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(Non-)Keynesian Effects of Fiscal Austerity: New Evidence from a large sample*

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January 2021

Abstract

We empirically assess whether a usually expected negative response of private consumption and private investment to a fiscal consolidation is reversed. We focus on a large sample of 174 countries between 1970 and 2018. We also employ three alternative measures of the Cyclically Adjusted Primary Balance used to determine fiscal episodes: i) the IMF-WEO based; ii) the HP-based; and iii) the Hamilton (2018)-based. We find that: i) increases in government consumption have a Keynesian effect on real per capita private consumption; ii) there is a positive effect of tax increases on private consumption when there is a fiscal consolidation; iii) there is a crowding-in effect for private investment, from fiscal contractions. Moreover, expansionary fiscal consolidations occur particularly in highly indebted advanced economies following an increase in taxes. Finally, the negative effect of taxation on private consumption is larger when an economy is experiencing a financial crisis but it is not consolidating.

JEL: C23, E21, E62, H5, H62
Keywords: non-Keynesian effects, fiscal consolidation, filtering, consumption, investment, financial crises, panel data, endogeneity

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1. Introduction

The COVID-19-led-recession is bringing again into the limelight the question of fiscal episodes and the importance of the so-called expansionary fiscal consolidations. Indeed, while several institutions and economists argued during the last Global Financial Crisis for the importance of fiscal stimuli in that context, the case for fiscal retrenchment, which via expectations, promotes more private demand and growth, surfaced in the discussion in the aftermath of that crisis. Now, history is revisited and to mitigate adverse consequences of the COVID-19 pandemic, all governments increased their spending in 2020, with advanced economies spending substantially more than developing counties. With falling revenues, this has meant a significant widening of fiscal deficits globally. As these deficits are not sustainable, fiscal adjustment in the post-COVID-19 period is inevitable. In this paper, we revisit the debate on the non-Keynesian effects of fiscal policy and assess the existence of expansionary fiscal consolidation episodes private consumption and private investment.

We contribute to the literature by applying two filtering techniques to determine the so-called fiscal episodes: the Hodrick-Prescott (HP) filter (that suffers from the identification of spurious cycles, inter alia) and the Hamilton (2018) alternative filtering method. We employ this strategy to circumvent potential issues linked to the common use of the cyclically adjusted primary balance (CAPB), as readily available from publicly available sources. In this context, a change of a considerable magnitude in the CAPB would usually flag the existence of a fiscal episode. In addition, we also employ the IMF's WEO CAPB measure for comparison and completeness purposes, although its use constrains the country-time coverage.

Looking at a panel of 37 advanced economies and 137 developing economies over the 1970-2018 period, we empirically test whether the usually expected negative response of private consumption (and investment) to a fiscal consolidation is reversed. Such event can arise if, for instance, consumers and investors might anticipate future benefits stemming from current fiscal consolidations with an increase in permanent income, allowing then private consumption (and investment) to increase.

We find that: i) an increase in general government final consumption expenditure has a positive (Keynesian) effect on real per capita private consumption; ii) a rise in social transfers positively affects consumption; iii) there is a positive effect of increases in tax revenue on per capita consumption when a fiscal consolidation is taking place; iv) we find evidence of a crowding-in effect for private investment stemming from fiscal retrenchment episodes; v) the effects are mostly significant for advanced economies rather than for developing ones; vi) expansionary fiscal consolidations occur particularly in highly indebted advanced economies

following an increase in taxes ; vii) the negative effect of taxation on private consumption is larger when an economy is experiencing a financial crisis but it is not consolidating..

The remainder of the paper is organised as follows. Section 2 briefly reviews the literature. Section 3 elaborates on the analytical framework to identify the fiscal episodes and presents key stylized facts. Section 4 empirically assesses the effects of fiscal adjustments on private consumption and private investment and conducts several robustness checks. The last section concludes.

2. Literature Review

The discussion of expansionary fiscal consolidations can be traced back to Feldstein (1982), who argued that when permanent public spending cuts are seen as an indication of future tax cuts, expectations of permanent income increases.[1] Thus, if a serious/credible fiscal consolidation occurs, there may be an induced wealth effect, leading to an increase in private consumption. On the other hand, lower government borrowing requirements decrease the risk premium associated with government debt, contributing to reduce real interest rates, and allowing the crowding-in of private investment[2]. However, if consumers do not think that a given fiscal consolidation is serious/credible, then the usual negative Keynesian effect on consumption will occur.[3]

Against this background, an empirical analysis conducted by Cavallari and Romano (2017) has supported the fiscal predictability as a condition to prevent the crowding-out phenomena. A credible and anticipated fiscal policy helps agents to formulate rational expectations supporting a Ricardian behaviour. In fact, expectations play an important role on the success of fiscal consolidations. Heterogeneous expectations among individuals on the beliefs about the success and on the manner that governments consolidate public finances, can lead to an improvement in fiscal positions or, on the other hand, can exacerbate the detrimental effects on government public accounts (Hommes et al., 2018)[4]. Moreover, Lemoine and Lindé (2016) also demonstrated the impact of imperfect credibility effects on the degree of success of fiscal

[1] Blanchard (1990), Sutherland (1997) and Perotti (1999) mentioned that with high debt ratios there is a higher probability of fiscal policy being non-Keynesian.

[2] As noticed in Escolano et al. (2018), as fiscal adjustments tend not to reduce debt ratio - governments tend to slowing down fiscal adjustment pace with debt-to-GDP stabilization –, it is found that expansionary monetary policy is fundamental to the success of those adjustments, explaining somehow the decrease of risk premium associated with debt and, therefore, crowding-in evidences.

[3] Such reasoning is sometimes also labelled as "the expectational view of fiscal policy" (see Hellwig and Neumann, 2014).

[4] Gupta et al. (2018) conclude that governments are not electorally penalized when they are successful to launch a fiscal consolidation at the same time that financial markets tend to recognize that success in bringing public finances to a sustainable trajectory.

consolidations with(out) monetary policy accommodation. The success of fiscal consolidations can be intimately related with monetary policy accommodation (see, for instance, Jalil, 2016; Afonso and Martins, 2016).

In addition, Bertola and Drazen (1993) refer to a "trigger point" as a moment after which a fiscal adjustment is highly probable. When government spending rises above a given threshold, this increases the probability that a fiscal consolidation will take place. In this context, consumers tend to exhibit a more Ricardian behaviour. The authors show this by using a model of intertemporal optimizing behaviour that, if government spending follows an upward-trending stochastic process and if the public believes that, the resulting fiscal imbalance will be cut sharply by tax increases when a specific trigger point is reached, there will be a nonlinear negative relationship between private sector consumption and government spending.

Several studies have empirically tackled the issue we are revisiting in this paper, although with somewhat inconclusive results (see Hjelm, 2002, Ahtiala and Kanto, 2002, van Aarle and Garretsen, 2003, Afonso, 2010, Guajardo et al., 2014, Yang et al., 2015). Gobbin and van Aarle (2001) analysed EU countries and found that non-Keynesian effects dominated the traditional Keynesian expenditure effects of government spending, taxation, and transfers. For instance, Afonso (2010) mentioned that regarding general government final consumption there was no statistically significant short-run effect on private consumption, with or without fiscal consolidations for an OECD panel, while Yang et al. (2015) proposing a new definition for the CAPB based on the fluctuations in asset prices and specific-country's fiscal policy features, did not support non-Keynesian effects from fiscal consolidations.

Another important aspect is composition. Some studies such as Alesina and Ardagna (2010) and Alesina et al. (2019) conclude for large differential effects when fiscal consolidations are based on government spending cuts or tax increases. These authors argue that there are lesser harmful effects when governments choose to consolidate via a spending reduction. On the other hand, Wiese et al. (2018) conclude that it is indifferent to implement a fiscal consolitdation via tax incrases or via spending reductions in what respects the degree of success of that consolitation. However, it was found that left-wing and right-wing governments are more successful in their consolidations when they rely on spending and on taxes, respectively[5]. In addition to the political economy effects on fiscal consolidations, it appears that a higher degree of centralization is positively correlated with improvements in primary balances.The higher the power to spend and tax on low levels of governments the higher is the probability of bringing

[5] Some articles as Tavares (2004) and Potrafke (2011), among others, have studied the linkage between the political spectrum of governments and the degree of success of fiscal consolidations, via taxation or spending.

public finances towards a sustainable path (Foremny et al., 2017). Moreover, Afonso and Jalles (2017) reported that fiscal consolidations based on the spending-side tended to be more counter-cyclical than those consolidations via taxation in what respects markups dynamics over the short- and medium-terms.

Regarding the effects of fiscal consolidations on private investment, via, for instance, lower overall costs to provide public services or due to a downward impact on the sovereign yield, the question also deserves an empirical assessment. A few results have been provided arguing for a positive effect of a fiscal consolidation on private investment, notably Ardagna (2009) and Schaltegger and Weder (2012). Finally, Afonso and Martins (2016) looking at a sample of 14 EU countries showed that, in some cases, when fiscal consolidations are coupled with monetary expansions, the traditional Keynesian result is reversed.

3. Fiscal episodes

3.1. Approaches to determine fiscal episodes

The literature addressing the identification of fiscal episodes is vast and has mostly relied on changes in the cyclically adjusted primary balance (CAPB) as a share of the GDP. Some caveats surrounding this approach have been highlighted recently. The CAPB approach could bias empirical estimates towards finding evidence of non-Keynesian effects (see, e.g., Afonso and Jalles, 2014). Many non-policy factors influence the CAPB and can lead to erroneous conclusions regarding fiscal policy changes.[6] Even when the CAPB accurately measures fiscal actions these include discretionary responses to economic developments.

Despite these known drawbacks, the alternative "narrative approach" to identifying fiscal episodes cannot be considered in our study, which looks at a large heterogeneous sample of countries, the reason being that the publicly available dataset compiled by Devries et al. (2011) covers only 17 advanced economies and it ends in 2009 (which is by now outdated). Hence, the analysis that follows relies on changes in the CAPB. When using this quantitative method to identifying fiscal episodes, some approaches have been commonly adopted, namely:

i) Giavazzi and Pagano (1996), who decrease the probability of fiscal adjustment periods with only one year by using a limit of 3 percentage points of GDP for a single year consolidation. They proposed using the cumulative changes in the CAPB that are at least 5, 4, 3 percentage points of GDP in respectively 4, 3 or 2 years, or 3 percentage points in one year.

[6] For example, a stock price boom raises the CAPB by increasing capital gains tax revenue and tends to coincide with an expansion in private demand (Morris and Schuknecht, 2007).

ii) Alesina and Ardagna (1998), who adopted a fiscal episode definition that allows that some stabilization periods may have only one year. They considered the change in the CAPB that is at least 2 percentage points of GDP in one year or at least 1.5 percentage points on average in the last two years.

iii) Afonso (2010), who defined the occurrence of a fiscal episode when either the change in the CAPB is at least one and a half times the standard deviation (from the panel of countries under scrutiny) in one year, or when the change in the CAPB is at least one standard deviation on average in the last two years.

Fiscal consolidation episodes identified using changes in the CAPB can either use a publicly available source – such as the IMF WEO – or be computed using a filtering approach (by decomposing GDP into its cyclical and trend components). Despite substantial progress in the estimation methodologies to calculate potential output, there is still not a widely accepted approach in the profession. According to Borio (2013), researchers frequently adopt two alternative approaches to estimate potential GDP: i) there are univariate statistical approaches, which usually consist of filtering out the trend component from the cyclical one; ii) there are the structural approaches, which derive the estimates directly from the theoretical structure of a model.

Aware of the shortcomings of using either of the two approaches[7], and at the cost of not maximizing the total number of observations in our panel dataset, instead of relying on the IMF's WEO measure of the CAPB[8], we rather apply two filtering techniques. Mindful of the criticisms surrounding the use of the Hodrick-Prescott (HP) filter (such as the identification of spurious cycles, inter alia), particularly in the context of a large sample of very heterogeneous countries (see Harvey and Jaeger, 1993; Cogley and Nason, 1995), Hamilton (2018) proposed an alternative method. Hamilton's (2018) approach to extract the cyclical and trend component of a generic variable y_t (denoted ${y^c}_t$ and ${y^\tau}_t$, respectively), consists of estimating:

$$y_{t+h} = \gamma_0 + \sum_{j=0}^{k} \gamma_j \, y_{t-j} + u_{t+h} \qquad (1)$$

[7] 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.

[8] The IMF does not have an official method for computing potential output and every country desk decides which measure fits best. While the most common IMF approach uses a production function approach, assumptions vary greatly across countries and discretion is left to the country desks.

where y_t equals the sum of the trend and cyclical components, that is, $y_t = y_t^\tau + y_t^c$. The stationary part of regression (1) provides the cyclical component:

$$y_t^c = \hat{u}_t \tag{2}$$

while the trend is given by

$$y_t^\tau = \hat{\gamma}_0 + \sum_{j=0}^{k} \hat{\gamma}_j \, y_{t-h-j}. \tag{3}$$

Hamilton (2018) suggested that *h* and *k* should be chosen such that the residuals from equation (1) are stationary and points out that, for a broad array of processes, the fourth differences of a series are indeed stationary. We choose *h = 2*, since a 2-year horizon would be consistent with business cycles, and *k = 3*, which is line with the dynamics seen in real GDP.

Once the output gap is obtained, we then use it to get a 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 take the same assumption as Girouard and André, 2005), we multiply government revenues by the factor [1/(1+OG/100)] to get REV_{adj} (revenue adjusted), with OG being the output gap obtained via the HP or the Hamilton filter. Mathematically we have:

$$CAPB = REV_{adj} - PEXP, \tag{4}$$

where REV_{adj} = *REV**[1/(1+OG/100) and OG is the Output Gap, computed applying the HP-filter and Hamilton's (2018) approach.

In this paper, we will make use of three measures of the CAPB: i) the WEO (which limits the country-time coverage); ii) the HP-based; and iii) the Hamilton-based, the latter two maximizing the total available number of observations for econometric purposes. Mindful of the alternative set of quantitative criteria used to identify fiscal consolidations, we take a middle ground approach. Fiscal consolidation episodes are defined as those that show at least a positive annual change in the CAPB of 0.5 percent of GDP for two consecutive years. A dummy variable is created which takes the value 1 if there is a consolidation year and 0 otherwise. The episode is then classified as expenditure-based if the absolute change in primary spending (in percent of GDP) divided by the absolute change in the CAPB (in percent of GDP) is larger than 0.5, provided that there is a consolidation and provided that the change in (primary) spending is

negative. If the ratio is less than 0.5 and/or the change in (primary) spending is positive within a given consolidation episode, that episode is defined as tax-based one instead. Succinctly, we have then an expenditure-based fiscal episode when, $\frac{|\Delta PEXP|}{|\Delta CAPB|} > 0.5\ \%\ (GDP)$ and $\Delta PEXP < 0$; and a tax-based fiscal episode when, $\frac{|\Delta PEXP|}{|\Delta CAPB|} < 0.5\ \%\ (GDP)$ and/or $\Delta PEXP > 0$.

3.2. Fiscal episodes

In Tables 1a-1b we report the fiscal austerity episodes computed according to the above mentioned three underlying measures of the CAPB, for the period 1970-2018, for 37 advanced economies and for 137 developing economies (Appendix Table A1 report the related summary statistics for the full sample and per criteria).

Table 1a: Fiscal Consolidations based on the change in the CAPB, WEO, HP-based and Hamilton-based (Advanced Economies)

Country	WEO-Based	HP-Based	Hamilton-Based
Australia	1995-1997, 2012-2013	1995-1997, 2012-2013	1995-1997, 2012-2013
Austria	1997, 2011-2013	1997, 2011	1997, 2011
Belgium	1985-1987, 1990, 1998	1985-1987, 1990, 1994, 1998	1985, 1990, 1994, 1998
Canada	1987-1988, 1995-1997, 2012-2015	1987-1988, 1995-1997, 2012-2014	1987-1988, 1995-1997, 2012-2014
Cyprus	2005, 2013-2014	2005-2007, 2013-2014, 2018	2005-2007, 2013-2014, 2018
Czech Republic	1997, 2011	2007, 2011, 2016-2017	2007, 2011, 2016-2017
Denmark	1997-1998, 2005, 2014	1984-1986, 1998-1999, 2005, 2014, 2017	1984-1986, 1997-2000, 2005, 2014, 2017
Estonia	2010	2010	2010
Finland	n.a.	1989, 1997-1998, 2007, 2016-2017	1989, 1997-1998, 2007, 2016-2017
Germany	1993-1994, 2004, 2012	1997, 2000, 2007, 2012	2000, 2007, 2012
Greece	1991-1994, 2000, 2011-2013	1991-1992, 2011-2013, 2016	1991, 2000, 2011-2013, 2016
Hong Kong SAR	2007, 2010, 2017	2007, 2010, 2017	2007, 2010, 2017
Iceland	2005-2006, 2010-2014	1991, 1996-1997, 2005, 2012-2014	1991, 1996-1997, 2005-2006, 2012-2014
Ireland	2004, 2011-2015	1997, 2004, 2012-2014	1997, 2004, 2012-2014, 2017
Israel	2004-2005, 2015	2005-2006, 2011, 2015	2005-2006, 2015
Italy	1992-1993, 1996-1997	1991-1993, 1996-1997, 2011-2012	1991-1993, 1996-1997, 2011-2012
Japan	2005-2006, 2015	1981, 1985, 1988, 2005-2006, 2015	1981, 1985, 1988, 2005-2006, 2015
Latvia	2012, 2016	2011-2012	2012, 2016
Lithuania	2003, 2010	n.a.	n.a.
Luxembourg	1997, 2006, 2012	2006-2007	2001, 2006-2007, 2013
Macao SAR	n.a.	2004-2008, 2011	2008, 2011
Malta	2005, 2017	2005, 2010, 2017	2005, 2010, 2017
Netherlands	2005, 2012-2014	2005, 2012-2014, 2017	2005, 2013, 2017
New Zealand	2012-2013	1987-1988, 1994-1995, 2003, 2012-2016	1987-1989, 1994-1995, 2001-2004, 2012-2016
Norway	1994-1997	1980, 1994-1997, 2000, 2005-2006, 2011-2012, 2018	1980, 1994-1997, 2000, 2005-2006, 2011-2012, 2018
Portugal	2007, 2012-2013, 2016	2007, 2012-2013, 2016	2007, 2012-2013, 2016
Puerto Rico	n.a.	2016	2016
San Marino	n.a.	2010-2012	2010, 2015-2018
Slovak Republic	1998, 2004	1998	2012-2013
Slovenia	2012-2013, 2016	2015-2016	2015-2016
Spain	1997, 2011-2014	1987, 1997-1999, 2006, 2014, 2017	1987, 1997, 2006, 2014, 2017
Sweden	1995-1998, 2001, 2016	1984, 1987, 1995-1998, 2005, 2016	1984, 1987, 1995-1998, 2005, 2016
Switzerland	1995	1995, 2006	1995, 2006
United Kingdom	1995-1999, 2011, 2017	1980, 1995-2000, 2011, 2016-2017	1980, 1988, 1995-2000, 2011, 2016-2017
United States	2006, 2012-2014	2006, 2011-2013	2006, 2011-2013
Years with episodes	122	169	171
Average duration (years)	1.783	1.690	1.629

Note: "n.a." stands for not available.

Table 1b: Fiscal Consolidations based on the change in the CAPB, WEO, HP-based and Hamilton-based (Developing Economies)

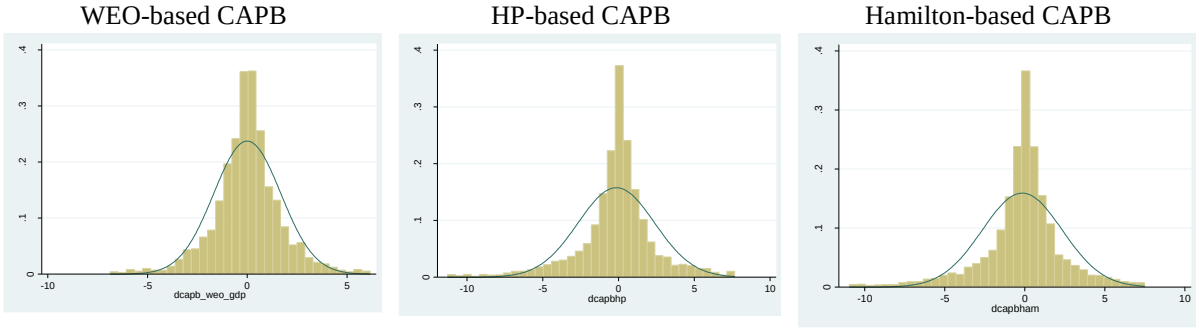
Country	WEO-Based	HP-Based	Hamilton-Based
Afghanistan	n.a.	2006, 2010, 2016	2010, 2016
Albania	n.a.	2016	2016
Algeria	2011, 2017	1995-1996, 2000, 2017-2018	1995-1996, 2000, 2017-2018
Angola	2004-2006, 2010	2005-2006, 2011	2005-2006, 2011
Anguilla	n.a.	2003, 2006-2007, 2011	2003-2007, 2011
Antigua and Barbuda	n.a.	1996, 2003-2004	1996, 2008
Argentina	2003-2004	2003-2004	2003-2004, 2018
Armenia	n.a.	2011-2012, 2018	2011-2012, 2018
Aruba	n.a.	2008	2006-2008
Azerbaijan	n.a.	1998, 2001, 2017-2018	2001, 2008
Bahamas, The	n.a.	1994, 1999, 2015-2016	1999, 2015-2016
Bahrain	n.a.	1996, 1999-2000, 2004-2005, 2017-2018	1996, 2004-2005, 2017-2018
Barbados	1998, 2017	2017	1998, 2017
Belarus	2012, 2017	2010-2012, 2017-2018	2010
Belize	n.a.	2005-2008, 2011, 2017-2018	2002, 2005-2006, 2017-2018
Benin	n.a.	1993, 2004, 2007, 2017-2018	1993, 2004, 2007, 2017-2018
Bhutan	n.a.	1991, 2007-2009	1991, 2007-2009
Bolivia	n.a.	1995, 2004-2006	1990, 1995, 2000, 2004-2006
Bosnia and Herzegovina	2002-2003, 2006, 2011-2013	2002-2003, 2006, 2011-2013, 2016-2018	2006, 2011, 2018
Botswana	2004-2006, 2011-2013	2004-2006, 2011-2013	2004-2006, 2011-2013
Brazil	1999, 2017	1999	n.a.
Brunei Darussalam	n.a.	1991, 1996, 2000, 2004-2006, 2011, 2018	1996, 2000, 2004-2006, 2011, 2018
Bulgaria	2004, 2012, 2016	2012, 2016	2004, 2012, 2016
Burkina Faso	n.a.	1989, 1992	1989, 1992
Cabo Verde	n.a.	1996-1998, 2004, 2014-2016	1996-1998, 2004, 2014-2016
Cambodia	n.a.	2005, 2014	2014
Cameroon	n.a.	2006, 2018	2006, 2018
Central African Republic	n.a.	1993, 1996, 2015-2016	1993, 1996, 2015-2016
Chad	n.a.	1998, 2005-2006, 2011, 2016-2018	1998, 2005-2006, 2011, 2016-2018
Chile	2005-2006, 2011	2004-2006, 2011	2004-2006, 2011
China	2004	2004	2004
Colombia	2012	1991, 2001, 2012	1991, 2012
Comoros	n.a.	1986-1989, 1997, 2005, 2010, 2013	1986-1989, 1997, 2005, 2010, 2013
Congo, Democratic Republic of the	n.a.	2002, 2005	2002, 2005
Congo, Republic of	n.a.	1994-1996, 2000, 2004-2006, 2017-2018	1994-1996, 2000, 2004-2006, 2017-2018
Costa Rica	n.a.	2006-2007	2006-2007
Croatia	2016-2017	1994, 2016-2017	2016-2017
Cote d'Ivoire	n.a.	2001	2001
Djibouti	n.a.	2004-2006, 2017-2018	2001, 2004-2006, 2017-2018
Dominica	n.a.	1996, 2012-2013, 2018	1996, 2006, 2009-2013, 2016-2018
Dominican Republic	2005	2005, 2014-2015	2005, 2014-2015
Ecuador	2010-2011	2000, 2011, 2018	2000, 2011, 2018
Egypt	2004, 2017	2018	2018
El Salvador	2004, 2017	2007, 2017	1994, 2007, 2013, 2017
Equatorial Guinea	n.a.	1996-1997, 2002, 2006, 2011. 2017-2018	1996-1997, 2002, 2006, 2011, 2017-2018
Eritrea	n.a.	1997, 2003-2004	2003-2004
Eswatini	n.a.	1988-1989, 2006, 2012	1988-1989, 2006, 2012
Ethiopia	n.a.	1992-1993, 2004	1992-1993, 2004, 2009
Fiji	n.a.	1995, 2008, 2013	1995, 2008, 2013
Gabon	n.a.	1995, 2000, 2018	1995, 2000, 2018
Gambia, The	n.a.	n.a.	2012
Georgia	2011	2011	2011
Ghana	n.a.	1982, 1995, 2015	1982, 1995, 2014-2015
Grenada	2004, 2009-2010, 2015-2016	1992-1993, 2004, 2009-2010, 2015-2016	1992-1993, 2001, 2004, 2008-2010, 2016-2017
Guinea	n.a.	2005	2005
Guinea-Bissau	n.a.	1996, 2000-2001, 2009	1996, 2000-2001, 2009
Guyana	2010	2008	2008
Haiti	n.a.	2005, 2015-2016	2005, 2015-2016
Honduras	n.a.	1992, 1995, 2005, 2011, 2015	1992, 1995, 2005, 2011, 2015
Hungary	2008-2009	2000, 2004, 2008	2000, 2004, 2008
India	2000, 2005-2007, 2013	1995, 2000, 2005-2007, 2013	1995, 2000, 2005-2007, 2013
Indonesia	n.a.	1999, 2002	1999, 2002
Iran	n.a.	2004	2004
Iraq	n.a.	2006, 2011, 2018	2006, 2011, 2018
Jamaica	n.a.	1999-2000, 2013	1999-2000, 2013
Jordan	2011, 2014, 2017	1989, 2014	1989, 2014
Kazakhstan	2006, 2011	2006, 2011	2006, 2011
Kenya	2004	1988, 1994-1995, 1999, 2004, 2018	1988, 1994-1995, 1999, 2004, 2018
Kiribati	n.a.	1998, 2010, 2013-2015	1998, 2010, 2013-2015
Kosovo	n.a.	2015-2016	2015

Country	WEO-Based	HP-Based	Hamilton-Based
Kuwait	n.a.	1993-1997, 2000, 2005, 2018	1993-1997, 2000, 2005, 2018
Kyrgyz Republic	n.a.	2001-2002-2006-2008, 2018	2001-2003, 2006-2007, 2018
Lao P.D.R.	n.a.	2011-2012, 2015	2011-2012, 2015
Lebanon	2002, 2009-2010, 2014-2016	1998-1999, 2002-2003	1998-1999, 2002-2003
Lesotho	n.a.	1984, 1990, 2003-2004	1984, 1990, 2003-2004
Liberia	n.a.	2015-2016	2009, 2015-2016
Libya	n.a.	1995-1996, 2000, 2005, 2017-2018	1995-1996, 2000, 2005-2006, 2017-2018
Madagascar	n.a.	1982-1983, 1996-1997, 2006	1982-1983, 1996-1997, 2006
Malawi	n.a.	n.a.	2010
Malaysia	1994, 2002, 2005, 2011	1994, 2002, 2005, 2011	1994, 2002, 2005, 2011
Maldives	n.a.	2007, 2011-2013	2011-2013
Marshall Islands	n.a.	2017	2017
Mauritania	n.a.	2010, 2016-2018	2010, 2016-2018
Mauritius	2008	n.a.	n.a.
Mexico	2000-2001	2001, 2016-2017	2000-2001, 2017
Micronesia	n.a.	2008-2009, 2015, 2018	2008-2009, 2015, 2018
Moldova	n.a.	1998-1999, 2017	1999, 2004, 2017
Mongolia	n.a.	1995, 2000-2001, 2004-2006	1995, 2000-2001, 2004-2006
Montenegro, Rep. of	n.a.	2007, 2013-2014	2007, 2010, 2013-2014
Morocco	2007	1997, 2007	1997, 2007
Mozambique	n.a.	1985, 1988-1989, 1992, 2003, 2013, 2016-2017	1985, 1992, 1999, 2003, 2013, 2016-2017
Myanmar	n.a.	2013	2013
Namibia	n.a.	1994, 2000, 2005-2007	2000, 2005-2007
Niger	n.a.	2001, 2006, 2011	2006, 2011
Nigeria	n.a.	1995, 2000, 2011	2000, 2011
North Macedonia	2017	2000, 2016	2000, 2016
Oman	n.a.	1996-1997, 2000, 2005, 2011, 2018	1996-1997, 2000, 2006, 2011, 2018
Panama	2000, 2006-2007	1996, 2000, 2006-2007, 2016	1996, 2000, 2006-2007, 2016
Papua New Guinea	n.a.	1995, 2007, 2015	1995, 2007, 2015-2017
Paraguay	n.a.	1986, 1990, 1994, 2004, 2011	1986, 1990, 1998, 2004, 2011
Peru	2007, 2011	2007, 2011	2007, 2011
Philippines	2004-2006	2004-2006	2004-2006
Poland	2012	2005, 2012, 2018	2005, 2012, 2016-2018
Qatar	n.a.	1999-2000, 2012-2013, 2018	1999-2000, 2012-2013, 2018
Romania	2010-2012	1998-1999, 2011-2012	1998-1999, 2011-2012
Russia	2005, 2011	2000, 2005, 2011, 2018	2000, 2005, 2011, 2018
Rwanda	n.a.	2004, 2016	2004, 2016
Saudi Arabia	n.a.	1995-1997, 2000, 2004-2006, 2011, 2018	1995-1997, 2000, 2004-2006, 2011, 2018
Senegal	2015	2017	2017
Serbia	2016-2017	2004-2005, 2016-2017	2004-2005, 2016-2017
Seychelles	n.a.	1988	1988, 1995
Sierra Leone	n.a.	2018	n.a.
Solomon Islands	n.a.	2010	2007, 2010
South Africa	n.a.	2006	2006
Sri Lanka	n.a.	1997, 2003	1997
St. Kitts and Nevis	n.a.	1995, 2002-2003, 2012-2013	1997, 2002-2003, 2007, 2012-2013
St. Lucia	n.a.	1994, 2014-2016	1988, 1991, 2007-2008, 2014
St. Vincent and the Grenadines	n.a.	1993, 1999-2001, 2009-2012, 2015-2016	1989, 1993, 1996, 1999-2000, 2005, 2009, 2015-2016
Sudan	n.a.	1993-1994, 1997, 2014-2015	1993-1994, 1997, 2003, 2014-2015
Suriname	2006-2007, 2017	1993-1996, 2006-2007, 2017-2018	2006-2007, 2017
Syria	n.a.	1996-1997	1996-1997
São Tomé and Príncipe	n.a.	2013, 2017-2018	2013, 2017-2018
Tajikistan	n.a.	2002, 2011-2012, 2018	2002, 2011-2012, 2018
Tanzania	n.a.	1996, 2017	1996, 2014, 2017
Thailand	n.a.	2011	2011
Timor-Leste	n.a.	2005, 2018	2010-2011, 2018
Togo	n.a.	1995	1995, 2008
Tonga	n.a.	2003-2004, 2014, 2017-2018	2002, 2009, 2014-2017
Trinidad and Tobago	n.a.	1990-1991, 2018	1990-1991, 2018
Tunisia	1993-1994	1993-1994, 1998, 2018	1998
Turkey	n.a.	2011	2011
Tuvalu	n.a.	2008, 2012-2013	2008, 2012-2013
Uganda	n.a.	2004, 2017	2004, 2017
Ukraine	2015	1999, 2011, 2015	1999, 2006, 2011, 2015
United Arab Emirates	n.a.	n.a.	1995, 2000, 2004-2006, 2011-2012, 2017
Uruguay	2002-2003	2001-2004	2003
Uzbekistan	n.a.	2004, 2007-2008, 2011	2004, 2007-2008, 2011-2012
Vanuatu	n.a.	1997, 2004-2005, 2012-2013	1997, 2004-2005, 2012-2013
Vietnam	n.a.	2011, 2015-2016	2011, 2015-2016
Yemen	n.a.	1996, 2000, 2011	2000, 2011
Zimbabwe	n.a.	2009, 2010	2009
Years with episodes	103	503	498
Average duration (years)	1.474	1.462	1.423

Note: “n.a.” stands for not available.

From Table 1 we observe that the number of fiscal episodes is significantly lower when we consider the WEO-based consolidation criterion when compared to either the HP-based or the Hamilton-based criteria. In fact, while we count 123 episodes for the WEO-based criterion, we observe 169 and 171 consolidation episodes for the HP-based and the Hamilton-based fiscal consolidation criteria for advanced economies, respectively. The same pattern can be traced for developing economies: our results establish a set of 112 WEO-based, 503 HP-based and 498 Hamilton-based fiscal consolidation episodes. It seems that the duration of a fiscal episode is higher for advanced economies than the duration observed for developing economies. In fact, while the reported duration is, on average, of 1.7 years for advanced economies, the duration of fiscal episodes for developing economies is slightly lower - 1.5 years. The three methods that determine fiscal austerity episodes on the basis of the change in the CAPB essentially coincide in identifying, for instance, the fiscal contractions of Australia in 1995-1997 and 2012-2013 periods and of China in 2004.

Figure 1: Changes in the cyclically adjusted primary balance: 1970-2018, all sample



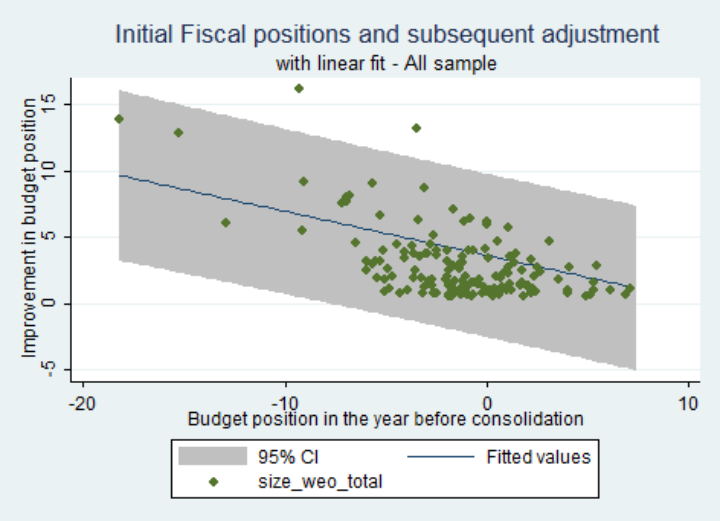
Note: CAPB expressed in percent of potential GDP. Top and bottom 1% of the change in the respective CAPB dropped to remove serious outliers. HP-based CAPB and Hamilton-based CAPB distributions constrained – for comparison purposes – to map the same country-time coverage as the one available for the WEO CAPB.

From Figure 1 we also see that the average change in the CAPB (expressed in percent of potential GDP) in the full panel is -0.07%, -0.08% and -0.10% for WEO-based, HP-based and Hamilton-based CAPB, respectively, and the standard deviation is 2.72, 4.02 and 3.85 for WEO-based, HP-based and Hamilton-based approaches, respectively. When we look for the average change in the CAPB by development stage it is roughly the same as for the full sample (by criterion, respectively). However, the volatility of the CAPB changes are greater for advanced economies than that can be observed for developing ones. Figure A1 in the appendix illustrates this point for each income group.

3.3. Characteristics of the fiscal episodes

As far as the characteristics of fiscal episodes are concerned, initial fiscal conditions prevailing just before the beginning of a given consolidation episode seem to have had an impact on the size of subsequent fiscal efforts (Figure 2). The lower the CAPB, the larger the size of the ensuing fiscal consolidation. This may reflect that large budget deficits made it more necessary to consolidate and, at the same time, raised public awareness of the extent of the fiscal imbalance problem, making it easier to act. When inspecting each income group independently, we conclude advanced economies seem to have been more concerned with fiscal sustainability relative to developing economies (Figure A2 in the appendix plots, by income group, the improvement in budgetary position versus the budget position in the year before fiscal consolidation).

Figure 2: Initial fiscal imbalances and subsequent adjustment: 1970-2018, full sample, WEO-based CAPB

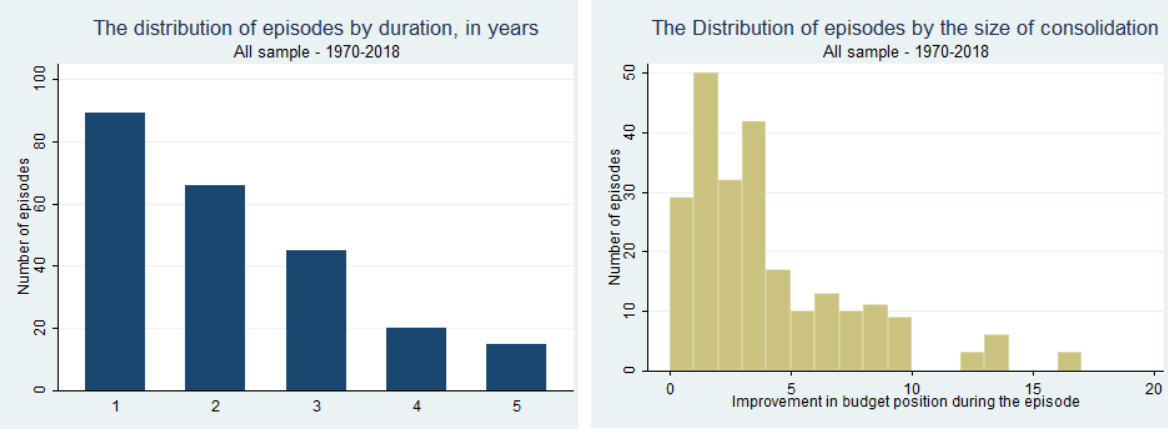


Note: budget position measured by the cyclically adjusted primary balance (% of potential GDP), vertical axis. "improvement" measured during the consolidation years of the identified episode, horizontal axis.

Most the fiscal consolidation episodes were of short duration (with some exceptions for the WEO IMF-based measure - see Table 1) and involved relatively modest gains (Figure 3). However, there were a number of large efforts, amounting to improvements of more than 7 percent of GDP for the four measures, as well as a few episodes lasting for four years (or more in the case of the IMF-based measure). When looking in more detail at the distribution of episodes by duration for each income group, we conclude that fiscal consolidation episodes were longer in advanced economies than in developing economies. Advanced economies experienced fiscal episodes lasting a maximum of 5 years– there are more than 30 episodes

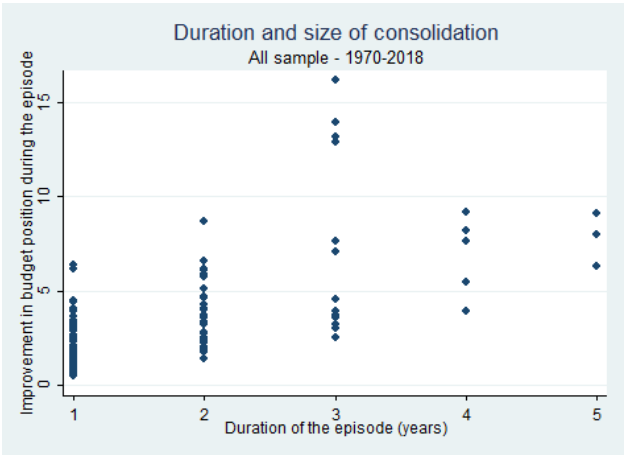
with a duration greater than 3 years. In contrast, emerging markets experienced consolidations lasting a maximum of 3 years per episode. That said, the improvement in the budget position for developing economies is more concentrated than the one observed for advanced economies. This is not entirely surprising since government debt levels in developing economies are typically lower than those in advanced economies, illustrating better fiscal sustainability positions for the former. Results by income group are illustrated in Appendix Figure A6.

Figure 3: Strength and duration of consolidation episodes: 1970-2018, full sample WEO-based CAPB



Note: budget position measured by the cyclically adjusted primary balance (% of potential GDP). "improvement" measured during the consolidation years of the identified episode.

Figure 4: Relationship between duration and size of consolidation: 1970-2018, full sample, WEO-based CAPB



Note: budget position measured by the cyclically adjusted primary balance (% of potential GDP). "improvement" measured during the consolidation years of the identified episode.

In general, it is also possible to observe that sizeable fiscal consolidations lasted for longer periods and vice-versa (Figure 4). The time distribution of fiscal episodes is less concentrated for advanced economies than for emerging ones. Moreover, we note that budget position

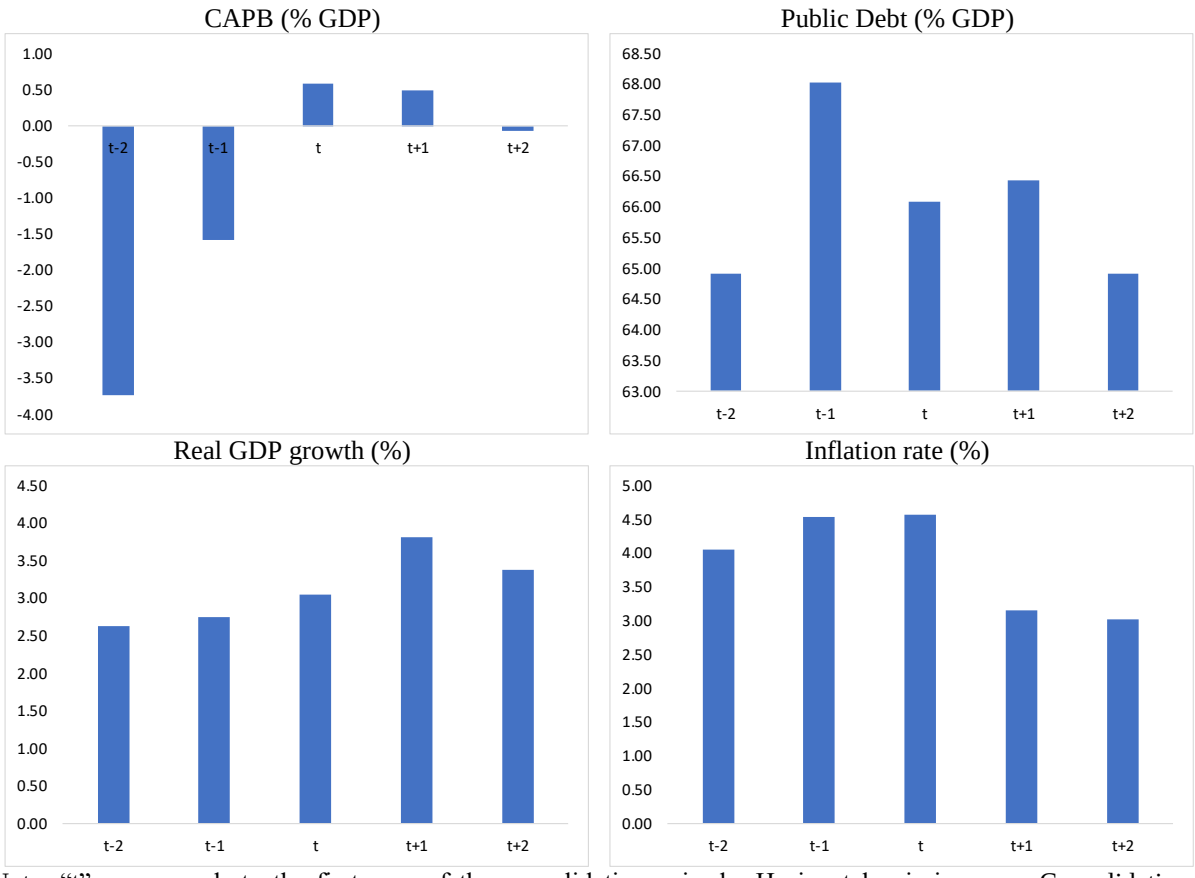
improvements are comparatively bigger for advanced economies, improving the overall fiscal sustainability levels for this income group. Figure A4 in the Appendix reports this set of results by income group.

4. Effects of Fiscal Adjustments

4.1. Stylised facts: fiscal consolidations and macroeconomic and fiscal variables

In this sub-section, we assess some stylised links between fiscal consolidations and a series of macroeconomic and fiscal variables, namely real GDP growth, private consumption, private investment, the debt-to-GDP ratio, government consumption and tax revenues. Figure 5 illustrates as an event-study-type chart, the paths of several of these variables by showing averages from two years before the consolidation to up to two years after.

Figure 5: Overview of Selected Fiscal and Macroeconomic Indicators around consolidation episodes, overall sample



Note: "t" corresponds to the first year of the consolidation episode. Horizontal axis in years. Consolidations identified using the WEO-based CAPB.

The expected improvement in the CAPB during and after the consolidation episode takes place as a result of a simultaneous decrease in total government expenditures and an increase

in total government revenues. This dynamics is true for both advanced and emerging economies. However, for developing economies we observe a deterioration of CAPB two years after the fiscal consolidation episode. The magnitude of this deterioration seems to overcome the fiscal improvement registered during the fiscal consolidation. It is also interesting to note that despite the decrease in total government expenditures identified above, government final consumption increases during and after the consolidation period. However, one does observe a reduction in public investment after the end of the consolidation episode (translating a lagged negative effect).

Finally, fiscal consolidations seem to be related to increases in government debt ratios (both during and after). Yet, the dynamics of government debt ratios evidence a reduction of almost 2 p.p. during the after fiscal contractions. This patterns is similar to what happens when we observe the dynamics of government debt before and after fiscal consolidations by income group (see. Appendix figures A5 and A6 for the illustration).

4.2. Baseline Empirical Analysis

In addition to unconditional relationships, we want to empirically analysed more closely the impact of fiscal episodes on private consumption and investment. There are two main approaches when specifying consumption functions: one is the Euler approach (Perotti, 1999) and the other is the solved-out function approach (Giavazzi and Pagano, 1996). There is a debate as to which one to use (see Campbell, 1996 for further discussion). We follow the latter approach (even though it is not based on microeconomic foundations), which has also been applied in van Aarle and Garretsen (2003) and Afonso (2010).

The baseline specifications for the real per capita private consumption and real per capita private investment are given by equations (4) and (5) below, respectively:

$$\Delta C_{it} = c_i + \lambda C_{it-1} + \omega_0 Y_{it-1} + \omega_1 \Delta Y_{it} + \delta_0 Y_{it-1}^{av} + \delta_1 \Delta Y_{it}^{av} + \quad (5)$$
$$(\alpha_1 FCE_{it-1} + \alpha_3 \Delta FCE_{it} + \beta_1 TF_{it-1} + \beta_3 \Delta TF_{it} + \gamma_1 TAX_{it-1} + \gamma_3 \Delta TAX_{it}) \times FC_{it}^{m} + (\alpha_2 FCE_{it-1} + \alpha_4 \Delta FCE_{it}$$
$$+ \beta_2 TF_{it-1} + \beta_4 \Delta TF_{it} + \gamma_2 TAX_{it-1} + \gamma_4 \Delta TAX_{it}) \times (1 - FC_{it}^{m}) + \mu_{it}$$

$$\Delta I_{it} = c_i + \lambda C_{it-1} + \omega_0 Y_{it-1} + \omega_1 \Delta Y_{it} + \delta_0 Y_{it-1}^{av} + \delta_1 \Delta Y_{it}^{av} + \quad (6)$$
$$(\alpha_1 FCE_{it-1} + \alpha_3 \Delta FCE_{it} + \beta_1 TF_{it-1} + \beta_3 \Delta TF_{it} + \gamma_1 TAX_{it-1} + \gamma_3 \Delta TAX_{it}) \times FC_{it}^{m} + (\alpha_2 FCE_{it-1} + \alpha_4 \Delta FCE_{it}$$
$$+ \beta_2 TF_{it-1} + \beta_4 \Delta TF_{it} + \gamma_2 TAX_{it-1} + \gamma_4 \Delta TAX_{it}) \times (1 - FC_{it}^{m}) + \mu_{it}$$

where the index *i* denotes the country, the index *t* indicates the period (in years), and c_i denotes country fixed effects to control for unobserved cross-country heterogeneity. In addition, we consider: *C* – private consumption; *I* – private investment (gross fixed capital formation); *Y* – GDP; Y^{av} –GDP of the full country sample (or respective sub-sample when regressions are carried out by income group, that is, GDP for the group of advanced economies and GDP for the group of developing economies) (per capita averages); *FCE* – general government final consumption expenditure; *TF* – social transfers; *TAX* – taxes.

All the above-mentioned variables are taken as the logarithms of the respective real per capita observations (the GDP deflator is used to deflate nominal variables). FC^m is a dummy variable that controls for the existence of fiscal consolidation episodes, with *m=1, 2, 3* for each of the fiscal episode criteria used (which can be WEO-based, HP-based or Hamilton-based, giving us a total of three possible alternatives). The dummy variable FC^m takes yearly values and follows the rule: $FC^m = 1$ when there is a fiscal consolidation; $FC^m = 0$ when a fiscal consolidation does not occur. Additionally, it is assumed that the disturbances u_{it} are independent and identically distributed random shocks across countries, with zero mean and constant variance.[9]

We begin by estimating the baseline regressions with OLS considering government consumption, social transfers, and tax revenues together to reduce possible omitted variable bias.[10]

In addition, we also report the results of a panel Two-Stage-Least Squares estimation with instruments or the consolidation dummy being the first two lags of our regressors.[11] This way we arguably address endogeneity concerns as, e.g., tax revenues and social transfers can be expected to partly fluctuate automatically with economic activity, raising the issue of reversed causality.

Tables 2 and 3report the results for the baseline estimation of both private consumption and investment for the full panel using OLS and IV, respectively. They show that increases in general government final consumption expenditure have a statistically significant and positive (Keynesian) effect on real per capita private consumption. This occurs both when there are no

[9]We have conducted Im-Pesaran-Shin panel unit root tests whose results sugested the rejection the null of a common unit root. Such results are presented in Table A4 in the Appendix.

[10] Alternatively, we estimated specification (5) and (6) with each one of these budgetary items at a time and we obtained similar results (these results are available upon request).

[11] The Sargan-Hansen test, which is a test of overidentifying restrictions, confirms the validity of the used instruments at usual significance levels.

fiscal consolidations, and also when a fiscal consolidation episode takes place. However, the magnitude of that effect is higher when in the presence of a fiscal consolidation.

The increase of social transfers also positively influences private consumption, but this there is more uncertainty surrounding this estimate. This effect is stronger where a fiscal consolidation is taking place. We also find a positive influence of tax revenue increases on per capita consumption when the economy is consolidating its fiscal accounts, suggesting a Ricardian behaviour by economic agents (the impact of an increase in taxation does not impact consumption when fiscal consolidations episodes are not taking place). This result is true for the cases of the HP-based and Hamilton-based CAPB approaches.

As far as real per capita investment is concerned, we observe that the increase in social transfers in when a fiscal consolidation is happening has the opposite effect vis-à-vis those seen for consumption: there is a positive effect of social transfers on investment when a fiscal consolidation is taking place but real per capita investment seems to be reduced when fiscal consolidations are not observed.

The impact of an increase in government expenditures also hampers real per capita investment (WEO-based criterion).This effect is stronger, in absolute terms, in when a fiscal consolidation is taking place. Conversely, an increase in taxes promotes per capita investment, with higher effects during fiscal consolidations (but this effect fades away when we control for possible endogeneity).

Overall, and during fiscal episodes, it seems that fiscal contractions promote real per capita investment when based on government spending cuts and/or on increases in the level of taxation. In accordance to this, we can support the expansionary fiscal consolidation phenomena.

Table 2: Estimation results for real per capita private consumption and investment, OLS – 1970-2018, all sample

Dependent Variable		Real Private consumption per capita			Real Private Investment per capita		
	Specification	1	2	3	4	5	6
		WEO-based	HP-Based	Hamilton-based	WEO-based	HP-Based	Hamilton-based
λ	$dep.var._{t-1}$	-0.199***	-0.276***	-0.278***	-0.228***	-0.387***	-0.373***
		(0.055)	(0.073)	(0.071)	(0.041)	(0.095)	(0.099)
ω_0	Y_{t-1}	0.101*	0.218***	0.225***	0.298***	0.111	0.157
		(0.055)	(0.053)	(0.052)	(0.110)	(0.153)	(0.151)
ω_1	ΔY_t	0.674***	0.582***	0.594***	2.457***	1.386***	1.570***
		(0.083)	(0.095)	(0.096)	(0.216)	(0.477)	(0.436)
δ_0	${Y^{av}}_{t-1}$	-0.011	-0.013	-0.013	-0.060	-0.044	-0.045
		(0.012)	(0.018)	(0.018)	(0.039)	(0.077)	(0.075)
δ_1	${\Delta Y^{av}}_t$	0.033	0.055	0.056	0.026	0.358	0.444
		(0.031)	(0.070)	(0.069)	(0.135)	(0.290)	(0.286)
α_1	$FCE_{t-1} \times FC^m$	0.105***	0.003	0.004	-0.213**	-0.132	-0.092
		(0.032)	(0.029)	(0.029)	(0.101)	(0.122)	(0.107)
α_2	$FCE_{t-1} \times (1 - FC^m)$	0.084***	0.023	0.025	-0.116*	-0.141	-0.152
		(0.030)	(0.026)	(0.027)	(0.066)	(0.112)	(0.112)
β_1	$TF_{t-1} \times FC^m$	-0.023	0.005	0.004	-0.007	0.021	0.035
		(0.022)	(0.007)	(0.007)	(0.044)	(0.039)	(0.039)
β_2	$TF_{t-1} \times (1 - FC^m)$	-0.022	-0.004	-0.004	-0.020	0.038	0.032
		(0.019)	(0.006)	(0.006)	(0.036)	(0.038)	(0.036)
γ_1	$TAX_{t-1} \times FC^m$	-0.016	0.011	0.010	0.250***	0.265**	0.200*
		(0.020)	(0.024)	(0.024)	(0.091)	(0.121)	(0.109)
γ_2	$TAX_{t-1} \times (1 - FC^m)$	0.002	0.000	-0.003	0.167***	0.253**	0.256**
		(0.018)	(0.019)	(0.019)	(0.057)	(0.114)	(0.111)
α_3	$\Delta FCE_t \times FC^m$	0.126	0.065	0.010	-0.198	0.000	-0.001
		(0.117)	(0.084)	(0.081)	(0.376)	(0.286)	(0.292)
α_4	$\Delta FCE_t \times (1 - FC^m)$	0.084*	0.016	0.027	-0.118	0.030	0.095
		(0.052)	(0.042)	(0.042)	(0.123)	(0.198)	(0.194)
β_3	$\Delta TF_t \times FC^m$	0.043	0.001	-0.030	0.337*	-0.005	-0.018
		(0.058)	(0.021)	(0.048)	(0.184)	(0.066)	(0.080)
β_4	$\Delta TF_t \times (1 - FC^m)$	-0.024	-0.016	-0.014	-0.060	0.016	0.008
		(0.024)	(0.010)	(0.009)	(0.039)	(0.038)	(0.037)
γ_3	$\Delta TAX_t \times FC^m$	0.065	-0.080	-0.130*	-0.014	0.263	0.548**
		(0.072)	(0.072)	(0.079)	(0.224)	(0.225)	(0.236)
γ_4	$\Delta TAX_t \times (1 - FC^m)$	-0.054	0.001	-0.001	0.117	0.258	0.189
		(0.050)	(0.032)	(0.033)	(0.109)	(0.167)	(0.156)
Obs.		1,127	1,899	1,885	942	1,616	1,604
R2		0.428	0.251	0.249	0.467	0.246	0.242
# countries		61	98	98	51	86	86
H0 (p-values)							
$\alpha_1 - \alpha_2 = 0$		0.866	0.452	0.936	0.969	0.632	0.754
$\gamma_1 - \gamma_2 = 0$		0.261	0.237	0.096	0.290	0.995	0.139
$-\alpha_1 - \gamma_1 = 0$		0.015	0.693	0.692	0.665	0.148	0.249
$\beta_1 - \beta_2 = 0$		0.307	0.871	0.473	0.068	0.727	0.558

Note: Robust standard errors clustered at the country level are reported in parenthesis. Constant term and country and time effects estimated but omitted for reasons of parsimony. *, **, *** denote significance at 10, 5 and 1% levels.

Table 3: Estimation results for real per capita private consumption and investment, IV – 1970-2018, all sample

Dependent Variable		Real Private consumption per capita			Real Private Investment per capita		
	Specification	1	2	3	4	5	6
		WEO-based	HP-Based	Hamilton-based	WEO-based	HP-Based	Hamilton-based
λ	$dep.var_{.t-1}$	-0.202***	-0.268***	-0.274***	-0.219**	-0.308***	-0.331***
		(0.064)	(0.047)	(0.046)	(0.093)	(0.052)	(0.076)
ω_0	Y_{t-1}	-0.050	-0.004	0.085	0.422*	-0.341	-0.309
		(0.109)	(0.103)	(0.095)	(0.252)	(0.416)	(0.506)
ω_1	ΔY_t	-0.298	-0.132	0.050	2.488**	-0.184	0.535
		(0.446)	(0.351)	(0.308)	(1.096)	(1.571)	(1.780)
δ_0	$Y^{av}{}_{t-1}$	-0.040*	0.010	-0.004	-0.093	-0.012	0.041
		(0.025)	(0.023)	(0.024)	(0.058)	(0.083)	(0.114)
δ_1	$\Delta Y^{av}{}_t$	-0.025	0.162**	0.135**	-0.092	0.771**	0.679
		(0.078)	(0.074)	(0.064)	(0.163)	(0.372)	(0.432)
α_1	$FCE_{t-1} \times FC^m$	0.150**	0.096	0.060	-0.345**	0.064	0.761
		(0.066)	(0.094)	(0.092)	(0.164)	(0.457)	(0.706)
α_2	$FCE_{t-1} \times (1 - FC^m)$	-0.019	-0.000	-0.004	0.003	-0.030	-0.140
		(0.038)	(0.018)	(0.018)	(0.064)	(0.108)	(0.127)
β_1	$TF_{t-1} \times FC^m$	0.120	0.092*	0.079	0.280	0.437	-0.132
		(0.095)	(0.054)	(0.063)	(0.231)	(0.346)	(0.487)
β_2	$TF_{t-1} \times (1 - FC^m)$	0.043	-0.318	-0.174	-0.242	0.296	9.975
		(0.514)	(0.949)	(1.139)	(1.181)	(4.473)	(8.106)
γ_1	$TAX_{t-1} \times FC^m$	0.169	0.666**	0.396*	-0.996	1.246	1.193
		(0.347)	(0.276)	(0.231)	(0.677)	(1.255)	(1.599)
γ_2	$TAX_{t-1} \times (1 - FC^m)$	-0.177	-0.064	0.079	0.698	1.492	-0.303
		(0.468)	(0.288)	(0.324)	(1.278)	(1.233)	(1.707)
α_3	$\Delta FCE_t \times FC^m$	-0.071*	-0.027	-0.053	-0.006	-0.094	-0.156
		(0.038)	(0.033)	(0.036)	(0.060)	(0.178)	(0.208)
α_4	$\Delta FCE_t \times (1 - FC^m)$	1.235*	-0.106	0.082	-0.064	-0.901	0.113
		(0.647)	(0.542)	(0.445)	(1.599)	(2.057)	(1.812)
β_3	$\Delta TF_t \times FC^m$	0.585*	0.312*	0.251	0.357	0.904	0.354
		(0.355)	(0.176)	(0.177)	(0.842)	(1.067)	(1.325)
β_4	$\Delta TF_t \times (1 - FC^m)$	0.106*	0.151**	0.102*	-0.291*	0.168	0.374
		(0.055)	(0.071)	(0.058)	(0.153)	(0.332)	(0.436)
γ_3	$\Delta TAX_t \times FC^m$	-0.041	-0.010	-0.018	-0.010	0.004	-0.045
		(0.040)	(0.013)	(0.014)	(0.054)	(0.093)	(0.096)
γ_4	$\Delta TAX_t \times (1 - FC^m)$	0.181	0.053	0.054	0.238	0.302	0.166
		(0.122)	(0.047)	(0.047)	(0.248)	(0.235)	(0.336)
Obs.		1,003	1,698	1,684	843	1,451	1,439
# countries		60	96	96	50	84	84
Kleibergen-Paap p-value		0.285	0.900	0.908	0.519	0.937	0.927
Sargan–Hansen p-value		n.a.	0.619	0.326	0.012	0.604	0.720
H0 (p-values)							
$\alpha_1 - \alpha_2 = 0$		0.828	0.639	0.826	0.927	0.959	0.217
$\gamma_1 - \gamma_2 = 0$		0.073	0.725	0.995	0.823	0.558	0.908
$-\alpha_1 - \gamma_1 = 0$		0.010	0.030	0.054	0.765	0.184	0.186
$\beta_1 - \beta_2 = 0$		0.729	0.823	0.795	0.586	0.221	0.923

Note: Robust standard errors clustered at the country level are reported in parenthesis. Constant term and country and time effects estimated but omitted for reasons of parsimony. *, **, *** denote significance at 10, 5 and 1% levels.

4.3. Robustness and Sensitivity

4.3.1. Income Groups and Geographical Regions

To shed light on sample heterogeneity, we have estimated the effects of the Hamilton-based fiscal consolidations on both per capita real private consumption and investment by income group (Table 4) and by geographical regions (Tables 5a and 5b). Results are relatively close to those reflected previously in Tables 2 and 3. However, these effects seem to matter the most in the case of advanced economies (for developing countries coefficient estimates are seldomly significant). Even when both groups of countries show a statistically significant effect of a given fiscal variable on private consumption or investment, the effect is typically stronger

in advanced economies (see e.g. the effect of taxes on real per capita private consumption, in columns 1 and 2 of Table 4).

The effects on real per capita private consumption varies by geographical region. While the countries belonging to the Middle East, North Africa, Afghanistan, and Pakistan (MENAP) and Europe regions exhibit, during a fiscal consolidation, positive effects of government spending on private consumption, Sub-Saharan Africa (SSA) countries experience opposite effects of government spending on consumption (and this is independent of whether these economies are experiencing a fiscal consolidation or not-see Table 5a).Such results are also extensive to the effects of higher taxation on consumption for MENAP and European countries. Lastly, regarding social transfers, MENAP countries show stronger positive effects of this fiscal variable on private consumption during a fiscal consolidation episode,; in contrast we find evidence of a negative impact of an increase in transfers increase on consumption for Asian, SSA and European countries.

For Asian countries we find evidence of negative effects of transfers on consumption during a fiscal episode (there are no statistically significant effects of social transfers in Asian countries in the absence of fiscal consolidations and vice-versa for SSA and European countries). In what concerns to the effects of fiscal consolidation over real private investment per capita, it is worth mentioning that tax revenues are relevant in explaining private investment dynamics when fiscal consolidation is taking place (Table 5b, column 5).

Table 4: Estimation results for real per capita private consumption and investment by country group, IV (Hamilton-based) – 1970-2018

Dependent Variable		Real Private consumption per capita		Real Private investment per capita	
	Specification	**1**	**2**	**3**	**4**
	Income Group	**AE**	**DEV**	**AE**	**DEV**
λ	$dep.var._{t-1}$	-0.089***	-0.276***	-0.235***	-0.333***
		(0.034)	(0.050)	(0.059)	(0.081)
ω_0	Y_{t-1}	-0.009	0.057	0.402*	-0.191
		(0.047)	(0.118)	(0.244)	(0.585)
ω_1	ΔY_t	0.397***	-0.129	2.187***	0.881
		(0.154)	(0.379)	(0.672)	(2.149)
δ_0	${Y^{av}}_{t-1}$	0.001	0.025	0.046	-0.025
		(0.013)	(0.034)	(0.055)	(0.139)
δ_1	$\Delta {Y^{av}}_t$	0.055**	0.233*	0.161*	0.749
		(0.025)	(0.125)	(0.094)	(0.628)
α_1	$FCE_{t-1} \times FC^m$	0.103**	0.040	0.032	0.754
		(0.052)	(0.126)	(0.287)	(0.834)
α_2	$FCE_{t-1} \times (1 - FC^m)$	-0.006	0.005	-0.190**	-0.167
		(0.025)	(0.028)	(0.095)	(0.185)
β_1	$TF_{t-1} \times FC^m$	-0.029	0.101	0.060	-0.159
		(0.046)	(0.078)	(0.169)	(0.545)
β_2	$TF_{t-1} \times (1 - FC^m)$	0.449	-0.773	-1.830	11.128
		(0.461)	(1.570)	(2.966)	(9.582)
γ_1	$TAX_{t-1} \times FC^m$	0.646***	0.485*	1.878*	0.765
		(0.227)	(0.273)	(1.170)	(1.795)
γ_2	$TAX_{t-1} \times (1 - FC^m)$	-0.690**	0.234	0.678	-0.665
		(0.327)	(0.416)	(1.407)	(1.926)
α_3	$\Delta FCE_t \times FC^m$	0.068	-0.057	-0.779	-0.132
		(0.195)	(0.039)	(0.632)	(0.233)
α_4	$\Delta FCE_t \times (1 - FC^m)$	0.041	-0.058	-0.428	-0.352
		(0.468)	(0.480)	(1.363)	(1.744)
β_3	$\Delta TF_t \times FC^m$	0.119	0.294	-0.002	0.260
		(0.125)	(0.192)	(0.433)	(1.443)
β_4	$\Delta TF_t \times (1 - FC^m)$	0.083*	0.119	0.200	0.290
		(0.050)	(0.075)	(0.223)	(0.496)
γ_3	$\Delta TAX_t \times FC^m$	0.009	-0.020	-0.140	-0.030
		(0.040)	(0.015)	(0.126)	(0.113)
γ_4	$\Delta TAX_t \times (1 - FC^m)$	-0.021	0.054	-0.179	0.159
		(0.038)	(0.056)	(0.144)	(0.383)
Obs.		564	1,120	419	1,020
# countries		27	68	20	63
Kleibergen-Paap p-value		0.627	0.944	0.676	0.958
Sargan–Hansen p-value		0.749	0.462	0.551	0.743
H0 (p-values)					
$\alpha_1 - \alpha_2 = 0$		0.445	0.578	0.497	0.240
$\gamma_1 - \gamma_2 = 0$		0.886	0.756	0.733	0.926
$-\alpha_1 - \gamma_1 = 0$		0.110	0.131	0.684	0.293
$\beta_1 - \beta_2 = 0$		0.032	0.570	0.528	0.794

Note: Robust standard errors clustered at the country level are reported in parenthesis. Constant term and country and time effects estimated but omitted for reasons of parsimony. *, **, *** denote significance at 10, 5 and 1% levels.

Table 5a: Estimation results for real per capita private consumption by geographical region, IV (Hamilton-based) – 1970-2018

Dependent Variable		Real Private consumption per capita				
Specification		1	2	3	4	5
Region		Latin America	MENAP	SSA	Europe	Asia
λ	$dep.var_{.t-1}$	-0.243**	-0.195*	-0.677***	-0.116***	-0.291***
		(0.099)	(0.102)	(0.152)	(0.032)	(0.091)
ω_0	Y_{t-1}	-0.190	-0.162	0.716***	0.011	0.367**
		(0.191)	(0.220)	(0.182)	(0.055)	(0.148)
ω_1	ΔY_t	-0.397	-1.121*	0.345	0.575***	1.082***
		(0.774)	(0.598)	(0.495)	(0.161)	(0.254)
δ_0	${Y^{av}}_{t-1}$	0.001	0.098	0.117	-0.024**	0.040
		(0.090)	(0.083)	(0.115)	(0.012)	(0.052)
δ_1	$\Delta {Y^{av}}_t$	0.398	-0.022	0.435*	0.034	0.196
		(0.276)	(0.266)	(0.237)	(0.033)	(0.129)
α_1	$FCE_{t-1} \times FC^m$	0.306	0.257**	-0.121	0.144***	-0.146
		(0.210)	(0.126)	(0.144)	(0.048)	(0.161)
α_2	$FCE_{t-1} \times (1 - FC^m)$	-0.024	0.077	-0.061**	-0.007	0.032
		(0.047)	(0.058)	(0.024)	(0.031)	(0.052)
β_1	$TF_{t-1} \times FC^m$	0.106	0.110	0.024	-0.038	-0.005
		(0.188)	(0.076)	(0.131)	(0.046)	(0.159)
β_2	$TF_{t-1} \times (1 - FC^m)$	1.345	-1.019	0.202	0.018	-0.246
		(1.018)	(1.959)	(1.040)	(0.478)	(0.794)
γ_1	$TAX_{t-1} \times FC^m$	0.506	0.576*	-0.370	0.431**	0.122
		(0.471)	(0.302)	(0.231)	(0.202)	(0.256)
γ_2	$TAX_{t-1} \times (1 - FC^m)$	0.001	0.303	0.022	-0.375	-0.412
		(0.834)	(0.383)	(0.304)	(0.418)	(0.560)
α_3	$\Delta FCE_t \times FC^m$	-0.062	0.134	-0.069***	-0.048	-0.076
		(0.044)	(0.088)	(0.023)	(0.136)	(0.096)
α_4	$\Delta FCE_t \times (1 - FC^m)$	0.538	-0.026	-1.073	0.395	-0.138
		(0.489)	(0.345)	(1.078)	(0.336)	(0.551)
β_3	$\Delta TF_t \times FC^m$	0.545	0.519**	0.331	-0.020	-0.220*
		(0.516)	(0.224)	(0.220)	(0.121)	(0.123)
β_4	$\Delta TF_t \times (1 - FC^m)$	0.206	0.270***	-0.222***	0.135***	-0.002
		(0.135)	(0.099)	(0.085)	(0.051)	(0.061)
γ_3	$\Delta TAX_t \times FC^m$	-0.025	0.050	-0.052***	-0.016	-0.035
		(0.035)	(0.044)	(0.016)	(0.034)	(0.042)
γ_4	$\Delta TAX_t \times (1 - FC^m)$	0.206	0.109	0.126*	-0.020	-0.065
		(0.140)	(0.079)	(0.068)	(0.043)	(0.051)
Obs.		354	190	237	582	149
# countries		20	11	13	30	7
Kleibergen-Paap p-value		0.986	0.730	0.977	0.667	0.637
Sargan–Hansen p-value		0.955	0.919	0.600	0.974	0.150
H0 (p-values)						
$\alpha_1 - \alpha_2 = 0$		0.232	0.503	0.748	0.792	0.893
$\gamma_1 - \gamma_2 = 0$		0.448	0.689	0.311	0.224	0.758
$-\alpha_1 - \gamma_1 = 0$		0.023	0.014	0.252	0.064	0.058
$\beta_1 - \beta_2 = 0$		0.976	0.575	0.784	0.359	0.420

Note: Robust standard errors clustered at the country level are reported in parenthesis. Constant term and country and time effects estimated but omitted for reasons of parsimony. *, **, *** denote significance at 10, 5 and 1% levels. Middle East, North Africa, Afghanistan, and Pakistan (MENAP), Sub-Saharan Africa (SSA).

Table 5b: Estimation results for real per capita private investment by geographical region, IV (Hamilton-based) – 1970-2018

Dependent Variable		Real Private investment per capita				
	Specification	1	2	3	4	5
	Region	Latin America	MENAP	SSA	Europe	Asia
λ	$dep.var._{t-1}$	-0.265**	-0.296***	-0.592***	-0.306***	-1.369***
		(0.111)	(0.096)	(0.145)	(0.077)	(0.360)
ω_0	Y_{t-1}	0.606	-0.461	-0.218	0.514	0.673
		(0.553)	(0.765)	(0.628)	(0.364)	(0.647)
ω_1	ΔY_t	4.198*	-0.261	-0.624	2.905***	1.950
		(2.223)	(2.917)	(2.308)	(0.798)	(2.801)
δ_0	${Y^{av}}_{t-1}$	-0.035	0.176	0.169	0.068	-0.288
		(0.269)	(0.270)	(0.398)	(0.068)	(0.240)
δ_1	$\Delta {Y^{av}}_t$	-0.634	0.147	2.466**	0.008	0.121
		(0.836)	(0.652)	(1.064)	(0.172)	(0.610)
α_1	$FCE_{t-1} \times FC^m$	-0.439	0.436	0.071	0.047	1.002
		(0.453)	(0.480)	(0.744)	(0.311)	(1.095)
α_2	$FCE_{t-1} \times (1 - FC^m)$	0.055	0.185	-0.053	-0.339	-0.278
		(0.113)	(0.157)	(0.351)	(0.247)	(0.385)
β_1	$TF_{t-1} \times FC^m$	-0.156	0.263	0.551	-0.016	-0.201
		(0.483)	(0.259)	(0.788)	(0.258)	(0.722)
β_2	$TF_{t-1} \times (1 - FC^m)$	-2.039	-2.130	0.391	-4.705	2.988
		(1.672)	(4.743)	(4.761)	(3.406)	(3.141)
γ_1	$TAX_{t-1} \times FC^m$	-1.170	0.532	0.827	1.046	3.846**
		(1.172)	(1.093)	(2.281)	(1.118)	(1.577)
γ_2	$TAX_{t-1} \times (1 - FC^m)$	0.208	0.068	0.636	2.515	-0.642
		(2.104)	(0.970)	(2.421)	(1.831)	(1.619)
α_3	$\Delta FCE_t \times FC^m$	0.056	0.289	0.131	0.380	0.862
		(0.101)	(0.296)	(0.457)	(0.762)	(0.921)
α_4	$\Delta FCE_t \times (1 - FC^m)$	0.362	-1.032	-5.509	-0.452	-2.525
		(1.664)	(0.975)	(6.381)	(2.085)	(2.821)
β_3	$\Delta TF_t \times FC^m$	-1.314	1.324	-0.274	-0.153	0.380
		(1.387)	(1.036)	(1.461)	(0.548)	(1.776)
β_4	$\Delta TF_t \times (1 - FC^m)$	-0.482	0.338	-0.190	0.034	0.232
		(0.316)	(0.389)	(0.827)	(0.295)	(0.652)
γ_3	$\Delta TAX_t \times FC^m$	0.049	0.176	0.105	-0.127	0.093
		(0.081)	(0.142)	(0.346)	(0.185)	(0.324)
γ_4	$\Delta TAX_t \times (1 - FC^m)$	-0.131	0.312	0.709	-0.232	0.137
		(0.381)	(0.306)	(0.495)	(0.214)	(0.322)
Obs.		342	190	224	418	130
# countries		19	11	13	22	6
Kleibergen-Paap p-value		0.979	0.734	1.000	0.406	0.438
Sargan–Hansen p-value		0.870	0.880	0.145	0.842	0.708
H0 (p-values)						
$\alpha_1 - \alpha_2 = 0$		0.255	0.587	0.944	0.146	0.427
$\gamma_1 - \gamma_2 = 0$		0.776	0.190	0.360	0.846	0.302
$-\alpha_1 - \gamma_1 = 0$		0.206	0.299	0.219	0.932	0.202
$\beta_1 - \beta_2 = 0$		0.942	0.904	0.795	0.103	0.815

Note: Robust standard errors clustered at the country level are reported in parenthesis. Constant term and country and time effects estimated but omitted for reasons of parsimony. *, **, *** denote significance at 10, 5 and 1% levels. Middle East, North Africa, Afghanistan, and Pakistan (MENAP), Sub-Saharan Africa (SSA).

4.3.2. Composition of Fiscal Consolidations

Regarding the composition of the fiscal episode, we also assessed if the effects differ due to the fact that a consolidation is more based on the spending side or on the revenue (tax) side of the budget. From Table 6 (columns 3 and 4) we can detect that a consolidation more on the spending side, via final government consumption, promotes higher private investment, while that is not the case for the consolidations on the revenue side. Additionally, that effect on private investment has a higher magnitude for the case where a spending based consolidation takes place, than when it does not occur.

Table 6: Estimation results for real per capita private consumption and investment, spending vs. tax-based consolidations, IV (Hamilton-based) – 1970-2018

Dependent Variable		Real Private consumption per capita		Real Private Investment per capita	
	Specification	1	2	3	4
		Hamilton-based		Hamilton-based	
	Consolidation Composition	Spending-based	Tax-based	Spending-based	Tax-based
λ	$dep.var_{.t-1}$	-0.265***	-0.272***	-0.317***	-0.331***
		(0.023)	(0.049)	(0.033)	(0.068)
ω_0	Y_{t-1}	0.166**	0.073	-0.481	0.616
		(0.071)	(0.111)	(0.374)	(0.474)
ω_1	ΔY_t	0.582**	0.047	0.397	2.954*
		(0.237)	(0.343)	(1.150)	(1.592)
δ_0	$Y^{av}{}_{t-1}$	0.012	-0.001	0.094	-0.066
		(0.022)	(0.023)	(0.123)	(0.104)
δ_1	$\Delta Y^{av}{}_t$	0.188**	0.138*	1.071**	0.481
		(0.083)	(0.071)	(0.427)	(0.425)
α_1	$FCE_{t-1} \times FC^m$	0.054	0.070	1.035**	-0.407
		(0.084)	(0.071)	(0.489)	(0.359)
α_2	$FCE_{t-1} \times (1 - FC^m)$	0.148**	0.117*	0.816**	-0.434
		(0.063)	(0.069)	(0.396)	(0.337)
β_1	$TF_{t-1} \times FC^m$	-0.003	0.003	-0.273*	-0.019
		(0.028)	(0.017)	(0.161)	(0.109)
β_2	$TF_{t-1} \times (1 - FC^m)$	-0.024**	-0.018	-0.131	0.029
		(0.012)	(0.014)	(0.104)	(0.091)
γ_1	$TAX_{t-1} \times FC^m$	0.011	0.072	-0.120	0.086
		(0.053)	(0.049)	(0.259)	(0.265)
γ_2	$TAX_{t-1} \times (1 - FC^m)$	-0.060	0.047	-0.019	0.080
		(0.045)	(0.046)	(0.216)	(0.221)
α_3	$\Delta FCE_t \times FC^m$	-1.403	-0.165	6.692	1.202
		(1.019)	(0.643)	(4.571)	(2.751)
α_4	$\Delta FCE_t \times (1 - FC^m)$	0.591**	0.436	3.393**	-1.126
		(0.245)	(0.295)	(1.427)	(1.447)
β_3	$\Delta TF_t \times FC^m$	-0.175	0.254	-0.048	-1.738
		(0.240)	(0.608)	(1.102)	(2.564)
β_4	$\Delta TF_t \times (1 - FC^m)$	-0.069**	-0.053*	-0.352*	-0.009
		(0.032)	(0.032)	(0.210)	(0.152)
γ_3	$\Delta TAX_t \times FC^m$	0.003	0.184	-1.739	-2.487
		(0.673)	(0.471)	(2.973)	(1.939)
γ_4	$\Delta TAX_t \times (1 - FC^m)$	-0.158	0.225	-0.059	-0.343
		(0.151)	(0.169)	(0.713)	(1.047)
Obs.		1,684	1684	1,439	1439
# countries		60	96	50	84
Kleibergen-Paap p-value		0.22	0.68	0.45	0.70
Sargan–Hansen p-value		0.05	0.64	0.28	0.54
H0 (p-values)					
$\alpha_1 - \alpha_2 = 0$		0.131	0.707	0.188	0.557
$\gamma_1 - \gamma_2 = 0$		0.989	0.813	0.593	0.201
$-\alpha_1 - \gamma_1 = 0$		0.335	0.088	0.021	0.404
$\beta_1 - \beta_2 = 0$		0.461	0.679	0.833	0.505

Note: Robust standard errors clustered at the country level are reported in parenthesis. Constant term and country and time effects estimated but omitted for reasons of parsimony. *, **, *** denote significance at 10, 5 and 1% levels.

4.3.3. Debt thresholds

The effects of government spending on private consumption may depend on the level of government indebtedness. That is, the effects of government spending could become less Keynesian if large increases in the debt-to-GDP ratio occur or if these are already at relatively high levels as policy options are constrained and governments have less room for manoeuvre.

In order to assess how different levels of government indebtedness affect the responsiveness of private consumption and investment, we consider a threshold for the debt ratio using a dummy variable *highdebt* defined as follows: $highdebt_{it}$ takes the value 1 if the debt ratio is above the average of the debt ratio in year *t* for the respective income group sample, and 0 otherwise, represented by *lowdebt* (effectively it corresponds to 1-*highdebt*).

Results are shown in Table 7. We observe that the increase in government expenditure is positively associated with real private consumption in both advanced and developing economies irrespective of the indebtedness level. However, advanced economies with low government debt witness a larger reduction in private consumption from an increase in government spending when fiscal consolidations are not occurring.

Social transfers only affect real private consumption per capita in the case of developing economies: increasing social transfers has a negative toll on consumption independently of public indebtedness levels and of the occurrence, or not, of fiscal consolidations. Tax increases positively affect consumption per capita, exhibiting Ricardian behaviour mainly in highly indebted countries.

Regarding the effects of fiscal variables on private investment, an increase in government final consumption reduces real per capita private investment in advanced economies with lower debt levels and not experiencing a fiscal contraction. The opposite effect is found for social transfers, where higher levels are of this fiscal variable are associated with higher investment levels, only for lower debt developing economies. Lastly, an expansionary fiscal consolidation occurs with the increase of tax revenues in advanced economies facing higher debt levels and during fiscal contraction episodes.

Table 7: Estimation results for real per capita private consumption and investment, high and low public debt, IV (Hamilton-based) – 1970-2018

Dependent Variable	Real Private consumption per capita		Real Private investment per capita	
Specification	1	2	3	4
Income Group	AE	DEV	AE	DEV
$dep.var._{t-1}$	-0.073**	-0.287***	-0.236***	-0.288***
	(0.033)	(0.047)	(0.050)	(0.067)
Y_{t-1}	-0.028	0.186*	0.329*	-0.132
	(0.048)	(0.096)	(0.172)	(0.324)
ΔY_t	0.273**	0.458	1.588***	0.151
	(0.126)	(0.297)	(0.306)	(1.116)
${Y^{av}}_{t-1}$	-0.003	-0.012	0.035	-0.136
	(0.015)	(0.034)	(0.058)	(0.168)
$\Delta {Y^{av}}_t$	0.045*	0.276**	0.105	0.603
	(0.026)	(0.116)	(0.078)	(0.473)
$FCE_{t-1} \times FC^m \times highDebt$	0.148***	0.055	0.308	-0.346
	(0.053)	(0.114)	(0.366)	(0.488)
$FCE_{t-1} \times (1 - FC^m) \times highDebt$	0.100	0.052	0.024	-0.376
	(0.065)	(0.094)	(0.273)	(0.323)
$\mathrm{FCE}_{t-1} \times FC^m \times \mathrm{low}Debt$	0.081*	0.114**	0.086	-0.097
	(0.048)	(0.051)	(0.149)	(0.242)
$FCE_{t-1} \times (1 - FC^m) \times lowDebt$	-0.032	-0.007	-0.157*	0.399
	(0.024)	(0.049)	(0.083)	(0.339)
$TF_{t-1} \times FC^m \times highDebt$	-0.027	0.026	-0.104	0.009
	(0.029)	(0.032)	(0.092)	(0.123)
$TF_{t-1} \times (1 - FC^m) \times lowDebt$	-0.006	-0.027*	-0.087	0.028
	(0.024)	(0.014)	(0.079)	(0.124)
$TF_{t-1} \times FC^m \times highDebt$	-0.048	0.031	-0.168	0.153
	(0.040)	(0.109)	(0.371)	(0.560)
$TF_{t-1} \times (1 - FC^m) \times lowDebt$	-0.000	0.004	0.054	0.659**
	(0.046)	(0.063)	(0.218)	(0.308)
$TAX_{t-1} \times FC^m \times highDebt$	0.000	-0.005	-0.033	0.414*
	(0.041)	(0.048)	(0.103)	(0.230)
$TAX_{t-1} \times (1 - FC^m) \times lowDebt$	0.836	-0.072	-0.841	4.137
	(0.627)	(0.886)	(1.773)	(4.013)
$TAX_{t-1} \times FC^m \times highDebt$	0.247	0.312	2.688	-2.450
	(1.255)	(0.703)	(5.195)	(4.311)
$TAX_{t-1} \times (1 - FC^m) \times lowDebt$	0.593*	-0.094	1.702*	0.499
	(0.338)	(0.299)	(0.955)	(1.327)
$\Delta FCE_t \times FC^m \times highDebt$	0.524**	0.538**	0.967	-0.656
	(0.231)	(0.225)	(0.883)	(0.893)
$\Delta FCE_t \times (1 - FC^m) \times lowDebt$	-0.793*	-0.114	0.975	-1.234
	(0.483)	(0.202)	(0.971)	(1.038)
$\Delta FCE_t \times FC^m \times highDebt$	-0.331	-0.026	-2.329	-1.404
	(0.599)	(0.580)	(1.901)	(3.088)
$\Delta FCE_t \times (1 - FC^m) \times lowDebt$	-0.060	-0.083	-0.512	0.069
	(0.248)	(0.054)	(0.748)	(0.271)
$\Delta TF_t \times FC^m \times highDebt$	-0.046	-0.046*	-0.574	-0.124
	(0.111)	(0.027)	(0.384)	(0.138)
$\Delta TF_t \times (1 - FC^m) \times lowDebt$	0.094	-0.284	1.328	-0.424
	(0.439)	(0.488)	(1.731)	(2.109)
$\Delta TF_t \times FC^m \times highDebt$	0.167	0.015	0.849	0.533
	(0.455)	(0.377)	(1.514)	(1.691)
$\Delta TF_t \times (1 - FC^m) \times lowDebt$	0.178	0.118	0.310	0.826
	(0.197)	(0.181)	(0.395)	(1.079)
$\Delta TAX_t \times FC^m \times highDebt$	0.174*	-0.053	0.582***	1.120
	(0.103)	(0.193)	(0.215)	(0.828)
$\Delta TAX_t \times (1 - FC^m) \times lowDebt$	0.076*	0.109**	0.159	-0.101
	(0.046)	(0.055)	(0.137)	(0.219)
$\Delta TAX_t \times FC^m \times highDebt$	-0.009	-0.016	-0.136	0.031
	(0.023)	(0.013)	(0.089)	(0.096)
$\Delta TAX_t \times (1 - FC^m) \times lowDebt$	0.010	-0.002	-0.060	0.393*
	(0.032)	(0.048)	(0.114)	(0.221)
Obs.	564	1,120	419	1,020
# countries	27	68	20	63
Kleibergen-Paap p-value	0.998	0.938	0.971	0.808
Sargan–Hansen p-value	0.411	0.336	0.538	0.941

Note: Robust standard errors clustered at the country level are reported in parenthesis. Constant term and country and time effects estimated but omitted for reasons of parsimony. *, **, *** denote significance at 10, 5 and 1% levels.

4.3.4. Financial Crises

The influence of financial crises is likely to play a role when austerity and fiscal consolidations are being designed and implemented. While financial crises were not abundant in OECD countries prior to 2008 (although some significant crises took place in countries as Spain, the US, Finland, or Sweden before the "Great Recession") there are enough cases to consider. In what follows, we rely on Laeven and Valencia (2013, 2018) database (which was recently updated and is publicly available) to assess whether the link between fiscal consolidations and private consumption and investment is different during such crises episodes. These episodes include precise dating for (systemic) banking crises, currency crises, debt crises and sovereign debt restructurings. Under an impaired credit channel (near to) zero-bound monetary policy (in more recent years) the link between these variables is likely to differ and this is a hypothesis worth investigating. From a policy perspective a relevant message can be extracted such as the need to prop up the financial sector to restore confidence and the channelling of savings to private investment thus favouring a non-Keynesian outcome of fiscal consolidations. Using a specification similar to the one in the previous section for the case of debt thresholds and by means of a dummy variable (*crisis*) for financial crises, we obtain the estimates in Table 7.

The results in Table 8 show that when there are no crises, the increase of government spending (taxation), in the presence of fiscal consolidations (in the absence of fiscal consolidations), increase real private consumption per capita in advanced economies. An increase in tax and government spending levels positively affects real per capita consumption when a consolidation is taking place but there was no financial crisis. The opposite effect is verified when an economy sees itself in a situation where it is experiencing, at a same time, a financial crisis and does not consolidate. Regarding the fiscal impact over real private investment, both government spending (during a crisis) and taxes (without experiencing a financial crisis) positively affects investment during a fiscal consolidation episode. The increase in the overall tax burden in a non-crisis period and in the absence of consolidation negatively impacts private investment, while the rise in social transfers during a financial crisis concomitant with a fiscal retrenchment period leads to a fall in investment levels.

Table 8: Estimation results for real per capita private consumption and investment, financial crises, IV (Hamilton-based) – 1970-2018

Dependent Variable	Real Private consumption per capita		Real Private investment per capita	
Specification	1	2	3	4
Income Group	AE	DEV	AE	DEV
$dep.var._{t-1}$	-0.060	-0.262***	-0.220***	-0.327***
	(0.038)	(0.049)	(0.063)	(0.071)
Y_{t-1}	-0.015	0.063	0.260	-0.041
	(0.057)	(0.086)	(0.208)	(0.462)
ΔY_t	0.426**	-0.040	2.221***	1.031
	(0.195)	(0.296)	(0.519)	(1.690)
${Y^{av}}_{t-1}$	-0.017	0.018	0.092	-0.028
	(0.014)	(0.034)	(0.063)	(0.129)
$\Delta {Y^{av}}_t$	0.042*	0.203	0.189*	0.415
	(0.024)	(0.187)	(0.107)	(0.806)
$FCE_{t-1} \times FC^m \times crisis$	0.331	1.525	-0.120	19.567
	(0.341)	(2.611)	(0.222)	(19.811)
$FCE_{t-1} \times FC^m \times nocrisis$	0.088*	0.095	0.279	0.570
	(0.051)	(0.103)	(0.329)	(0.561)
$FCE_{t-1} \times (1 - FC^m) \times crisis$	0.210	0.137	-0.202	0.141
	(0.234)	(0.116)	(0.675)	(0.558)
$FCE_{t-1} \times (1 - FC^m) \times nocrisis$	-0.273	0.196		-0.739
	(0.332)	(0.412)		(2.579)
$TF_{t-1} \times FC^m \times crisis$	-0.011	0.007	-0.156	-0.109
	(0.024)	(0.027)	(0.100)	(0.143)
$TF_{t-1} \times FC^m \times nocrisis$	-0.316	-0.066	0.116	-0.185
	(0.244)	(0.078)	(1.165)	(0.370)
$TF_{t-1} \times (1 - FC^m) \times crisis$		-1.861		-18.807
		(2.916)		(18.835)
$TF_{t-1} \times (1 - FC^m) \times nocrisis$	-0.033	0.023	-0.140	-0.234
	(0.047)	(0.100)	(0.268)	(0.489)
$TAX_{t-1} \times FC^m \times crisis$	0.174	0.060	0.147	0.219
	(0.277)	(0.054)	(1.123)	(0.288)
$TAX_{t-1} \times FC^m \times nocrisis$		0.907		23.248
		(3.651)		(22.260)
$TAX_{t-1} \times (1 - FC^m) \times crisis$	0.613	-0.167	-0.873	6.766
	(0.403)	(0.918)	(1.648)	(4.798)
$TAX_{t-1} \times (1 - FC^m) \times nocrisis$	5.652**	1.328	5.911	6.183
	(2.692)	(1.398)	(7.426)	(7.688)
$\Delta FCE_t \times FC^m \times crisis$	0.268	0.436**	2.814***	0.262
	(0.213)	(0.203)	(0.895)	(1.138)
$\Delta FCE_t \times FC^m \times nocrisis$		0.232		-11.531
		(1.345)		(23.510)
$\Delta FCE_t \times (1 - FC^m) \times crisis$	-0.793**	-0.043	1.254	-0.692
	(0.384)	(0.118)	(1.540)	(0.828)
$\Delta FCE_t \times (1 - FC^m) \times nocrisis$	-3.257	0.356	-0.201	2.192
	(2.490)	(0.377)	(14.925)	(2.328)
$\Delta TF_t \times FC^m \times crisis$	0.157	-0.075*	-0.956**	-0.215
	(0.118)	(0.039)	(0.414)	(0.212)
$\Delta TF_t \times FC^m \times nocrisis$		-2.942		19.812
		(2.756)		(55.900)
$\Delta TF_t \times (1 - FC^m) \times crisis$	-0.102	0.376	-0.893	0.788
	(0.358)	(0.372)	(1.650)	(1.542)
$\Delta TF_t \times (1 - FC^m) \times nocrisis$	-0.045	0.123	1.052	-2.886
	(0.765)	(0.953)	(6.375)	(4.167)
$\Delta TAX_t \times FC^m \times crisis$	0.100	0.236	-0.294	0.181
	(0.115)	(0.167)	(0.418)	(0.890)
$\Delta TAX_t \times FC^m \times nocrisis$	0.051	0.113**	0.349**	0.105
	(0.046)	(0.051)	(0.175)	(0.285)
$\Delta TAX_t \times (1 - FC^m) \times crisis$	0.009	-0.026*	-0.081	-0.046
	(0.026)	(0.016)	(0.105)	(0.100)
$\Delta TAX_t \times (1 - FC^m) \times nocrisis$	-0.010	0.044	-0.296**	0.151
	(0.034)	(0.053)	(0.139)	(0.258)
Obs.	564	1,120	419	1,020
# countries	27	68	20	63
Kleibergen-Paap p-value	0.995	1.000	0.986	1.000
Sargan–Hansen p-value	0.911	0.744	0.957	0.944

Note: Robust standard errors clustered at the country level are reported in parenthesis. Constant term and country and time effects estimated but omitted for reasons of parsimony. *, **, *** denote significance at 10, 5 and 1% levels.

5. Conclusion and Policy Implications´

We have assessed in a panel framework, for an unbalanced sample of 174 countries between 1970-2018 (37 advanced and 137 developing economies), whether a usually expected negative response of private consumption and private investment to a fiscal consolidation is reversed. We have employed three alternative measures of the Cyclically Adjusted Primary Balance to determine the so-called fiscal episodes: i) sourced from the WEO based; ii) HP-based; and iii) Hamilton-based.

Our main results can be summarised as follows: i) increases in general government final consumption expenditure have a positive (Keynesian) effect on real per capita private consumption; : ii) there is a positive effect of tax increases on private consumption when there is a fiscal consolidation; iii) there is a crowding-in effect for private investment, from fiscal contractions. In addition, these effects are the strongest in advanced economies vis-à-vis developing countries (notably for the Hamilton-based fiscal consolidations). Expansionary fiscal consolidations occur particularly in highly indebted advanced economies following an increase in taxes. Finally, the negative effect of taxation on private consumption is larger when an economy is experiencing a financial crisis but it is not consolidating.

On the basis of our findings, it is relevant to consider that a fiscal retrenchment can in some cases contribute to an increase in domestic demand via private investment, a channel that should not be disregarded, notably if it implies lower tax rates. Regarding the level of government indebtedness, advanced economies with low government debt ratios endure a larger reduction in private consumption after increases in government spending and when fiscal consolidations are not occurring. In that sense, consumers in low debt countries would behave in a less profligate fashion when the government does not consolidate. Therefore, we present, in a general and summarized way, the results obtained in Table 9.

Possible future work could try to disentangle between countries that at some point appear to be more pressed for implementing fiscal austerity than others, which might imply different public perceptions and consumer reactions.

Table 9: Summary results

Real per capita consumption

	Baseline		Income Group				Source of fiscal policy consolidation			
			AE		DEV		Spending-based		Tax-based	
	Consol.	Not Consol.	Consol.	Not Consol.	Consol.	Not Consol.	Consol.	Not Consol.	Consol.	Not Consol.
FCE	+	+	+	0	0	0	+	0	+	0
TF	0	0	+	0	0	0	0	-	0	-
TAX	-	0	+	-	+	0	0	0	0	0

	Geographical Group									
	Latin America		MENAP		SSA		Europe		Asia	
	Consol.	Not Consol.	Consol.	Not Consol.	Consol.	Not Consol.	Consol.	Not Consol.	Consol.	Not Consol.
FCE	0	0	+	0	-	-	+	0	0	0
TF	0	0	+	+	0	0	0	+	-	0
TAX	0	0	+	0	-	+	+	0	0	0

Real per capita investment

	Baseline		Income Group				Source of fiscal policy consolidation			
			AE		DEV		Tax-based		Spending-based	
	Consol.	Not Consol.	Consol.	Not Consol.	Consol.	Not Consol.	Consol.	Not Consol.	Consol.	Not Consol.
FCE	-	-	0	-	0	0	+	+	0	0
TF	+	0	0	0	0	0	-	0	0	0
TAX	+	+	+	0	0	0	0	0	0	0

	Geographical Group									
	Latin America		MENAP		SSA		Europe		Asia	
	Consol.	Not Consol.	Consol.	Not Consol.	Consol.	Not Consol.	Consol.	Not Consol.	Consol.	Not Consol.
FCE	0	0	0	0	0	0	0	0	0	0
TF	0	0	0	0	0	0	0	0	0	0
TAX	0	0	0	0	0	0	0	0	+	0

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APPENDIX

Table A1. Summary statistics of fiscal Consolidations based on the change in the CAPB, WEO, HP-based and Hamilton-based, full sample, and per criterion of economic development.

Full Sample								
	Mean	*Std.Dev.*	*Min.*	*Max.*	*p1*	*p99*	*Skewness*	*Kurtosis*	*Obs.*
WEO-based	1.828	1.42	0.509	10.944	0.519	7.731	2.632	13.137	225
HP-based	6.219	33.648	-4.341	554.058	-0.017	49.466	13.59	198.826	672
Hamilton-based	6.701	35.095	-55.358	569.693	-0.047	90.787	12.791	181.82	669
Advanced Economies								
	Mean	*Std.Dev.*	*Min.*	*Max.*	*p1*	*p99*	*Skewness*	*Kurtosis*	*Obs.*
WEO-based	1.592	1.07	0.513	5.759	0.519	5.508	1.769	6.291	122
HP-based	1.617	1.42	0.132	10.653	0.14	7.318	2.893	14.52	169
Hamilton-based	1.523	1.188	0.17	8.047	0.356	6.089	2.366	10.072	171
Developing Economies								
	Mean	*Std.Dev.*	*Min.*	*Max.*	*p1*	*p99*	*Skewness*	*Kurtosis*	*Obs.*
WEO-based	2.107	1.709	0.509	10.944	0.551	8.39	2.504	11.079	103
HP-based	7.766	38.771	-4.341	554.058	-0.023	71.336	11.758	148.963	503
Hamilton-based	8.479	40.528	-55.358	569.693	-0.481	117.239	11.035	135.526	498

Table A2. Estimation results for real per capita private investment controlled for real interest rate, IV – 1970-2018, all sample

Dependent Variable		Real Private Investment per capita		
	Specification	**1**	**2**	**3**
		WEO-based	**HP-Based**	**Hamilton-based**
λ	$dep.var._{t-1}$	-0.169	-0.310***	-0.314***
		(0.114)	(0.063)	(0.071)
ω_0	Y_{t-1}	-0.400	-0.540	-0.186
		(0.463)	(0.498)	(0.533)
ω_1	ΔY_t	0.332	-0.802	0.350
		(1.587)	(1.489)	(1.529)
δ_0	${Y^{av}}_{t-1}$	-0.073	0.166	0.197
		(0.084)	(0.116)	(0.137)
δ_1	${\Delta Y^{av}}_t$	0.205	0.587	0.234
		(0.386)	(0.456)	(0.515)
δ_2	r_t	0.003	0.001	0.006
		(0.003)	(0.005)	(0.006)
α_1	$FCE_{t-1} \times FC^m$	-0.260	0.085	0.045
		(0.244)	(0.365)	(0.428)
α_2	$FCE_{t-1} \times (1 - FC^m)$	0.078	-0.056	-0.070
		(0.087)	(0.104)	(0.098)
β_1	$TF_{t-1} \times FC^m$	0.907***	0.466*	0.197
		(0.338)	(0.280)	(0.268)
β_2	$TF_{t-1} \times (1 - FC^m)$	-0.742	0.742	3.439
		(1.147)	(3.447)	(4.148)
γ_1	$TAX_{t-1} \times FC^m$	-0.488	0.480	-1.205
		(0.876)	(1.356)	(1.627)
γ_2	$TAX_{t-1} \times (1 - FC^m)$	-1.058	0.303	-1.908
		(1.645)	(1.996)	(3.093)
α_3	$\Delta FCE_t \times FC^m$	-0.018	-0.066	-0.028
		(0.084)	(0.142)	(0.128)
α_4	$\Delta FCE_t \times (1 - FC^m)$	1.390	0.154	0.448
		(1.737)	(1.422)	(1.471)
β_3	$\Delta TF_t \times FC^m$	1.676*	1.467*	1.364
		(0.962)	(0.911)	(1.011)
β_4	$\Delta TF_t \times (1 - FC^m)$	-0.158	0.120	-0.180
		(0.203)	(0.347)	(0.375)
γ_3	$\Delta TAX_t \times FC^m$	0.046	-0.032	-0.051
		(0.066)	(0.079)	(0.068)
γ_4	$\Delta TAX_t \times (1 - FC^m)$	0.846**	0.411*	0.406
		(0.374)	(0.229)	(0.263)
Obs.		527	964	958
# countries		36	62	62
Kleibergen-Paap p-value		0.557	0.936	0.872
Sargan–Hansen p-value		0.579	0.775	0.821
H0 (p-values)				
$\alpha_1 - \alpha_2 = 0$		0.653	0.837	0.383
$\gamma_1 - \gamma_2 = 0$		0.773	0.839	0.867
$-\alpha_1 - \gamma_1 = 0$		0.121	0.225	0.593
$\beta_1 - \beta_2 = 0$		0.492	0.855	0.553

Note: Robust standard errors clustered at the country level are reported in parenthesis. Constant term and country and time effects estimated but omitted for reasons of parsimony. *, **, *** denote significance at 10, 5 and 1% levels.

Table A3. Estimation results for real per capita private consumption and investment, by type of tax, IV (Hamilton-based) – 1970-2018

Dependent Variable		Real Private consumption per capita		Real Private investment per capita	
Specification		1	2	3	4
Income Group		AE	DEV	AE	DEV
λ	$dep.var._{t-1}$	-0.116***	-0.534***	-0.020	-0.339***
		(0.028)	(0.126)	(0.085)	(0.107)
ω_0	Y_{t-1}	0.049	0.499***	-0.404	0.337*
		(0.031)	(0.137)	(0.356)	(0.209)
ω_1	ΔY_t	0.296**	0.388	-0.091	2.496***
		(0.139)	(0.266)	(1.095)	(0.523)
δ_0	${Y^{av}}_{t-1}$	-0.034***	-0.042	-0.063	-0.042
		(0.010)	(0.060)	(0.073)	(0.137)
δ_1	${\Delta Y^{av}}_t$	0.015	-0.078	-0.224*	0.150
		(0.023)	(0.122)	(0.115)	(0.229)
α_1	$DirTax_{t-1} \times FC^m$	0.002	-0.021	0.042	0.034
		(0.017)	(0.068)	(0.156)	(0.119)
α_2	$DirTax_{t-1} \times (1 - FC^m)$	0.049*	0.055	0.316*	0.015
		(0.027)	(0.057)	(0.188)	(0.099)
β_1	$IndirTax_{t-1} \times FC^m$	-0.005	-0.008	0.273	-0.019
		(0.007)	(0.021)	(0.199)	(0.041)
β_2	$IndirTax_{t-1} \times (1 - FC^m)$	0.026	-0.128	1.068	-0.021
		(0.137)	(0.477)	(1.321)	(0.801)
γ_1	$SSC_{t-1} \times FC^m$	0.064	-0.099	0.516	-0.128
		(0.083)	(0.167)	(0.681)	(0.312)
γ_2	$SSC_{t-1} \times (1 - FC^m)$	0.777***	0.265	1.713	-0.100
		(0.291)	(0.317)	(1.633)	(0.709)
α_3	$\Delta DirTax_{t-1} \times FC^m$	0.206	0.363**	1.980**	0.151
		(0.161)	(0.172)	(0.996)	(0.330)
α_4	$\Delta DirTax_{t-1} \times (1 - FC^m)$	-0.015	-0.077	-0.162	-0.035
		(0.014)	(0.214)	(1.489)	(0.390)
β_3	$\Delta IndirTax_{t-1} \times FC^m$	0.002	-0.005	1.836**	-0.015
		(0.014)	(0.043)	(0.795)	(0.071)
β_4	$\Delta IndirTax_{t-1} \times (1 - FC^m)$	0.010	-0.039	0.035	0.031
		(0.017)	(0.044)	(0.156)	(0.088)
γ_3	$\Delta SSC_{t-1} \times FC^m$	0.038	0.078	0.274	0.023
		(0.027)	(0.062)	(0.197)	(0.103)
γ_4	$\Delta SSC_{t-1} \times (1 - FC^m)$	-0.008	-0.011	0.316*	-0.019
		(0.005)	(0.023)	(0.173)	(0.039)
Obs.		600	733	441	697
R2		0.584	0.160	0.002	0.387
# countries		29	62	22	59
Kleibergen-Paap p-value		0.934	0.996	0.793	0.993
Sargan–Hansen p-value		0.153	0.248	0.441	0.304

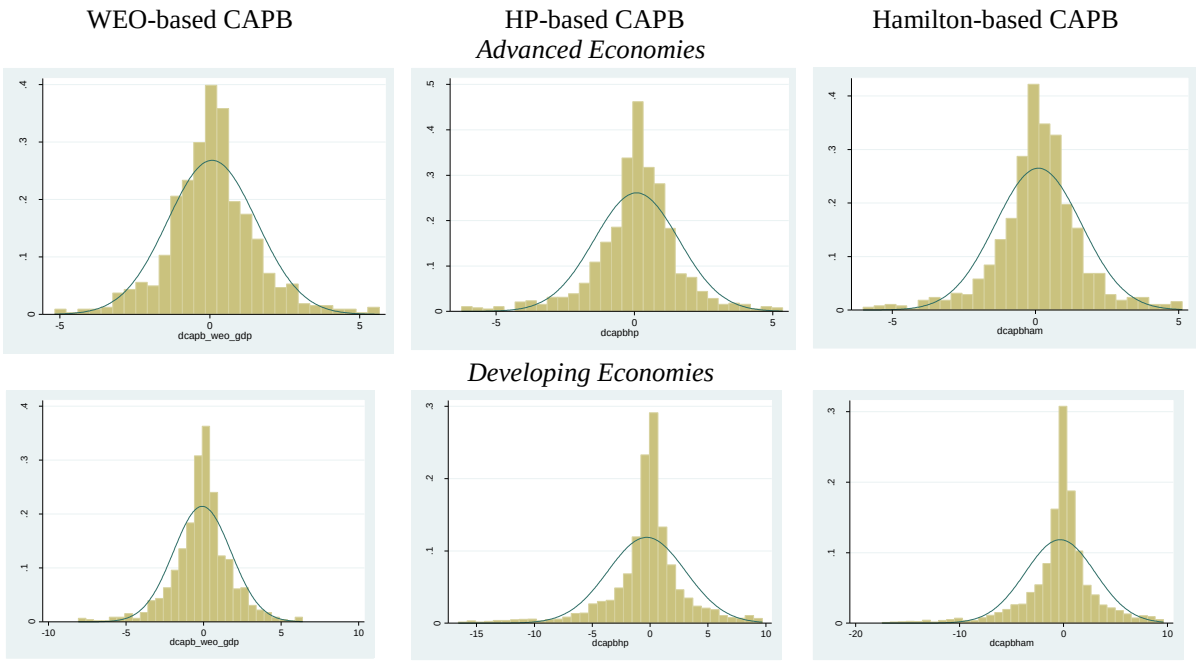
Note: Robust standard errors clustered at the country level are reported in parenthesis. Constant term and country and time effects estimated but omitted for reasons of parsimony. *, **, *** denote significance at 10, 5 and 1% levels.

Table A4. Unit-root tests

Variable	Constant		Constant and Linear Trend	
	Level	1st Difference	Level	1st Difference
lprivconspc	-5.178***	-60.638***	-3.023***	-59.158***
lprivinvpc	-6.879***	-63.252***	-17.375***	-56.734***
lrgdppc	-1.135	-43.601***	-1.113	-42.269***
lrpubconspc	-10.526***	-62.684***	-7.354***	-60.571***
lrtaxespc	-1.951**	-42.511***	-4.769***	-35.524***

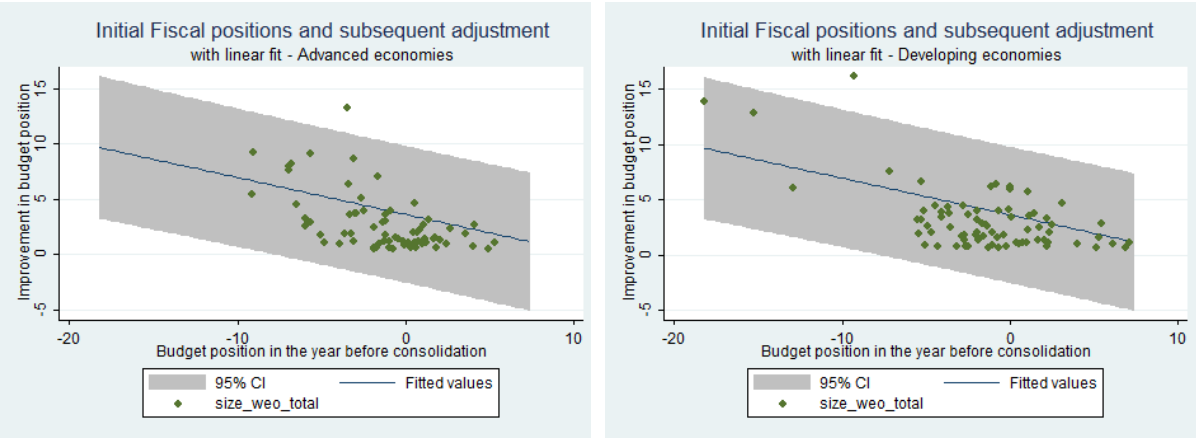
Note: *, **, *** denote significance at 10, 5 and 1% levels.

Figure A1: Changes in the cyclically adjusted primary balance by income group: 1970-2018



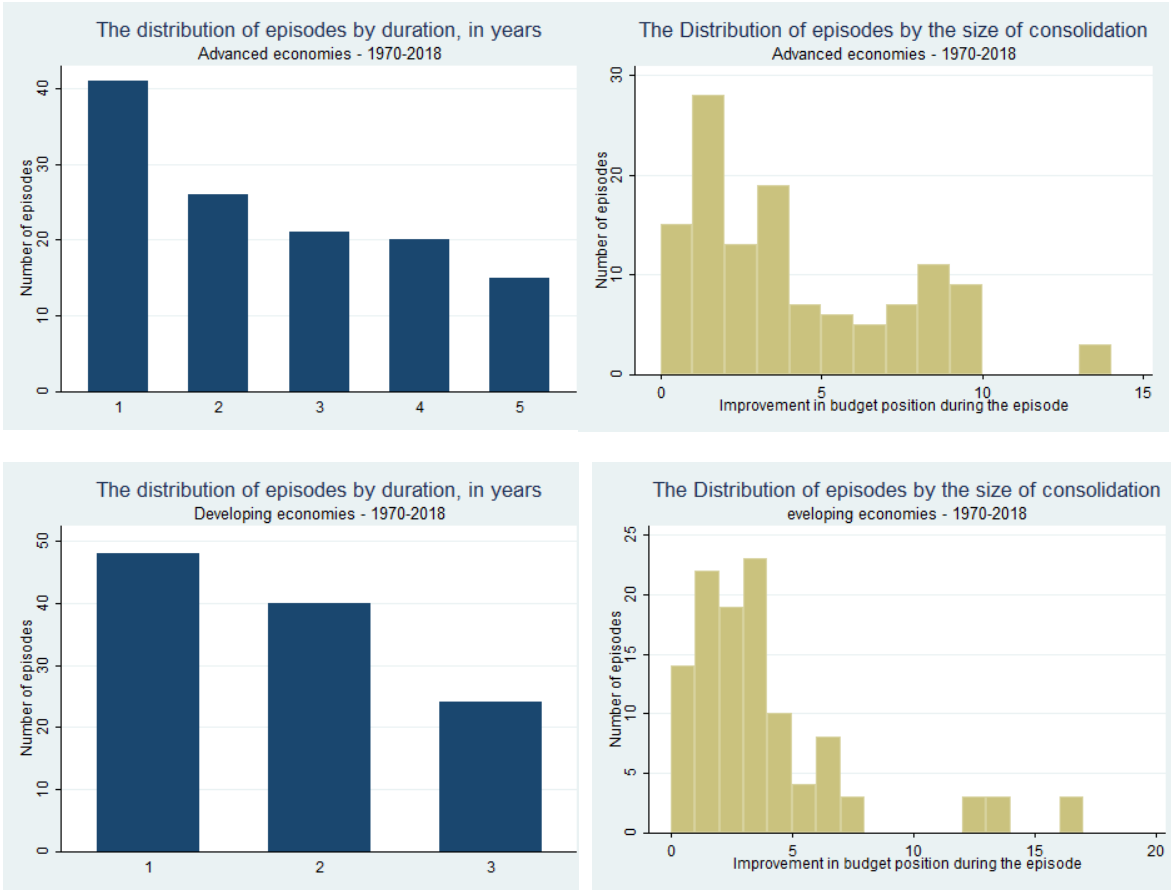
Note: CAPB expressed in percent of potential GDP. Top and bottom 1% of the change in the respective CAPB dropped to remove serious outliers. HP-based CAPB and Hamilton-based CAPB distributions constrained – for comparison purposes – to map the same country-time coverage as the one available for the WEO CAPB.

Figure A2: Initial fiscal imbalances and subsequent adjustment by income group: 1970-2018, WEO-based CAPB



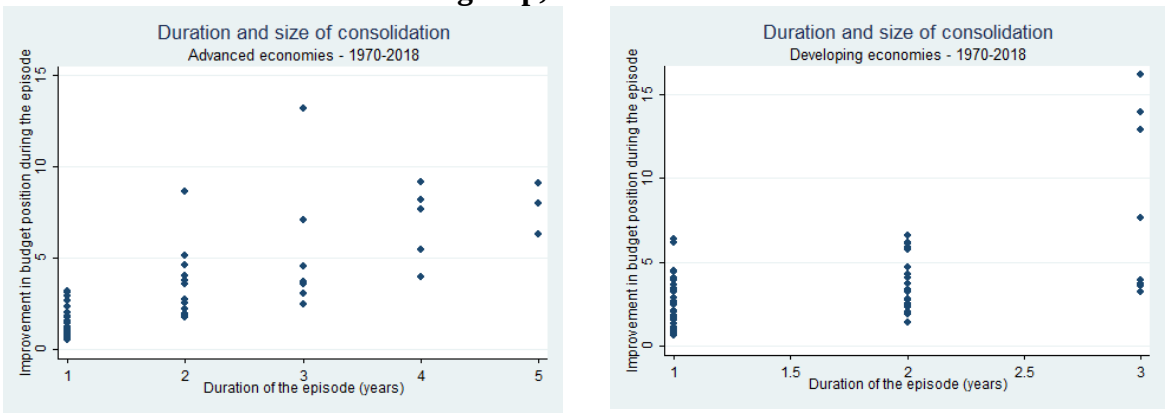
Note: budget position measured by the cyclically adjusted primary balance (% of potential GDP). "improvement" measured during the consolidation years of the identified episode.

Figure A3: Strength and duration of consolidation episodes, by income group: 1970-2018, WEO-based CAPB



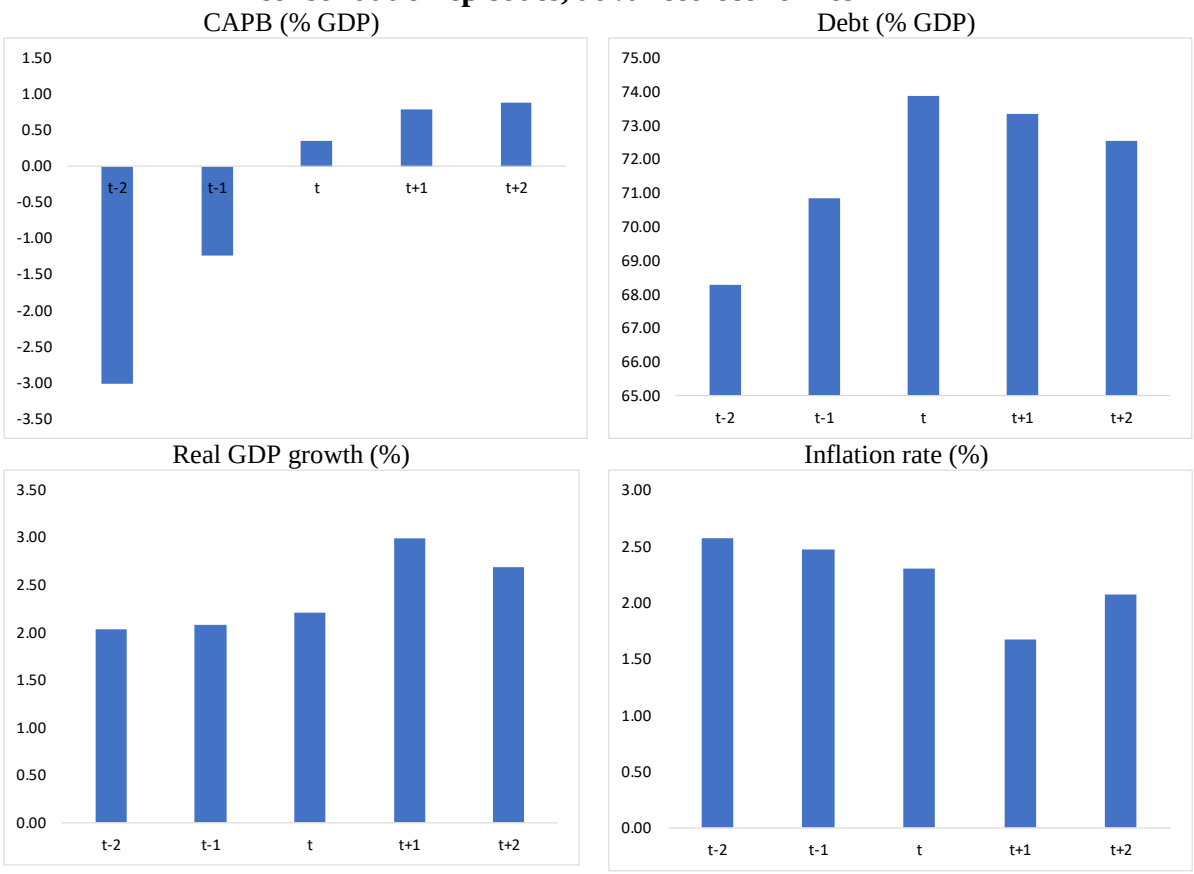
Note: budget position measured by the cyclically adjusted primary balance (% of potential GDP). "improvement" measured during the consolidation years of the identified episode.

Figure A4: Relationship between duration and size of consolidation: 1970-2018, by income group, WEO-based CAPB



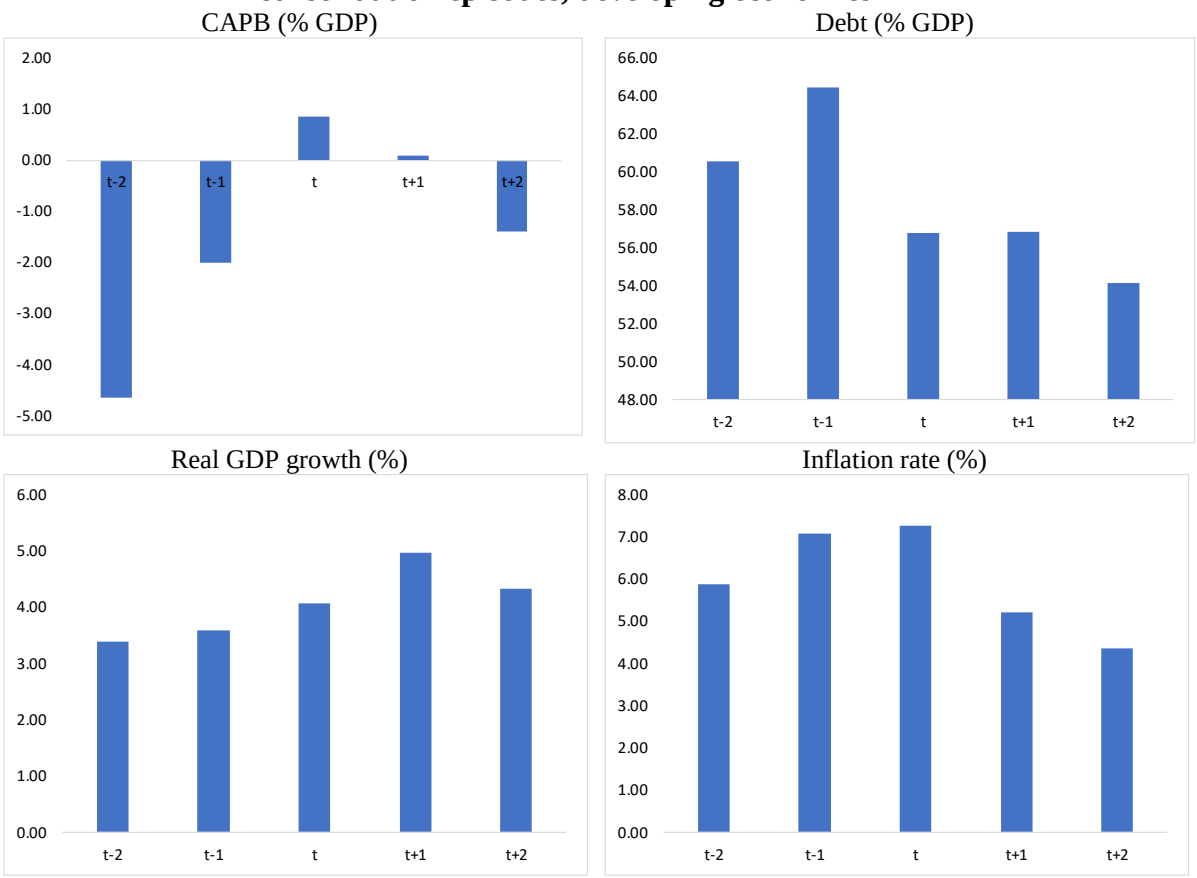
Note: budget position measured by the cyclically adjusted primary balance (% of potential GDP). "improvement" measured during the consolidation years of the identified episode.

Figure A5: Overview of Selected Fiscal and Macroeconomic Indicators around consolidation episodes, advanced economies



Note: "t" corresponds to the first year of the consolidation episode. Horizontal axis in years. Consolidations identified using the WEO-based CAPB.

Figure A6: Overview of Selected Fiscal and Macroeconomic Indicators around consolidation episodes, developing economies



Note: "t" corresponds to the first year of the consolidation episode. Horizontal axis in years. Consolidations identified using the WEO-based CAPB.

EconPol Europe

EconPol Europe - The European Network for Economic and Fiscal Policy Research is a unique collaboration of policy-oriented university and non-university research institutes that will contribute their scientific expertise to the discussion of the future design of the European Union. In spring 2017, the network was founded by the ifo Institute together with eight other renowned European research institutes as a new voice for research in Europe. A further five associate partners were added to the network in January 2019.

The mission of EconPol Europe is to contribute its research findings to help solve the pressing economic and fiscal policy issues facing the European Union, and thus to anchor more deeply the European idea in the member states. Its tasks consist of joint interdisciplinary research in the following areas

1) sustainable growth and 'best practice',

2) reform of EU policies and the EU budget,

3) capital markets and the regulation of the financial sector and

4) governance and macroeconomic policy in the European Monetary Union.

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