the end-point problem, that is, they are extremely sensitive to the addition of new data and to real-time data revisions. Structural models, on the other hand, may be difficult to implement consistently in cross-sectional environments and rely on the imposition of pre-determined assumptions (see also Reiss et al., 2007).

7   The IMF does not have an official method for computing potential output. While the most common IMF approach relies on a production function, assumptions vary greatly across countries.

Once the potential output (and, consequently, the output gap) is obtained, we use it to compute a new measure of the CAPB. Reflecting the fact that the elasticity of government revenues (REV) to output growth is close to one while primary expenditure (PEXP) is largely inelastic to growth (we assume the same as Girouard and André, 2005), we multiply government revenues by the factor [1/(1+OG/100)] to get REV_{adj} (adjusted government revenues), with OG being the output gap obtained via the HP or Hamilton filters.[8] Mathematically, we have:

$$CAPB = REV_{adj} - PEXP, \hspace{4cm} (1)$$

Composition-wise, a fiscal consolidation episode is defined as an expenditure-based episode if the ratio of the cumulative fall in the primary expenditure-to-GDP ratio (defined as the sum of all annual changes in the primary expenditure-to-GDP ratio within the episode) to the cumulative adjustment (defined as the sum of all annual changes in the CAPB-to-GDP ratio) is larger than (or equal to) 2/3 in absolute value. If the sum of all annual changes in the primary expenditure-to-GDP ratio within a fiscal consolidation episode is positive, the episode is classified as a tax-based consolidation. All remaining cases are classified as "mixed" consolidation episodes. Succinctly, a fiscal consolidation episode is defined as expenditure-based when: $\left|\frac{\Delta PEXPC\_GDP}{\Delta CAPBC\_GDP}\right| \geq 2/3$ and $\Delta PEXPC\_GDP < 0$, with $CAPBC\_GDP$ and $PEXPC\_GDP$ denoting cumulative CAPB and primary expenditure (in percent of GDP) within a given episode. Conversely, a fiscal consolidation episode is defined as tax-based when: $\Delta PEXPC\_GDP \geq 0$. It follows that any episodes that do not satisfy the criteria set forth above are classified as mixed consolidation episodes.

Finally, we distinguish between fiscal consolidation episodes that were needed (i.e., "responsible" fiscal consolidation episodes) and those that were not (i.e., "frugal" fiscal consolidation episodes). A fiscal consolidation episode is defined as a "responsible" episode (i.e., one motivated by a need to consolidate), if the difference between the debt-stabilizing primary balance (in percent of GDP) and the CAPB-to-GDP ratio is positive in the year prior to the start of the fiscal consolidation episode.[9]

3.2 Empirical approach

Our aim is to explore political and institutional determinants of fiscal consolidation episodes. The fiscal consolidation (FC) dummy for country i in year t takes the value of 1 if country i is in a fiscal consolidation episode (as defined above) in year t (0 otherwise). Based on this binary

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8   For a discussion of these approaches, see, for example, Hamilton (2018).

9   There is no standard definition of "responsible" consolidation episodes. In our case, an episode is classified as "responsible" if the country needed to improve primary balances in the year immediately preceding the fiscal consolidation to keep public debt from rising as a share of GDP. This approach is central to the IMF's debt sustainability assessments. While we understand that using the difference between the debt-stabilizing primary balance (in percent of GDP) and the CAPB-to-GDP ratio may not always be the relevant measure to label fiscal consolidations as "responsible" or "frugal", the focus of this paper is on fiscal outcomes and we are, hence, not interested in comparing plans with *ex-post* budget measures. For a discussion of fiscal promises versus realized actions, see Gupta and Jalles (2018) or Jalles (2021).

characterization, our baseline empirical exercise consists of estimating logistic regressions to assess the likelihood of a given country experiencing a fiscal consolidation year by considering several political and institutional elements, while controlling for other (macroeconomic and fiscal) variables identified in the literature as affecting the implementation of fiscal consolidations. In particular, we estimate the following reduced-form model[10]:

$$\text{Prob}(FC=1|X)=\Phi(Pol'\alpha+X'\beta) \tag{2}$$

where α, β are vectors of the parameters to be estimated; *Pol* is a political or institutional variable; X is a vector of control variables, and $\Phi(\cdot)$ is the logistic function. Our list of control variables includes: the real GDP growth rate, the rate of inflation, and the debt-ot-GDP ratio. These variables are sourced from the April 2022 IMF WEO vintage. We also add trade openness (proxied by the value of imports and exports in percent of GDP), percent changes in the terms of trade, and percent changes in the real exchange rate from the World Bank's (WB) World Development Indicators (WDI) database as controls. The relevance of fiscal institutions proxied by fiscal rules is also tested in some specifications. The structural μodel associated with (2) can be written as:

$$FC=\alpha Pol_{it}+\beta X_{it}+\varepsilon_{it} \tag{3}$$

where, again, the FC variable takes the value 1 if a fiscal consolidation episode takes place: $FC_{it}=1$ if $FC_{it}^{*}>0$, and 0 otherwise. With $i=1, ..., N$; $t=1, ..., T$; and ε_{it} is an i.i.d. error term.

To test the role of political variables in influencing the occurrence of fiscal consolidation episodes, we rely on principal component analyses (PCAs). Specifically, we group political economy variables along four dimensions:

- *Political orientation*: taking the value 1 when the chief executive party orientation is left-wing (with 0 corresponding to center-right chief executive parties).
- *Electoral proximity:* This considers the time that policymakers have before forthcoming elections. Politicians facing elections in the immediate future do not have strong incentives to deliver on their budget promises and may delay (needed) fiscal consolidation (which typically has a detrimental social impact) to capture more votes. We use three variables to compute the "proximity" PCA. A higher electoral proximity is associated with more years in office, government freshness (that is, fewer years left in the current term), and the party of the chief executive with a short tradition in office.[11] The first principal component is kept, since the first factor explains close to 50 percent of the variance in the standardized data (Table A1).

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10 For details on this binary choice model see, for example, Greene (2012, Ch. 17).
11 This indicator refers to the number of actual months left until the next election *ex post*, while the variable "more years left in current term" is observed *ex ante*.

- *Political cohesion:* This dimension captures the number of political actors participating in budgetary decisions, which typically exhibit conflicting budgetary demands. These actors could be parties in government—or in opposition—, interest groups or, more generally, veto players. Cohesive governments are those which operate in less fragmented political environments and are likely to be subject to less stringent spending demands. Therefore, they are typically associated with tighter fiscal discipline. We use three variables to compute the "cohesion" PCA. More political cohesion is associated with a higher margin of parliamentary majority, executive control of all houses, and a larger voting share in parliament. The first principal component is kept (and it explains close to 70 percent of the variance).

- *Political accountability:* This dimension considers the institutional context in which fiscal policy decisions are made. When politicians operate in contexts with more transparency, better governance, and more mechanisms to monitor their activities objectively, they tend to be more responsive to citizen's demands and more accountable to voters. In such contexts, higher accountability would be associated with more fiscal discipline. We use three variables to compute the "accountability" PCA. A higher accountability index is associated with more voice and accountability, higher regulatory quality, and higher government effectiveness. The first principal component is kept (as it explains close to 88 percent of the variance).

The "proximity" and "cohesion" variables are, hence, each represented by one factor composed of three underlying variables. These underlying variables are sourced from the 2020 Database of Political Institutions (DPI) vintage (Scartascini et al., 2020).[12] "Accountability"[13] is represented by one factor composed of three underlying variables from the WB Governance Indicators (WGI) database.[14] The resulting principal components are described in Table A2, while Table A1 lists their factor loadings. We can interpret the principal components by focusing on the factor loadings and the uniqueness of each variable.[15] Regarding political "proximity", uniqueness is centered around relatively fewer years left in the current term. As to political "cohesion", the resulting factor appears to be better described by the margin of majority. Finally, with respect to "accountability", uniqueness

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12 See: https://publications.iadb.org/en/database-political-institutions-2020-dpi2020
13 As these variables come from the World Bank's Governance Indicators and their coverage starts in 1996, some regressions exclude the "accountability" PCA to maximize the number of observations in the specification.
14 See: https://databank.worldbank.org/source/worldwide-governance-indicators
15 In a PCA, we obtain eigenvectors (unit vectors) and eigenvalues. Loadings are defined as "Loadings = Eigenvectors x (Eigenvalues)^1/2". In other words, loadings are the covariances/correlations between the original variables and the unit-scaled components. Uniqueness represents the variance that is not shared with other variables. It is equal to 1 – communality (variance that is shared with other variables).

is relatively low throughout which implies that the factor retained spans the original variables adequately.[16]

4. Data and stylized facts

Macroeconomic and fiscal data come from the IMF's April 2022 WEO database. These include real GDP, the budget-balance-to-GDP ratio, CAPB (in percent of GDP), total government revenues (in percent of GDP), primary government expenditures (in percent of GDP), the CPI inflation rate (in percent), and government gross debt (in percent of GDP). Additional information on trade openness (value of exports and imports, in percent of GDP), changes in the terms of trade, and changes in the real exchange rate come from the WB WDI database as mentioned above.

Fiscal rules data are publicly available from the IMF's "Fiscal Rules Dataset" (Davoodi et al., 2022). This database contains information on fiscal rules for 92 countries, during the period 1980–2021. The IMF's fiscal rules data has been extended back in time using information from the database's supplementary material (Bova et al., 2015; Lledó et al., 2017) and independent background research. The types of fiscal rules considered are: expenditure rules (ER), revenue rules (RR), budget balance rules (BBR) and debt rules (DR).

Political economy data comes from the DPI and WB WGI databases, as described in the previous section.

From Table 1, we observe that the number of fiscal consolidation episodes is significantly smaller when we consider the WEO-based consolidation criterion as compared to the HP or Hamilton-based criteria.[17] This is particularly salient in the case of LIDCs (13 WEO episodes vs. 272/270 HP/Hamilton episodes). Also, the average adjustment in percent of GDP is lower when the former criterion is used (around 2 percent of GDP when using the WEO-based approach and more than 2 percent of GDP under the HP/Hamilton-based approaches). So, using solely the WEO as a key source of information,

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16   Given that PCA is based on the classical covariance matrix, which is sensitive to outliers, we cross-checked if such an issue was a problem in our data. A well-suited method is the Minimum Covariance Determinant (MCD) that considers all subsets containing h percent of the observations and estimates the variance of the mean on the data of the subset associated with the smallest covariance matrix determinant; we implement Rousseeuw and Van Driessen's (1999) algorithm. After recomputing the same factors with the MCD version, we obtain, generally speaking, similar results, meaning that outliers are likely not driving our factor analysis.

17   To verify whether episodes defined via these CAPB criteria are consistent with the "narrative" approach, we have examined their association with the consolidation episodes in Devries et al. (2011) and David and Leigh (2018) for the 31 AEs and Latin American EMLIDCs covered in these studies during the period 1978–2016. Regressing the narrative fiscal consolidation dummy on the WEO, HP and Hamilton-based consolidation dummies separately, we find a positive and significant (at the 1 percent level, clustering standard errors at the country level) association between the two approaches with a coefficient of around 0.2 across specifications. This exercise provides suggestive evidence that the CAPB approach applied in this paper is broadly in line with the narrative approach to defining fiscal consolidation episodes.

could underestimate the average size of consolidations due to data limitations. In addition, the duration of a fiscal consolidation episode is higher for AEs than the duration observed for EMs and LIDCs. In fact, while the reported duration is, on average, of 3 years for AEs, the duration of fiscal consolidation episodes for non-AEs is around 2.5 years.

TABLE 1. Summary statistics by fiscal consolidation episode definition and sample

Advanced Economies (AEs)			
	Total # Years of FC	Avg. # FC Episodes	Avg. Size of Consolidation in Episode (percent GDP)	Avg. Duration (years)
WEO-based	191	1.65	1.72	3.22
HP-based	269	2.24	1.94	3.14
Hamilton-based	278	2.35	1.87	3.05
Emerging Markets (EMs)			
	Total # Years of FC	Avg. # FC Episodes	Avg. Size of Consolidation in Episode (percent GDP)	Avg. Duration (years)
WEO-based	178	1.60	2.12	2.63
HP-based	581	2.06	4.77	2.74
Hamilton-based	577	2.15	12.04	2.68
Low-Income Developing Countries (LIDCs)			
	Total # Years of FC	Avg. # FC Episodes	Avg. Size of Consolidation in Episode (percent GDP)	Avg. Duration (years)
WEO-based	13	1.38	1.29	2.23
HP-based	272	2.04	2.83	2.55
Hamilton-based	270	2.02	3.26	2.51

Source: See text.

Note: Duration of fiscal consolidation episode: the sum of all years during which a country has improved its fiscal balance within a given consolidation episode. (Average) size of fiscal consolidation: the cumulative consolidation (defined as the sum of all annual changes in the CAPB-to-GDP ratio) within a given episode, divided by the duration (total number of years) of the episode. Country income group classifications are based on the International Monetary Fund's World Economic Outlook (WEO) database.

In Figure 1, we report the distribution of changes in CAPB (in percent of GDP) in the overall sample as well as separately for AEs, EMs and LIDCs using the Hamilton criterion.[18]

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18   The WEO and HP-based results are also available upon request.

FIGURE 1. Distribution of Hamilton-based changes in CAPB by sample (In percent of GDP)

a. Hamilton—All countries

b. Hamilton—AEs

c. Hamilton—EMs

d. Hamilton—LIDCs
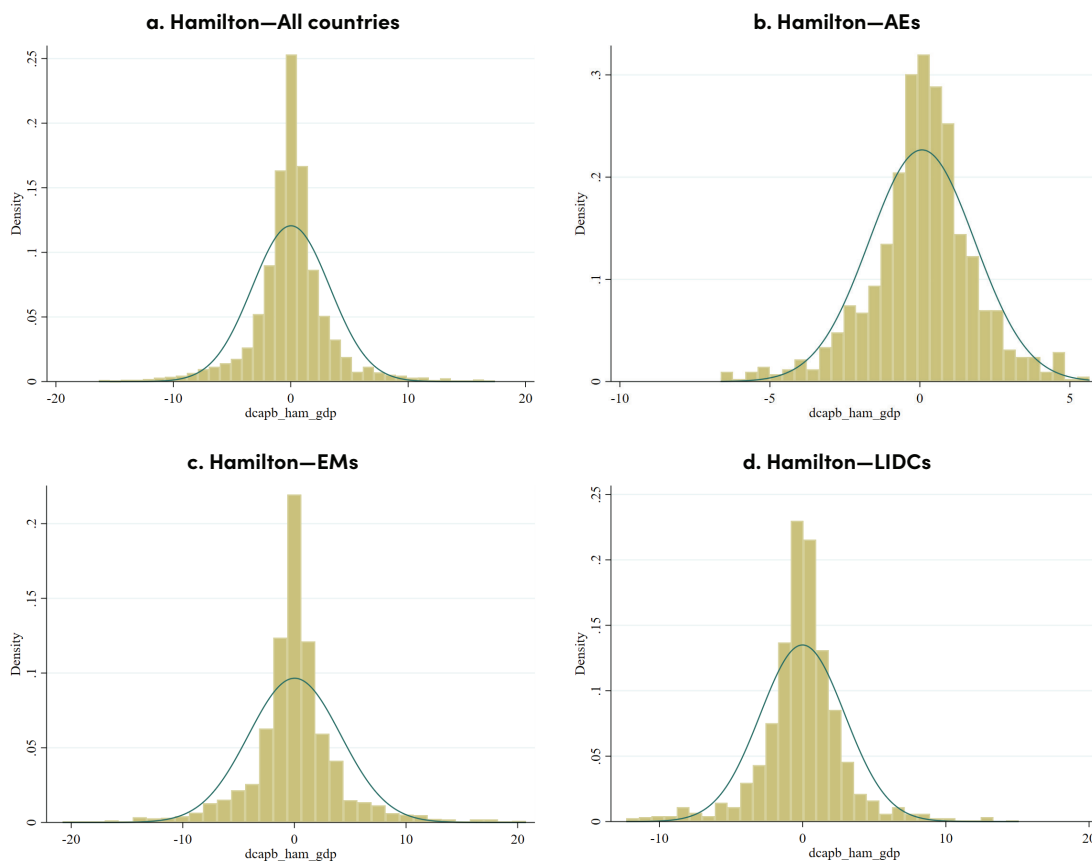
Source: See text.

Note: The figure plots both the histogram and Kernel densities for the Hamilton criterion by country group. Country income group classifications are based on the International Monetary Fund's World Economic Outlook (WEO) database. Histograms exclude observations below the 1st and above the 99th percentile of the distribution.

As far as the characteristics of fiscal consolidation episodes are concerned, initial fiscal conditions prevailing just before the beginning of a given consolidation episode seem to be associated with the size of subsequent consolidation efforts (Figure 2). This is true across all income groups. The lower the CAPB, the larger the size of the ensuing fiscal consolidation episode. This may reflect that large budget deficits made it more necessary to tighten balances and, at the same time, raised public awareness of the fiscal imbalance problem, making it relatively more politically imperative to act upon.

FIGURE 2. Initial fiscal imbalance and subsequent Hamilton-based consolidation by sample
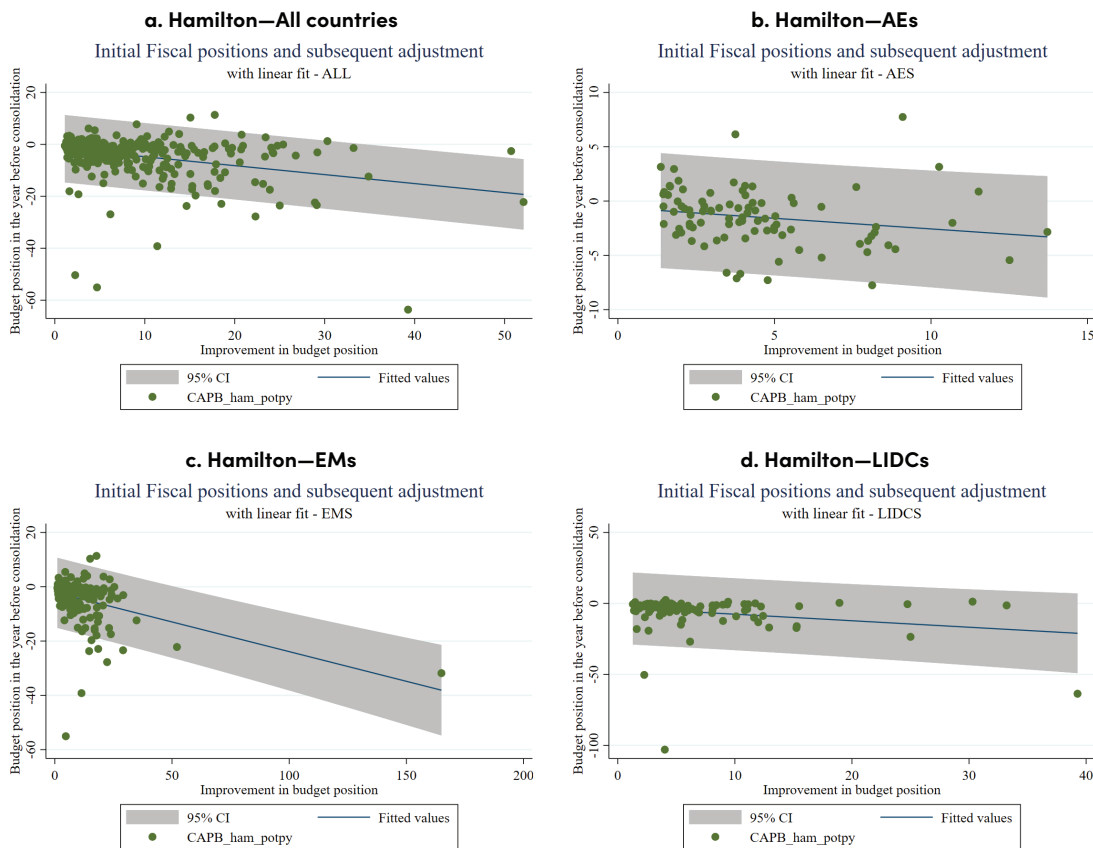
a. Hamilton—All countries

Initial Fiscal positions and subsequent adjustment
with linear fit - ALL

b. Hamilton—AEs

Initial Fiscal positions and subsequent adjustment
with linear fit - AES

c. Hamilton—EMs

Initial Fiscal positions and subsequent adjustment
with linear fit - EMS

d. Hamilton—LIDCs

Initial Fiscal positions and subsequent adjustment
with linear fit - LIDCS

Source: See text.

Note: Country income group classifications are based on the International Monetary Fund's World Economic Outlook (WEO) database. Figures exclude observations below the 1st and above the 99th percentile of the distribution.

Most fiscal consolidation episodes were of short duration (Figure 3) and involved relatively modest gains (Figure 4). However, there were several large efforts, amounting to improvements of more than 10 percent of GDP in all income groups, as well as a few episodes lasting four years or more. Fiscal consolidation episodes were longer in AEs than in EMs or LIDCs. AEs experienced fiscal consolidation episodes lasting a maximum of 7 years. In contrast, EMs and LIDCs experienced consolidations lasting a maximum of 5 or 6 years per episode, respectively. Finally, the improvement in the budget position for AEs is more concentrated than the one observed for other income groups.

FIGURE 3. Duration of Hamilton-based consolidation episodes by sample (Number of episodes by episode duration in years)
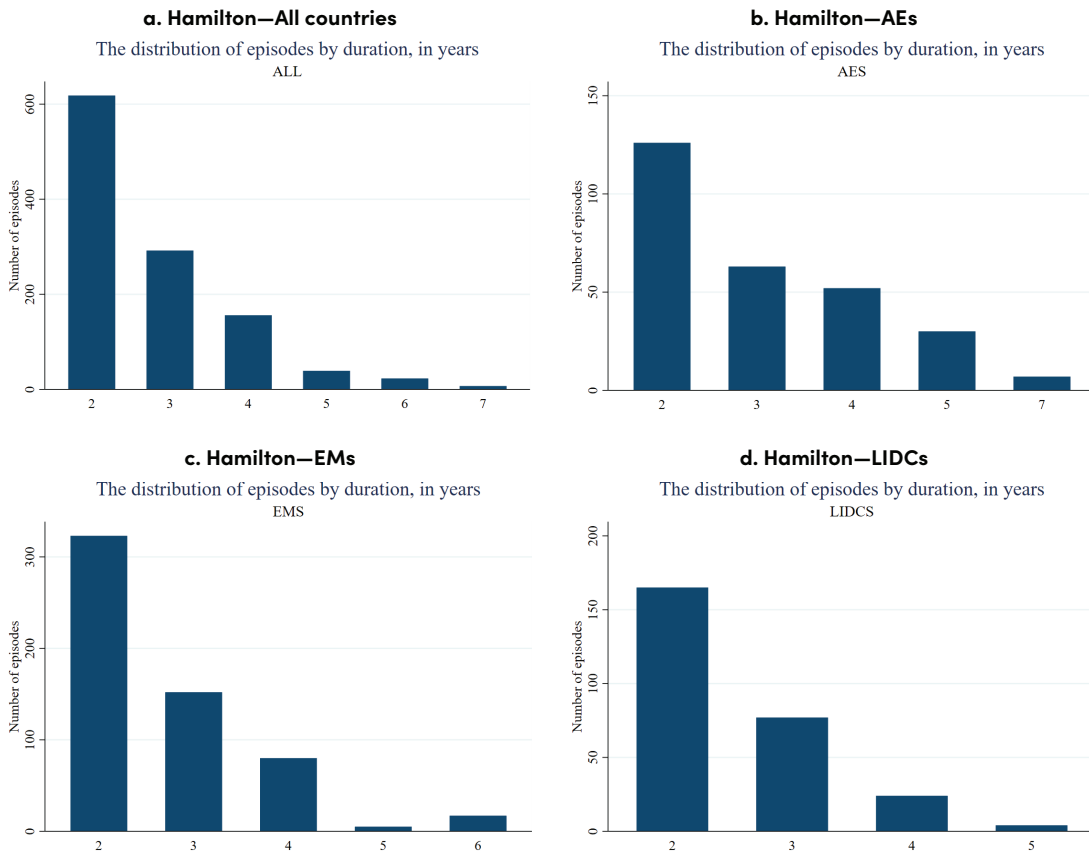
a. Hamilton—All countries

b. Hamilton—AEs

c. Hamilton—EMs

d. Hamilton—LIDCs

Source: See text.

Note: Country income group classifications are based on the International Monetary Fund's World Economic Outlook (WEO) database. Budget position measured by the CAPB (in percent of GDP).

FIGURE 4. Size of Hamilton-based consolidation episodes by sample

a. Hamilton—All countries

The Distribution of episodes by the size of consolidation
ALL

b. Hamilton—AEs

The Distribution of episodes by the size of consolidation
AES

c. Hamilton—EMs

The Distribution of episodes by the size of consolidation
EMS

d. Hamilton—LIDCs

The Distribution of episodes by the size of consolidation
LIDCS
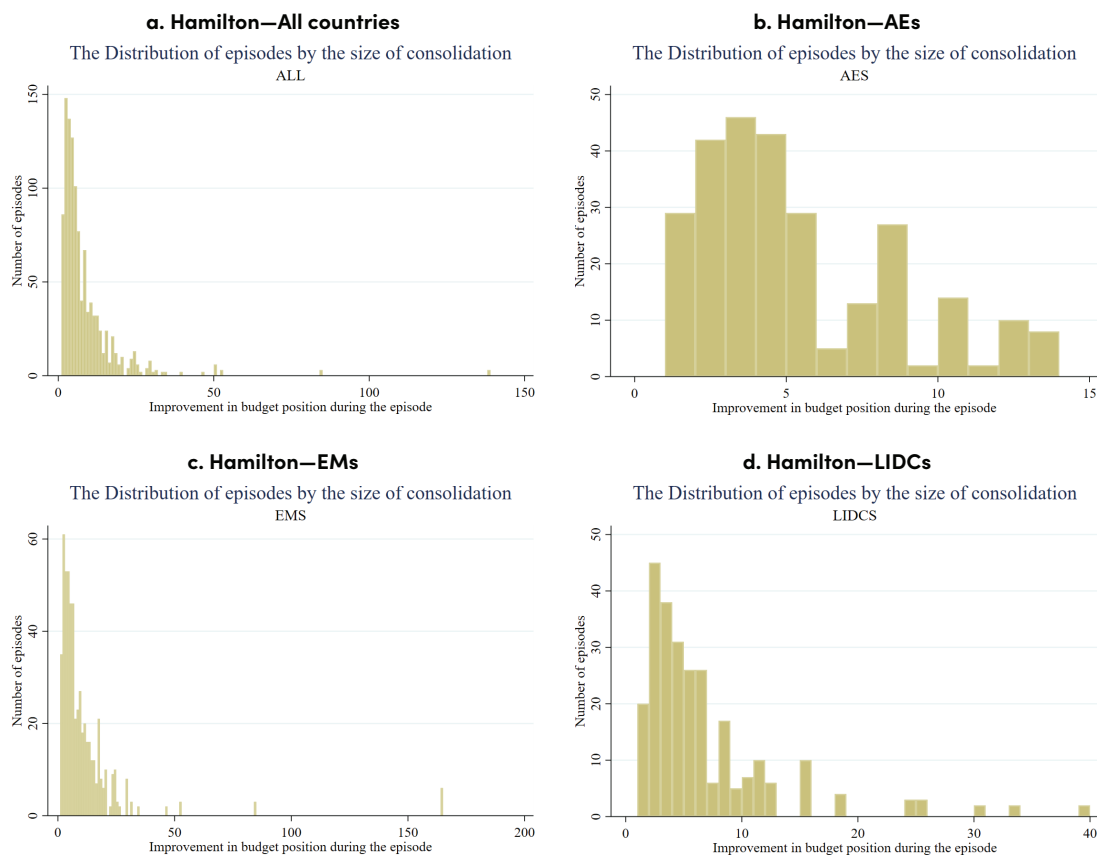
Source: See text.

Note: Improvement measured during the fiscal consolidation years of the identified episode. Country income group classifications are based on the International Monetary Fund's World Economic Outlook (WEO) database. Histograms exclude observations below the 1st and above the 99th percentile of the consolidation size distribution.

In general, sizeable fiscal consolidations lasted for longer periods in AEs (Figure 5). We also note that budget position improvements are comparatively similar across all country income groups, except for EMs, where several outliers in terms of fiscal consolidation size persist (even when excluding observations lower than the 1st and higher than the 99th percentile of the consolidation size distribution).

FIGURE 5. Relationship between duration and size of Hamilton-based consolidation episodes by sample

a. Hamilton—All countries
Duration and size of consolidation
ALL

b. Hamilton—AEs
Duration and size of consolidation
AES

c. Hamilton—EMs
Duration and size of consolidation
EMS

d. Hamilton—LIDCs
Duration and size of consolidation
LIDCS
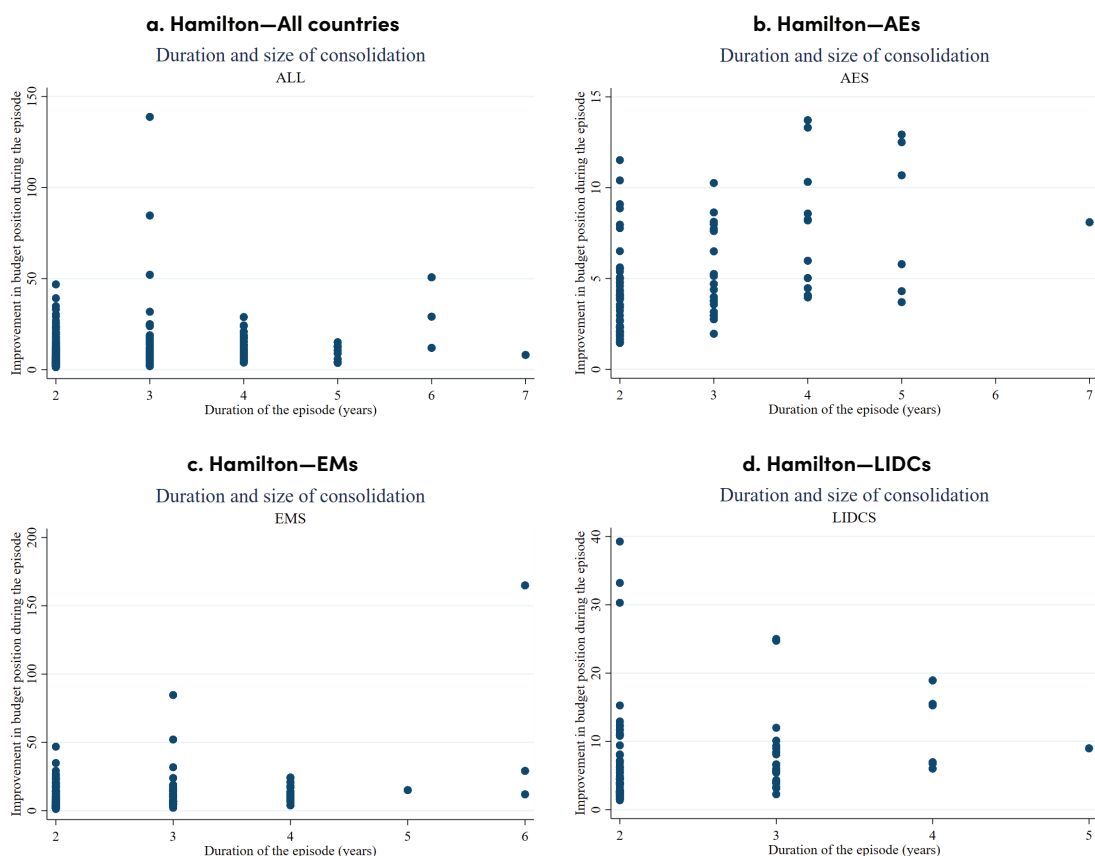
Source: See text.

Note: Budget position measured by the CAPB (percent of GDP). Improvement is measured during the consolidation years of the identified episode. Country income group classifications are based on the International Monetary Fund's World Economic Outlook (WEO) database. Histograms exclude observations below the 1st and above the 99th percentile of the consolidation size distribution.

5. Empirical results

5.1 Baseline determinants of fiscal consolidations—panel analysis

We begin with the estimation of logistic regression (3) to explore the political economy determinants of fiscal consolidations.[19] Table 2 shows the results when we: i) initially exclude the political variables (column 1); ii) individually add each political variable used in the PCA; and iii) consider the PCAs themselves.

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19 Results are based on the Hamilton-based CAPB criterion for identifying fiscal consolidation episodes. The WEO and HP-based results are available upon request. All results exclude net commodity-exporting countries as these are defined in IMF (2015).

This exercise is carried out for all countries in our sample (Table 2) and for each income group separately (Table A3 for AEs and Table A4 in Appendix for EMLIDCs). We can observe that for the entire sample, better economic conditions (in terms of real GDP growth) make it less likely that a country will experience a consolidation (Table 2, column 1) This result, however, does not hold when we add political variables (columns 2 through 6) or when we restrict the sample to AEs (Table A3 in Appendix). Once we control for some political variables (Table 2, column 2), public debt becomes a significant determinant of the likelihood of a consolidation, with the expected positive sign. External conditions also matter: trade openness seems to be associated with an increase in the likelihood of a consolidation taking place, but only in EMLIDCs (Table A4 in Appendix).

TABLE 2. Panel analysis: Hamilton-based fiscal consolidations, all countries

Specification Regressors	(1)	(2)	(3)	(4)	(5)	(6)
Real GDP growth (t–1)	−0.046**	0.005	0.014	0.006	0.018	−0.000
	(0.020)	(0.031)	(0.032)	(0.032)	(0.035)	(0.025)
Debt ratio (t–1)	0.003	0.008*	0.008**	0.008**	0.009**	0.004
	(0.003)	(0.004)	(0.004)	(0.004)	(0.004)	(0.003)
Inflation (t–1)	−0.022	−0.010	0.033	−0.021	0.026	−0.007
	(0.025)	(0.038)	(0.038)	(0.045)	(0.042)	(0.040)
REER growth (t–1)	−0.050***	−0.051***	−0.059***	−0.053***	−0.061***	−0.063***
	(0.014)	(0.018)	(0.020)	(0.017)	(0.019)	(0.015)
Trade openness (t–1)	0.003**	0.002	0.001	0.002	0.001	0.001
	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Terms of trade growth (t–1)	0.002	−0.015	−0.011	−0.015	−0.012	−0.005
	(0.009)	(0.021)	(0.021)	(0.020)	(0.020)	(0.013)
Left-wing (t–1)		−0.116	−0.133	−0.156	−0.162	
		(0.220)	(0.239)	(0.201)	(0.227)	
Party length in office (t–1)				−0.000	0.015+	−0.003
				(0.009)	(0.010)	(0.009)
Years in office (t–1)				−0.069	−0.073	
				(0.053)	(0.054)	
Gov. Freshness (t–1)				0.128+	0.101	
				(0.084)	(0.094)	
Margin of majority (t–1)				−0.303	−0.301	
				(1.141)	(1.271)	
Control of All houses (t–1)				−0.002***	−0.002***	−0.001***
				(0.000)	(0.000)	(0.000)
Vote share gov. party (t–1)				0.011	0.011	
				(0.010)	(0.013)	
Horizon pca (t–1)		−0.224	−0.132			
		(0.167)	(0.171)			
Cohesion pca (t–1)		−0.294	−0.649			
		(1.036)	(0.991)			
Accountability pca (t–1)			0.328*			
			(0.191)			
WGI gov. effectiveness (t–1)					−0.198	
					(0.521)	

Specification Regressors	(1)	(2)	(3)	(4)	(5)	(6)
WGI regulatory quality (t–1)					0.397 (0.603)	
WGI voice and accountability (t–1)					0.344 (0.429)	0.362** (0.184)
Observations	1,190	654	580	654	580	897
Pseudo-R2	0.030	0.036	0.046	0.046	0.059	0.043

Note: Dependent variable is a dummy taking the value of one in a fiscal consolidation year (zero otherwise), defined using the Hamilton-based criterion. Standard errors in parentheses. Constant term omitted. +, *, **, *** denote statistical significance at the 15, 10, 5 and 1 percent levels, respectively. Results exclude net commodity-exporting countries as these are defined in IMF (2015).

One of the most robust results for both AEs and EMLIDCs is that real exchange rate depreciations raise the probability that a country will be consolidating. This may reflect the fact that depreciations indicate a loss of international market confidence in the country's macroeconomic management, thus providing the political and economic rationale for changing current economic policies and undertaking fiscal consolidation. Surprisingly, negative terms of trade shocks appear to spur fiscal consolidation in AEs, but not in EMLIDCs. Turning to the political economy variables, we see that left-wing governments are less inclined to consolidate in EMLIDCs, although this result is sensitive to the inclusion (or exclusion) of other political variables. Political accountability increases the probability of consolidation in both AEs and EMLIDCs.

The underlying macroeconomic and political conditions that explain the onset and permanence of a consolidation episode differ between frugal and responsible consolidation years. In Tables 3–4, we inspect this by first looking at all countries and then focusing separately on these types of consolidations in AEs and EMLIDCs in the Appendix.

TABLE 3. Panel analysis: Hamilton-based fiscal consolidations, all frugal consolidations

Specification Regressors	(1)	(2)	(3)	(4)	(5)	(6)
Real GDP growth (t–1)	−0.037* (0.022)	0.018 (0.036)	0.044 (0.043)	0.028 (0.037)	0.060 (0.049)	0.031 (0.034)
Debt ratio (t–1)	−0.002 (0.005)	0.001 (0.006)	0.002 (0.006)	0.001 (0.006)	0.004 (0.006)	0.000 (0.005)
Inflation (t–1)	−0.017 (0.026)	−0.025 (0.048)	0.047 (0.036)	−0.036 (0.061)	0.055 (0.041)	0.017 (0.034)
REER growth (t–1)	−0.048*** (0.017)	−0.060** (0.025)	−0.073*** (0.027)	−0.062** (0.025)	−0.075*** (0.028)	−0.066*** (0.020)
Trade openness (t–1)	0.002 (0.002)	−0.001 (0.002)	−0.003+ (0.002)	−0.001 (0.002)	−0.004* (0.002)	−0.002 (0.002)
Terms of trade growth (t–1)	−0.002 (0.011)	−0.001 (0.025)	0.008 (0.029)	−0.002 (0.023)	0.010 (0.027)	−0.007 (0.018)
Left-wing (t–1)		−0.180 (0.322)	−0.215 (0.340)	−0.307 (0.306)	−0.323 (0.321)	

Specification Regressors	(1)	(2)	(3)	(4)	(5)	(6)
Party length in office (t–1)				−0.006 (0.011)	0.020+ (0.014)	0.007 (0.008)
Years in office (t–1)				−0.055 (0.074)	−0.082 (0.079)	
Gov. Freshness (t–1)				0.039 (0.103)	−0.063 (0.106)	
Margin of majority (t–1)				−0.070 (1.531)	0.307 (1.643)	
Control of All houses (t–1)				−0.002*** (0.000)	−0.003*** (0.000)	−0.001*** (0.000)
Vote share gov. party (t–1)				0.013 (0.011)	0.023+ (0.015)	
Horizon pca (t–1)		−0.253 (0.182)	−0.066 (0.209)			
Cohesion pca (t–1)		−0.170 (1.071)	−0.452 (1.108)			
Accountability pca (t–1)			0.623*** (0.192)			
WGI gov. effectiveness (t–1)					0.264 (0.611)	
WGI regulatory quality (t–1)					0.322 (0.786)	
WGI voice and accountability (t–1)					0.396 (0.498)	0.606*** (0.176)
Observations	684	356	307	356	307	500
Pseudo-R2	0.021	0.029	0.065	0.041	0.090	0.047

Note: Dependent variable is a dummy taking the value of one in a frugal fiscal consolidation year (zero otherwise), defined using the Hamilton-based criterion. Standard errors in parentheses. Constant term omitted. +, *, **, *** denote statistical significance at the 15, 10, 5 and 1 percent levels, respectively. Results exclude net commodity-exporting countries as these are defined in IMF (2015).

Periods with less trade openness are more likely to be consolidation periods that were not needed in AEs (Table A5 in the Appendix). As in the sample of all AE consolidation years (Table A3 in the Appendix), division in government (i.e., lack of control of all houses of government) is positively associated with more likely consolidations. This may be due to the difficulty of raising spending in good times, relative to years in which governments control all houses. In EMLIDCs (Table A6 in the Appendix), it appears that high inflation increases the probability of consolidating when consolidations are not needed, which may reflect the impact of inflation surprises on spending-to-GDP ratios and hence the CAPB. This result, however, is not robust to all specifications. Real exchange rate depreciation remains a powerful predictor of consolidations in years of frugal consolidations, as per the results for the sample of EMLIDCs (Table A4 in the Appendix).

The results focusing on responsible consolidation years are quite different from those for the frugal consolidation years, underscoring the need for separate analysis of consolidations based on whether they were needed in the first place.

TABLE 4. Panel analysis: Hamilton-based fiscal consolidations, all responsible consolidations

Specification Regressors	(1)	(2)	(3)	(4)	(5)	(6)
Real GDP growth (t–1)	−0.090** (0.037)	−0.055 (0.050)	−0.061 (0.049)	−0.071 (0.053)	−0.091* (0.051)	−0.063* (0.038)
Debt ratio (t–1)	0.007* (0.004)	0.015*** (0.005)	0.016*** (0.005)	0.016*** (0.005)	0.017*** (0.005)	0.007+ (0.005)
Inflation (t–1)	−0.103* (0.058)	−0.067 (0.059)	−0.059 (0.062)	−0.059 (0.055)	−0.066 (0.064)	−0.144** (0.066)
REER growth (t–1)	−0.060** (0.024)	−0.038 (0.028)	−0.047+ (0.031)	−0.037 (0.028)	−0.054* (0.031)	−0.071*** (0.024)
Trade openness (t–1)	0.005*** (0.002)	0.009** (0.004)	0.009** (0.004)	0.009** (0.004)	0.008** (0.004)	0.008*** (0.003)
Terms of trade growth (t–1)	0.017 (0.026)	−0.053+ (0.036)	−0.051+ (0.032)	−0.051 (0.039)	−0.061* (0.036)	−0.007 (0.025)
Left-wing (t–1)		0.068 (0.258)	0.100 (0.258)	−0.004 (0.261)	−0.136 (0.298)	
Party length in office (t–1)				−0.023 (0.036)	−0.013 (0.040)	−0.040** (0.018)
Years in office (t–1)				−0.084 (0.075)	−0.084 (0.083)	
Gov. Freshness (t–1)				0.281* (0.167)	0.293* (0.175)	
Margin of majority (t–1)				−0.296 (2.127)	−0.633 (2.386)	
Control of All houses (t–1)				−0.228 (0.434)	−0.114 (0.456)	0.005*** (0.001)
Vote share gov. party (t–1)				0.009 (0.023)	−0.009 (0.026)	
Horizon pca (t–1)		−0.448 (0.331)	−0.380 (0.326)			
Cohesion pca (t–1)		−0.101 (2.347)	−1.146 (2.454)			
Accountability pca (t–1)			−0.174 (0.268)			
WGI gov. effectiveness (t–1)					−1.489* (0.909)	
WGI regulatory quality (t–1)					0.818 (0.978)	
WGI voice and accountability (t–1)					1.000 (0.876)	0.060 (0.262)
Observations	506	298	273	298	273	397
Pseudo-R2	0.079	0.103	0.101	0.118	0.134	0.103

Note: Dependent variable is a dummy taking the value of one in a responsible fiscal consolidation year (zero otherwise), defined using the Hamilton-based criterion Standard errors in parentheses. Constant term omitted. +, *, **, *** denote statistical significance at the 15, 10, 5 and 1 percent levels, respectively. Results exclude net commodity-exporting countries as these are defined in IMF (2015).

In frugal AE consolidations (Table A5), low growth does not increase the probability of an adjustment. Responsible AE consolidation years (i.e., years in which the undertaken consolidations were needed), however, appear to occur because of "bad times", as indicated by the negative coefficients for economic growth, adverse changes in the terms of trade, and a positive coefficient for the debt to GDP ratio (Table A7 in the Appendix). Fiscal adjustment appears to be positively associated with changes in government (a positive coefficient for government freshness, negative for length of time in office). A high margin of majority is not associated, however, with more likely consolidations—in fact, a high majority margin reduces the probability of consolidation, controlling for all other factors. In EMLIDC (Table A8 in the Appendix), the economic determinants of responsible consolidation years are very different from those of responsible AE consolidations. Needed consolidation in these countries is much more likely to take place in good times—when growth is high, countries experience positive terms of trade shocks, and inflation is low. High debt remains a significant determinant of consolidation. The story regarding political variables is complex. Unlike AEs, EMLIDC governments that have been in power longer are more likely to consolidate when they need to, and a high margin of majority is associated with fiscal consolidation. Some degree of political competition between parties raises the probability of responsible consolidation years occurring, given the negative coefficient on years of power of the incumbent political party.

An additional issue of interest is whether the determinants of consolidations differ based on whether these are implemented as expenditure-based fiscal adjustments (where 2/3 of the adjustment in the CAPB or more is undertaken on the expenditure side) or tax-based ones (where adjustment is undertaken while expenditure rises). Tables 5a and 5b suggest that expenditure-based adjustments are more likely where governments are more fractured but still accountable, given the negative coefficient of the variable for control of all houses and positive coefficients of the "accountability" PCA. For tax-based consolidations, on the other hand, control of all houses of government boosts the probability of undertaking consolidation, as does having a less "fresh" government. For these fiscal adjustments, political cohesion increases the chance of fiscal consolidation occurrence, while there is no association with higher accountability. These results suggest that tax-based consolidations may be politically more challenging, as they appear to be accompanied by more unanimity across government than those based on expenditure cuts.

TABLE 5A. Panel analysis: Hamilton-based fiscal consolidations—expenditure based

Specification Regressors	(1)	(2)	(3)	(4)	(5)	(6)
Real GDP growth (t–1)	−0.022 (0.039)	0.005 (0.035)	0.027 (0.039)	0.006 (0.036)	0.025 (0.043)	−0.014 (0.045)
Debt ratio (t–1)	0.001 (0.006)	0.004 (0.007)	0.005 (0.007)	0.003 (0.007)	0.005 (0.007)	0.000 (0.007)
Inflation (t–1)	−0.082+ (0.057)	−0.105+ (0.072)	−0.047 (0.073)	−0.132* (0.069)	−0.053 (0.070)	−0.080 (0.076)
REER growth (t–1)	−0.078*** (0.020)	−0.095*** (0.034)	−0.103*** (0.034)	−0.099*** (0.034)	−0.103*** (0.032)	−0.086*** (0.023)
Trade openness (t–1)	0.005** (0.002)	0.004+ (0.003)	0.003 (0.003)	0.004+ (0.003)	0.002 (0.003)	0.003 (0.003)
Terms of trade growth (t–1)	0.003 (0.011)	0.021 (0.029)	0.038 (0.030)	0.014 (0.024)	0.025 (0.023)	0.009 (0.013)
Left-wing (t–1)		−0.281 (0.428)	−0.217 (0.432)	−0.395 (0.442)	−0.331 (0.435)	
Party length in office (t–1)				0.016 (0.014)	0.039* (0.023)	0.020 (0.020)
Years in office (t–1)				−0.102+ (0.065)	−0.136* (0.073)	
Gov. Freshness (t–1)				0.151 (0.110)	0.122 (0.109)	
Margin of majority (t–1)				−0.222 (1.580)	0.878 (2.012)	
Control of All houses (t–1)				−0.003*** (0.000)	−0.004*** (0.001)	−0.002*** (0.000)
Vote share gov. party (t–1)				0.016 (0.013)	0.022 (0.018)	
Horizon pca (t–1)		−0.112 (0.289)	0.001 (0.326)			
Cohesion pca (t–1)		−1.375 (1.212)	−1.556 (1.118)			
Accountability pca (t–1)			0.569* (0.342)			
WGI gov. effectiveness (t–1)					−0.371 (0.739)	
WGI regulatory quality (t–1)					0.976 (0.925)	
WGI voice and accountability (t–1)					0.433 (0.787)	0.624* (0.368)
Observations	1,190	654	580	654	580	897
Pseudo-R2	0.051	0.073	0.084	0.094	0.118	0.083

Note: Dependent variable is a dummy taking the value of one in an expenditure-based fiscal consolidation year (zero otherwise), defined using the Hamilton-based criterion. Standard errors in parentheses. Constant term omitted. +, *, **, *** denote statistical significance at the 15, 10, 5 and 1 percent levels, respectively. Results exclude net commodity-exporting countries as these are defined in IMF (2015).

TABLE 5B. Panel analysis: Hamilton-based fiscal consolidations—tax-based

Specification Regressors	(1)	(2)	(3)	(4)	(5)	(6)
Real GDP growth (t–1)	−0.003 (0.051)	0.070 (0.073)	0.059 (0.060)	0.097 (0.083)	0.117* (0.071)	0.041 (0.044)
Debt ratio (t–1)	−0.012 (0.013)	−0.030** (0.014)	−0.032** (0.016)	−0.036** (0.018)	−0.038** (0.018)	−0.008 (0.016)
Inflation (t–1)	0.034 (0.025)	−0.000 (0.050)	−0.041 (0.119)	−0.041 (0.100)	−0.019 (0.156)	−0.004 (0.057)
REER growth (t–1)	−0.000 (0.031)	−0.001 (0.047)	−0.014 (0.052)	−0.013 (0.049)	−0.014 (0.055)	−0.031 (0.027)
Trade openness (t–1)	0.002 (0.003)	−0.000 (0.005)	0.001 (0.005)	−0.001 (0.004)	0.001 (0.007)	0.002 (0.005)
Terms of trade growth (t–1)	−0.002 (0.019)	0.027 (0.029)	0.029 (0.034)	0.027 (0.033)	0.046 (0.040)	−0.010 (0.020)
Left-wing (t–1)		−1.376* (0.786)	−1.472+ (0.934)	−0.999 (0.900)	−1.331 (1.013)	
Party length in office (t–1)				−0.016 (0.024)	−0.032 (0.037)	−0.067* (0.037)
Years in office (t–1)				−0.079 (0.176)	−0.233 (0.206)	
Gov. Freshness (t–1)				−0.381** (0.185)	−0.312+ (0.205)	
Margin of majority (t–1)				−3.557 (4.775)	−2.455 (4.207)	
Control of All houses (t–1)				1.866** (0.775)	1.792* (0.965)	0.285 (0.784)
Vote share gov. party (t–1)				0.022 (0.031)	0.043+ (0.028)	
Horizon pca (t–1)		−0.647 (0.781)	−1.353 (1.035)			
Cohesion pca (t–1)		5.821 (4.341)	8.488* (4.363)			
Accountability pca (t–1)			−0.573 (0.553)			
WGI gov. effectiveness (t–1)					0.895 (1.177)	
WGI regulatory quality (t–1)					−0.694 (1.596)	
WGI voice and accountability (t–1)					−0.898 (1.405)	−0.669+ (0.458)
Observations	1,190	654	580	654	580	897
Pseudo-R2	0.023	0.107	0.159	0.191	0.238	0.061

Note: Dependent variable is a dummy taking the value of one in a tax-based consolidation year (zero otherwise), defined using the Hamilton-based criterion. Standard errors in parentheses. Constant term omitted. +, *, **, *** denote statistical significance at the 15, 10, 5 and 1 percent levels, respectively. Results exclude net commodity-exporting countries as these are defined in IMF (2015).

5.2 Determinants of fiscal consolidations—cross-sectional analysis

We also examined the characteristics of countries that already entered a fiscal consolidation episode by looking at cross-sectional data on fiscal consolidation episodes in the sample. Because the unit of observation is the individual episode, rather than years in which consolidation may or may not have been undertaken, the resulting samples are smaller. To save on degrees of freedom, we use only the PCA measures for our analysis of political economy variables, instead of looking at the effects of the constituent political economy variables separately. Additionally, with fewer observations, we are not able to disaggregate countries into as many categories as in the panel regression analysis.

The results indicate that for EMLIDCs as a whole, high debt ratios do not precede fiscal adjustment (Table 6). In fact, EMLIDC adjustments are preceded by low levels of debt. This may reflect the fact that countries that manage fiscal policy well, and have low levels of debt relative to GDP, are also opportunistic in engaging in fiscal consolidation when they can. High inflation prior to the consolidation raises the probability of a fiscal adjustment in EMLIDCs, suggesting that countries may find it an easier task to reduce government spending in real terms when inflation is high. These results on inflation are consistent with the panel regressions for frugal EMLIDC consolidation years. High levels of political cohesion in the pre-consolidation period also tend to make consolidation more likely.

TABLE 6. Cross-sectional analysis: Hamilton-based fiscal consolidations— emerging markets and low-income developing countries

Specification Income Group Regressors	(1)	(2)
Real GDP growth (t–1)	0.051+	0.100+
	(0.035)	(0.065)
Debt ratio (t–1)	−0.034***	−0.036**
	(0.011)	(0.016)
Inflation (t–1)	0.230***	0.140*
	(0.086)	(0.079)
REER growth (t–1)	−0.020	−0.014
	(0.034)	(0.036)
Trade openness (t–1)	−0.013***	−0.011+
	(0.005)	(0.007)
Terms of trade growth (t–1)	0.023	−0.014
	(0.055)	(0.051)
Left-wing (t–1)		0.084
		(0.777)
Horizon pca (t–1)		0.245
		(0.571)
Cohesion pca (t–1)		9.792**
		(4.491)
Observations	104	62
Pseudo-R2	0.246	0.271

Note: Dependent variable is a dummy taking the value of one if the fiscal consolidation occurs in an EMLIDC (zero otherwise), defined using the Hamilton-based criterion. Standard errors in parentheses. Constant term omitted. +, *, **, *** denote statistical significance at the 15, 10, 5 and 1 percent levels, respectively. Results exclude net commodity-exporting countries as these are defined in IMF (2015).

We also assess the factors associated with entering a fiscal consolidation episode when the episode was needed (Table 7). The results indicate that "bad times"—low GDP growth, high public debt, and negative shocks to the terms of trade —motivate fiscal consolidation that is needed. These results mirror those for the panel econometric analysis of responsible consolidation years. Low inflation prior to the consolidations increases the chances of entering a consolidation, which is consistent with the low growth experienced in years before the consolidation episode begins. One salient result from the analysis is that responsible adjustments are more likely to be preceded by left-wing governments being in power. This result differs from the one found in the panel analysis, where left wing governments were found to be negatively (or insignificantly) associated with the probability of a responsible year of fiscal adjustment.

TABLE 7. Cross-sectional analysis: Hamilton-based fiscal consolidations—responsible consolidations

Specification Type Regressors	(1)	(2)	(3)
Real GDP growth (t–1)	−0.464***	−0.977***	−1.352***
	(0.098)	(0.344)	(0.336)
Debt ratio (t–1)	0.026+	0.044***	0.049***
	(0.016)	(0.016)	(0.016)
Inflation (t–1)	−0.243***	−0.385**	−0.440***
	(0.085)	(0.186)	(0.128)
REER growth (t–1)	−0.078+	−0.027	0.111
	(0.050)	(0.067)	(0.129)
Trade openness (t–1)	0.002	0.010	0.004
	(0.004)	(0.007)	(0.011)
Terms of trade growth (t–1)	−0.135**	−0.433*	−0.603***
	(0.062)	(0.235)	(0.231)
Left-wing (t–1)		1.841**	3.805**
		(0.930)	(1.682)
Horizon pca (t–1)		−1.074	−1.159+
		(1.142)	(0.740)
Cohesion pca (t–1)		−15.931*	−9.331
		(9.574)	(8.519)
Accountability pca (t–1)			−0.527
			(0.821)
Observations	104	62	60
Pseudo-R2	0.443	0.685	0.690

Note: Dependent variable is a dummy taking the value of one for responsible fiscal consolidations (zero otherwise), defined using the Hamilton-based criterion. Standard errors in parentheses. Constant term omitted. +, *, **, *** denote statistical significance at the 15, 10, 5 and 1 percent levels, respectively. Results exclude net commodity-exporting countries as these are defined in IMF (2015).

We also examined whether the probability of starting an adjustment episode differed if the adjustment was based primarily on expenditure cuts or tax increases. Table A9 in the Appendix suggests that it is difficult to identify economic or political characteristics of countries that undertake expenditure-based consolidations, given that the coefficients on most of our explanatory variables are statistically insignificant at standard significance levels (columns 1–3). The exception is the terms of trade variable, with positive developments in the terms of trade raising the chances of spending-based consolidations. On the tax side, high initial levels of public debt and political cohesion raise the probability of these consolidations happening. This last result is consistent with the panel analysis.

TABLE 8. Cross-sectional analysis: Hamilton-based fiscal consolidations—the role of fiscal rules

Specification	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Sample			AE					EMLIDC		
Regressors										
Real GDP growth (t−1)	0.005	0.014	0.037	0.021	0.018	−0.005	−0.014	−0.037	−0.021	−0.018
	(0.038)	(0.037)	(0.038)	(0.042)	(0.036)	(0.038)	(0.037)	(0.038)	(0.042)	(0.036)
Debt ratio (t−1)	0.040***	0.040***	0.047***	0.041***	0.048***	−0.040***	−0.040***	−0.047***	−0.041***	−0.048***
	(0.015)	(0.014)	(0.015)	(0.015)	(0.016)	(0.015)	(0.014)	(0.015)	(0.015)	(0.016)
Inflation (t−1)	−0.091	−0.141*	−0.086	−0.114	−0.162+	0.091	0.141*	0.086	0.114	0.162+
	(0.097)	(0.086)	(0.089)	(0.085)	(0.109)	(0.097)	(0.086)	(0.089)	(0.085)	(0.109)
REER growth (t−1)	0.029	0.008	0.012	0.020	0.014	−0.029	−0.008	−0.012	−0.020	−0.014
	(0.030)	(0.028)	(0.028)	(0.027)	(0.034)	(0.030)	(0.028)	(0.028)	(0.027)	(0.034)
Trade openness (t−1)	0.002	0.004	0.001	0.003	0.004	−0.002	−0.004	−0.001	−0.003	−0.004
	(0.007)	(0.008)	(0.008)	(0.008)	(0.007)	(0.007)	(0.008)	(0.008)	(0.008)	(0.007)
Terms of trade growth (t−1)	−0.045	−0.045	−0.022	−0.034	−0.038	0.045	0.045	0.022	0.034	0.038
	(0.064)	(0.072)	(0.075)	(0.071)	(0.070)	(0.064)	(0.072)	(0.075)	(0.071)	(0.070)
Left-wing (t−1)										
Horizon pca (t−1)										
Cohesion pca (t−1)										
Accountability pca (t−1)										
ER (t−1)	1.935**				1.413+	−1.935**				−1.413+
	(0.837)				(0.996)	(0.837)				(0.996)
RR (t−1)		−			−		−			−
BBR (t−1)			1.885***		3.268***			−1.885***		−3.268***
			(0.709)		(1.058)			(0.709)		(1.058)
DR (t−1)				0.578	−2.538**				−0.578	2.538**
				(0.747)	(1.039)				(0.747)	(1.039)
Observations	75	71	75	75	71	75	71	75	75	71
Pseudo-R2	0.284	0.206	0.272	0.207	0.345	0.284	0.206	0.272	0.207	0.345

Note: Dependent variable is a dummy taking the value of one for responsible fiscal consolidations (zero otherwise), defined using the Hamilton-based criterion. Standard errors in parentheses. Constant term omitted. +, *, **, *** denote statistical significance at the 15, 10, 5 and 1 percent levels, respectively. Results exclude net commodity-exporting countries as these are defined in IMF (2015).

Finally, we explore the role of fiscal rules in the cross-sectional dataset.[20] Looking at Table 8, some key messages emerge. First, episodes in AEs are more likely to have been preceded by the presence of an ER and BBR (but not a DR), likely pointing to the fact that ERs and BBRs in AEs have been designed to accommodate potentially necessary fiscal adjustment. The opposite holds for EMLIDC episodes, which may reflect the fact that the absence of fiscal rules raises the need for more frequent *ad hoc* fiscal consolidations. In terms of composition,[21] expenditure-based consolidation episodes are more likely to have been preceded by the presence of an ER and BBR (but not an RR; results for the DR are not significant). No clear results emerge from the specifications including mixed and tax-based episodes. The same applies to the exercises examining "frugal" and "responsible" episodes.

6. Conclusion and policy implications

We construct a novel database covering more than 450 fiscal consolidation episodes in 185 countries during the period 1979–2019. Using discrete choice models, we also examine the (broader macroeconomic and political) factors motivating these fiscal consolidation episodes. Our results suggest a complex landscape in assessing whether (and when) countries undertake fiscal adjustment. Among the most salient results are the following:

- The factors that influence whether a country finds itself in a year of fiscal adjustment (based on the results of the panel econometric analysis) vary between adjustments that are needed ("responsible" consolidations) and those that are not needed ("frugal" consolidations). Responsible AE consolidations appear more likely during "bad times", when there is negative economic growth, a decline in the terms of trade, a weakening of the real exchange rate, and a high public debt-to-GDP ratio. The cross-sectional analysis confirms that "bad times"—low GDP growth, high public debt, and negative shocks to the terms of trade—motivate fiscal consolidation for the overall sample.

- In EMLIDCs, the economic determinants of responsible consolidations are different from those in AEs. Consolidation is more likely to take place in "good times"—when growth is high, countries experience positive terms of trade shocks, and inflation is low. This could be attributable to policymakers' concern for the poor against the background of inadequate mechanisms to shield economically vulnerable segments of the population during fiscal consolidations. High debt remains a significant determinant of consolidation, as these countries have limited access to financial markets *vis-à-vis* AEs.

- The role of politics varies across country groups. When consolidations are needed in AEs, new governments have a greater chance of implementing them. In EMLIDCs, unlike AEs, governments that have been in power longer are more likely to consolidate, and a high margin of majority is positively associated with the occurrence of fiscal consolidation.

20 Doing so for the panel dataset yields less clear messages based on the specifications including all countries, AEs and EMLIDCs. Results are available upon request.
21 These results are also available upon request.

Some degree of political competition between parties raises the probability of undertaking consolidation.

- Tax-based consolidations may be politically more challenging to implement than those based on lower expenditures, as they appear to require more unanimity across government. This is true for all country groups.

- Fiscal consolidations in AEs as well as expenditure-based consolidations are relatively more likely to have been preceded by fiscal rules. The opposite seems to be the case regarding EMLIDC consolidations.

The results have important implications for policymakers in the post-COVID-19 environment, where many countries are faced with high debt-to-GDP ratios and high (and rising) costs of debt service. AEs have historically shown an ability to implement fiscal consolidation even during "bad times"—which they undoubtedly are in now with a slowing world economy and rising food and energy costs. Unlike EMLIDCs, AEs are not faced with imminent financing constraints. At the same time, rising interest rates and debt service, as well as expanded provision of subsidies to offset higher energy costs, are likely to exert pressure on other spending items. These developments suggest that fiscal tightening will be needed in these countries in the foreseeable future. With limited external financing and many countries already in debt distress, EMLIDCs have no alternative but to implement fiscal tightening. Our results suggest that EMLIDCs with stable governments which have been in power for a long period should be able to consolidate. Within this group, several EMLIDCs will need restructuring of their debt obligations before they are able to tighten their budgets. Otherwise, the burden of adjustment on the middle classes and poor in these countries will be economically and politically unsustainable. The results of this paper also have important bearing on the design of IMF-supported programs, which many EMLIDCs will need to enter into in the coming years.

Future work could consider extending the framework presented in this paper by conducting a duration analysis of the consolidation episodes as well as the factors—including fiscal rules—that help extend these episodes over several years. In addition, the consolidation episode dataset could be used to examine determinants of successful fiscal consolidation episodes, for example, in terms of reduced public debt ratios, and what types of adjustment (expenditure- or tax-based) are more likely to ensure fiscal consolidation "success." Finally, one could also further assess the distributional impact of fiscal consolidations.

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Appendix

TABLE A1. Factor loadings and uniqueness

Variables	Factors			Uniqueness
	Proximity	Cohesion	Accountability	
party of chief executive more time in office	0.59			0.29
years in office	0.59			0.29
years left in current term	0.002			0.002
margin of majority		0.41		0.26
control of all houses		0.38		0.35
cabinet strength proxied by voting share		0.40		0.29
government effectiveness			0.36	0.08
regulatory quality			0.37	0.07
voice and accountability			0.34	0.22
percentage explained	**0.47**	**0.68**	**0.88**	

TABLE A2. Summary of political composite (PCA-based) variables

Concept	Average	Standard Deviation	Variables
Proximity	0	1	party of chief executive more time in office years in office years left in current term
Cohesion	0	1	margin of majority cabinet strength proxied by voting share control of all houses
Accountability	0	1	voice and accountability regulatory quality government effectiveness

TABLE A3. Panel analysis: Hamilton-based fiscal consolidations, advanced economies

Specification Regressors	(1)	(2)	(3)	(4)	(5)	(6)
Real GDP growth (t–1)	−0.024 (0.039)	−0.005 (0.041)	0.014 (0.042)	−0.013 (0.044)	0.006 (0.045)	−0.001 (0.040)
Debt ratio (t–1)	0.004 (0.004)	0.005 (0.005)	0.009+ (0.006)	0.005 (0.005)	0.011** (0.005)	0.006 (0.005)
Inflation (t–1)	−0.087 (0.085)	−0.109 (0.100)	−0.067 (0.092)	−0.106 (0.103)	−0.052 (0.100)	−0.056 (0.078)
REER growth (t–1)	−0.047*** (0.018)	−0.034* (0.020)	−0.039** (0.020)	−0.036** (0.018)	−0.042** (0.020)	−0.049*** (0.017)
Trade openness (t–1)	0.001 (0.002)	0.000 (0.002)	0.000 (0.002)	0.001 (0.002)	0.000 (0.002)	−0.001 (0.002)
Terms of trade growth (t–1)	−0.048+ (0.031)	−0.047 (0.034)	−0.049* (0.028)	−0.049+ (0.031)	−0.055** (0.027)	−0.044* (0.027)

Specification Regressors	(1)	(2)	(3)	(4)	(5)	(6)
Left-wing (t–1)		0.154 (0.189)	0.254 (0.213)	0.043 (0.217)	0.094 (0.241)	
Party length in office (t–1)				0.015 (0.027)	0.013 (0.031)	−0.018 (0.024)
Years in office (t–1)				−0.090+ (0.061)	−0.103* (0.063)	
Gov. Freshness (t–1)				0.181+ (0.113)	0.174+ (0.121)	
Margin of majority (t–1)				−0.881 (1.663)	−1.961 (1.709)	
Control of All houses (t–1)				−0.002*** (0.000)	−0.002*** (0.001)	−0.001*** (0.000)
Vote share gov. party (t–1)				0.007 (0.020)	0.006 (0.021)	
Horizon pca (t–1)		−0.137 (0.309)	−0.235 (0.342)			
Cohesion pca (t–1)		−1.015 (0.966)	−1.049 (1.008)			
Accountability pca (t–1)			0.784* (0.466)			
WGI gov. effectiveness (t–1)					−0.308 (0.812)	
WGI regulatory quality (t–1)					0.986 (0.947)	
WGI voice and accountability (t–1)					0.592 (1.237)	1.085* (0.650)
Observations	506	396	368	396	368	438
Pseudo-R2	0.028	0.026	0.036	0.038	0.056	0.040

Note: Dependent variable is a dummy taking the value of one in an AE fiscal consolidation year (zero otherwise), defined using the Hamilton-based criterion. Standard errors in parentheses. Constant term omitted. Country and time fixed effects are omitted for reasons of parsimony. +, *, **, *** denote statistical significance at the 15, 10, 5 and 1 percent levels, respectively. Results exclude net commodity-exporting countries as these are defined in IMF (2015).

TABLE A4. Panel analysis: Hamilton-based fiscal consolidations, emerging markets and low-income developing countries

Specification Regressors	(1)	(2)	(3)	(4)	(5)	(6)
Real GDP growth (t–1)	−0.050* (0.026)	0.072 (0.057)	0.061 (0.054)	0.071 (0.061)	0.071 (0.066)	0.011 (0.038)
Debt ratio (t–1)	−0.005 (0.006)	0.013+ (0.008)	0.016* (0.009)	0.015+ (0.009)	0.016 (0.013)	−0.001 (0.007)
Inflation (t–1)	−0.004 (0.021)	0.012 (0.040)	0.074** (0.037)	0.005 (0.053)	0.080** (0.039)	0.002 (0.039)
REER growth (t–1)	−0.061*** (0.020)	−0.091*** (0.028)	−0.100*** (0.036)	−0.090*** (0.028)	−0.106*** (0.034)	−0.081*** (0.021)
Trade openness (t–1)	0.008*** (0.003)	0.011* (0.007)	0.013+ (0.008)	0.012* (0.006)	0.014+ (0.010)	0.009** (0.004)

Specification Regressors	(1)	(2)	(3)	(4)	(5)	(6)
Terms of trade growth (t–1)	0.009 (0.009)	−0.002 (0.023)	0.011 (0.023)	0.001 (0.021)	0.013 (0.028)	0.003 (0.010)
Left-wing (t–1)		−0.622+ (0.443)	−0.995** (0.501)	−0.619 (0.526)	−0.919+ (0.636)	
Party length in office (t–1)				−0.001 (0.013)	0.024 (0.018)	−0.002 (0.011)
Years in office (t–1)				−0.057 (0.123)	0.012 (0.134)	
Gov. Freshness (t–1)				−0.019 (0.119)	−0.196* (0.120)	
Margin of majority (t–1)				0.782 (2.063)	0.462 (1.851)	
Control of All houses (t–1)				−0.261 (0.414)	−0.132 (0.748)	−0.165 (0.325)
Vote share gov. party (t–1)				0.008 (0.019)	−0.007 (0.025)	
Horizon pca (t–1)		−0.160 (0.293)	0.242 (0.309)			
Cohesion pca (t–1)		0.402 (1.571)	−1.505 (1.397)			
Accountability pca (t–1)			0.752** (0.364)			
WGI gov. effectiveness (t–1)					0.299 (1.219)	
WGI regulatory quality (t–1)					0.173 (1.416)	
WGI voice and accountability (t–1)					0.593 (0.658)	0.301 (0.318)
Observations	684	258	212	258	212	459
Pseudo-R2	0.045	0.102	0.146	0.107		0.059

Note: Dependent variable is a dummy taking the value of one in an EMLIDC consolidation year (zero otherwise), defined using the Hamilton-based criterion. Standard errors in parentheses. Constant term omitted. Country and time fixed effects are omitted for reasons of parsimony. +, *, **, *** denote statistical significance at the 15, 10, 5 and 1 percent levels, respectively. Results exclude net commodity-exporting countries as these are defined in IMF (2015).

TABLE A5. Panel analysis: Hamilton-based fiscal consolidations, AE frugal consolidations

Specification Regressors	(1)	(2)	(3)	(4)	(5)	(6)
Real GDP growth (t–1)	0.047 (0.038)	0.047 (0.042)	0.079+ (0.052)	0.041 (0.044)	0.062 (0.055)	0.113* (0.062)
Debt ratio (t–1)	−0.001 (0.007)	−0.008 (0.006)	−0.002 (0.007)	−0.009+ (0.006)	0.000 (0.007)	0.004 (0.006)
Inflation (t–1)	−0.158 (0.128)	−0.379** (0.159)	−0.256 (0.190)	−0.419** (0.182)	−0.275 (0.208)	−0.110 (0.141)
REER growth (t–1)	−0.027 (0.020)	−0.018 (0.028)	−0.025 (0.033)	−0.019 (0.029)	−0.023 (0.034)	−0.035 (0.028)
Trade openness (t–1)	−0.001 (0.003)	−0.005** (0.002)	−0.004* (0.003)	−0.006** (0.002)	−0.005* (0.003)	−0.005* (0.003)
Terms of trade growth (t–1)	−0.014 (0.048)	0.025 (0.054)	−0.004 (0.058)	0.023 (0.051)	−0.011 (0.053)	−0.031 (0.057)
Left-wing (t–1)		0.319 (0.278)	0.335 (0.286)	0.120 (0.319)	0.158 (0.257)	
Party length in office (t–1)				0.023 (0.035)	0.015 (0.039)	−0.009 (0.036)
Years in office (t–1)				−0.058 (0.063)	−0.072 (0.077)	
Gov. Freshness (t–1)				−0.100 (0.142)	−0.151 (0.144)	
Margin of majority (t–1)				1.258 (2.491)	0.463 (2.508)	
Control of All houses (t–1)				−0.002*** (0.001)	−0.002*** (0.001)	−0.002*** (0.001)
Vote share gov. party (t–1)				0.033+ (0.021)	0.040* (0.024)	
Horizon pca (t–1)		0.012 (0.487)	−0.133 (0.518)			
Cohesion pca (t–1)		−0.205 (0.904)	−0.474 (1.002)			
Accountability pca (t–1)			0.950+ (0.616)			
WGI gov. effectiveness (t–1)					0.634 (0.949)	
WGI regulatory quality (t–1)					1.123 (1.125)	
WGI voice and accountability (t–1)					−0.548 (1.529)	1.768** (0.870)
Observations	255	201	188	201	188	217
Pseudo-R2	0.013	0.055	0.067	0.078	0.100	0.071

Note: Dependent variable is a dummy taking the value of one in a frugal AE fiscal consolidation year (zero otherwise), defined using the Hamilton-based criterion. Standard errors in parentheses. Constant term omitted. +, *, **, *** denote statistical significance at the 15, 10, 5 and 1 percent levels, respectively. Results exclude net commodity-exporting countries as these are defined in IMF (2015).

TABLE A6. Panel analysis: Hamilton-based fiscal consolidations, frugal consolidations (emerging markets and low-income developing countries)

Specification Regressors	(1)	(2)	(3)	(4)	(5)	(6)
Real GDP growth (t–1)	−0.053** (0.027)	0.134+ (0.095)	0.127 (0.110)	0.130 (0.107)	0.127 (0.158)	0.009 (0.042)
Debt ratio (t–1)	−0.008+ (0.006)	0.012 (0.013)	0.015 (0.016)	0.010 (0.017)	0.014 (0.027)	−0.007 (0.009)
Inflation (t–1)	0.003 (0.020)	0.023 (0.049)	0.092** (0.041)	0.032 (0.059)	0.167*** (0.057)	0.030 (0.028)
REER growth (t–1)	−0.072*** (0.022)	−0.131*** (0.030)	−0.144*** (0.043)	−0.140*** (0.036)	−0.164*** (0.056)	−0.097*** (0.031)
Trade openness (t–1)	0.009*** (0.003)	0.004 (0.010)	0.006 (0.014)	0.001 (0.012)	0.005 (0.016)	0.008+ (0.005)
Terms of trade growth (t–1)	−0.001 (0.011)	−0.012 (0.036)	0.006 (0.038)	−0.014 (0.033)	0.009 (0.055)	−0.006 (0.017)
Left-wing (t–1)		−0.803+ (0.557)	−1.420** (0.672)	−0.652 (0.751)	−1.061 (0.954)	
Party length in office (t–1)				−0.010 (0.022)	0.022 (0.029)	0.005 (0.008)
Years in office (t–1)				−0.025 (0.163)	0.044 (0.223)	
Gov. Freshness (t–1)				0.019 (0.175)	−0.368+ (0.240)	
Margin of majority (t–1)				−0.564 (3.131)	−3.294 (3.153)	
Control of All houses (t–1)				0.896 (0.729)	2.107* (1.133)	0.021 (0.421)
Vote share gov. party (t–1)				0.003 (0.025)	−0.018 (0.037)	
Horizon pca (t–1)		−0.065 (0.306)	0.352 (0.402)			
Cohesion pca (t–1)		1.078 (1.914)	−0.483 (1.932)			
Accountability pca (t–1)			0.824 (0.756)			
WGI gov. effectiveness (t–1)					1.305 (1.597)	
WGI regulatory quality (t–1)					−0.704 (1.939)	
WGI voice and accountability (t–1)					0.624 (0.967)	0.382 (0.346)
Observations	429	155	119	155	119	283
Pseudo-R2	0.058	0.123	0.221	0.132	0.275	0.076

Note: Dependent variable is a dummy taking the value of one in a frugal EMLIDC consolidation year (zero otherwise), defined using the Hamilton-based criterion. Standard errors in parentheses. Constant term omitted. +, *, **, *** denote statistical significance at the 15, 10, 5 and 1 percent levels, respectively. Results exclude net commodity-exporting countries as these are defined in IMF (2015).

TABLE A7. Panel analysis: Hamilton-based fiscal consolidations, AE responsible consolidations

Specification Regressors	(1)	(2)	(3)	(4)	(5)	(6)
Real GDP growth (t–1)	−0.151*** (0.048)	−0.108* (0.057)	−0.098* (0.058)	−0.143** (0.061)	−0.127* (0.067)	−0.142*** (0.048)
Debt ratio (t–1)	0.009+ (0.006)	0.018** (0.008)	0.018** (0.009)	0.021*** (0.008)	0.029*** (0.009)	0.008 (0.006)
Inflation (t–1)	−0.045 (0.065)	−0.037 (0.080)	−0.038 (0.083)	0.011 (0.087)	0.013 (0.102)	−0.036 (0.071)
REER growth (t–1)	−0.070*** (0.023)	−0.040 (0.030)	−0.050+ (0.032)	−0.035 (0.032)	−0.057 (0.041)	−0.075*** (0.027)
Trade openness (t–1)	0.006*** (0.002)	0.009** (0.004)	0.009** (0.004)	0.010** (0.004)	0.009** (0.004)	0.007** (0.003)
Terms of trade growth (t–1)	−0.076** (0.035)	−0.105*** (0.038)	−0.089** (0.037)	−0.140*** (0.045)	−0.139*** (0.045)	−0.062** (0.031)
Left-wing (t–1)		0.340 (0.406)	0.311 (0.403)	0.258 (0.463)	0.220 (0.516)	
Party length in office (t–1)				0.022 (0.038)	0.008 (0.047)	−0.015 (0.037)
Years in office (t–1)				−0.165+ (0.109)	−0.191* (0.106)	
Gov. Freshness (t–1)				0.509** (0.232)	0.581** (0.243)	
Margin of majority (t–1)				−6.711* (3.924)	−8.390** (3.638)	
Control of All houses (t–1)				0.297 (0.685)	0.353 (0.688)	0.006** (0.003)
Vote share gov. party (t–1)				−0.021 (0.039)	−0.038 (0.039)	
Horizon pca (t–1)		0.072 (0.522)	0.074 (0.589)			
Cohesion pca (t–1)		−3.773 (4.474)	−3.985 (4.700)			
Accountability pca (t–1)			−0.113 (0.661)			
WGI gov. effectiveness (t–1)					−2.031 (1.445)	
WGI regulatory quality (t–1)					1.801 (1.875)	
WGI voice and accountability (t–1)					1.902 (1.967)	−0.060 (0.765)
Observations	251	195	180	195	180	221
Pseudo-R2	0.110	0.136	0.130	0.203	0.234	0.106

Note: Dependent variable is a dummy taking the value of one in a responsible AE fiscal consolidation year (zero otherwise), defined using the Hamilton-based criterion. Standard errors in parentheses. Constant term omitted. +, *, **, *** denote statistical significance at the 15, 10, 5 and 1 percent levels, respectively. Results exclude net commodity-exporting countries as these are defined in IMF (2015).

TABLE A8. Panel analysis: Hamilton-based fiscal consolidations, responsible consolidations (emerging markets and low-income developing countries)

Specification Regressors	(1)	(2)	(3)	(4)	(5)	(6)
Real GDP growth (t–1)	−0.090+ (0.062)	0.137*** (0.043)	0.137** (0.057)	0.012 (0.041)	0.026 (0.045)	0.013 (0.098)
Debt ratio (t–1)	−0.008 (0.010)	0.022*** (0.007)	0.019** (0.009)	0.048*** (0.010)	0.048*** (0.015)	0.011* (0.006)
Inflation (t–1)	−0.214*** (0.079)	−0.298** (0.127)	−0.282** (0.138)	−0.279*** (0.108)	−0.289* (0.158)	−0.327*** (0.102)
REER growth (t–1)	−0.007 (0.042)	−0.018 (0.061)	−0.008 (0.060)	0.007 (0.049)	0.013 (0.054)	−0.030 (0.041)
Trade openness (t–1)	0.010** (0.004)	0.024* (0.013)	0.022* (0.014)	0.024** (0.010)	0.030** (0.013)	0.019** (0.008)
Terms of trade growth (t–1)	0.109*** (0.036)	0.098* (0.059)	0.090+ (0.058)	0.110* (0.068)	0.112* (0.069)	0.093** (0.043)
Left-wing (t–1)		0.165 (0.513)	0.071 (0.702)	0.259 (0.575)	0.150 (0.830)	
Party length in office (t–1)				−0.350** (0.139)	−0.453*** (0.161)	−0.063*** (0.024)
Years in office (t–1)				0.091 (0.163)	0.318* (0.171)	
Gov. Freshness (t–1)				−0.227** (0.115)	−0.394*** (0.147)	
Margin of majority (t–1)				6.747*** (2.230)	8.168*** (3.025)	
Control of All houses (t–1)				−2.120*** (0.672)	−2.498*** (0.844)	−0.568 (0.458)
Vote share gov. party (t–1)				0.029 (0.023)	0.028 (0.030)	
Horizon pca (t–1)		−1.937+ (1.260)	−1.371 (1.116)			
Cohesion pca (t–1)		4.117+ (2.865)	3.757 (3.645)			
Accountability pca (t–1)			0.522 (0.577)			
WGI gov. effectiveness (t–1)					0.970 (1.423)	
WGI regulatory quality (t–1)					−0.059 (1.505)	
WGI voice and accountability (t–1)					0.298 (1.029)	0.016 (0.553)
Observations	255	103	93	103	93	176
Pseudo-R2	0.113	0.212	0.173	0.281	0.269	0.191

Note: Dependent variable is a dummy taking the value of one in a responsible EMLIDC consolidation year (zero otherwise), defined using the Hamilton-based criterion. Standard errors in parentheses. Constant term omitted. +, *, **, *** denote statistical significance at the 15, 10, 5 and 1 percent levels, respectively. Results exclude net commodity-exporting countries as these are defined in IMF (2015).

TABLE A9. Cross-sectional analysis: Hamilton-based fiscal consolidations—expenditure vs. tax-based

Specification	(1)	(2)	(3)	(4)	(5)	(6)
Composition	**Expenditure**			**Tax**		
Regressors						
Real GDP growth (t–1)	−0.016	−0.027	−0.013	0.087*	0.112+	0.100
	(0.034)	(0.057)	(0.062)	(0.050)	(0.073)	(0.076)
Debt ratio (t–1)	−0.000	0.007	0.008	−0.015	−0.053**	−0.056**
	(0.008)	(0.011)	(0.012)	(0.020)	(0.023)	(0.028)
Inflation (t–1)	−0.076*	−0.061	−0.033	0.119**	0.115	0.023
	(0.046)	(0.070)	(0.083)	(0.055)	(0.096)	(0.115)
REER growth (t–1)	−0.055+	−0.060	−0.064	0.079*	0.083	0.074
	(0.036)	(0.061)	(0.062)	(0.042)	(0.066)	(0.069)
Trade openness (t–1)	0.004	0.007	0.005	−0.002	−0.004	−0.002
	(0.005)	(0.006)	(0.006)	(0.004)	(0.007)	(0.009)
Terms of trade growth (t–1)	0.018	0.181**	0.191**	−0.007	0.057	0.027
	(0.044)	(0.088)	(0.076)	(0.047)	(0.082)	(0.068)
Left-wing (t–1)		0.336	0.354		−1.748+	−1.624+
		(0.586)	(0.580)		(1.170)	(1.152)
Horizon pca (t–1)		0.306	0.514		−1.042	−1.452
		(0.473)	(0.544)		(0.883)	(1.233)
Cohesion pca (t–1)		−1.548	−0.321		6.380**	8.074*
		(2.422)	(2.940)		(3.225)	(4.519)
Accountability pca (t–1)			0.592			−0.913
			(0.536)			(0.805)
Observations	104	62	60	104	62	60
Pseudo-R2	0.041	0.119	0.123	0.133	0.299	0.336

Note: Dependent variable is the dummy for expenditure- vs. tax-based consolidation defined using the Hamilton-based criterion. Standard errors in parentheses. Constant term omitted. +, *, **, *** denote statistical significance at the 15, 10, 5 and 1 percent levels, respectively. Results exclude net commodity-exporting countries as these are defined in IMF (2015).