FISCAL CONSOLIDATION AND INEQUALITY IN ADVANCED ECONOMIES: HOW ROBUST IS THE LINK?

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This paper examines the robustness of the link distributional effects of fiscal consolidation. Using a sample of 17 OECD countries over the period 1978-2009, we show that fiscal consolidations increase income inequality and lower wage income shares in the short and medium term. Our results are robust to the use of "traditional" methods of identifying fiscal episodes based on changes in the cyclically-adjusted primary balance (CAPB) as well as the policy-action narrative approach. They are also robust to the use of alternate sources for the data on income inequality.

"[we need a] fiscal policy that focuses not only on efficiency, but also on equity, particularly on fairness in sharing the burden of adjustment, and on protecting the weak and vulnerable."

Christine Lagarde (2012)

1 Introduction

Fiscal policy played a key role in the response to the global financial crisis. At the onset of the crisis, many G20 countries implement comprehensive support packages, mainly based on expenditure hikes, to try to stave off the crisis. Combined with the decline in tax revenues (as incomes fell), the increase in social spending (particularly unemployment benefits) and the costs of financial bailouts of banks and companies, the net result has been a sharp rise in government debt. Public debt rose on average from 70 per cent of GDP in 2007 to slightly over 100 per cent of GDP in 2014 – its highest level in 50 years (IMF, *Fiscal Monitor*, 2014a).

Concerned about the long-term sustainability of public finances, many governments across the world have turned to implementing budgetary consolidation measures. The effects of such fiscal consolidations on output remain a matter of some debate which revolves in part around the measurement of fiscal consolidation. Using the cyclically-adjusted primary balance (CAPB), some work suggests that fiscal consolidation could be expansionary (see, e.g., Alesina and Perotti, 1995; Alesina and Ardagna, 2010, 2012).[1] In contrast, using a narrative approach to measuring consolidation, Guajardo *et al.*, (2014) argue that consolidations are contractionary.

In addition to the aggregate effects of fiscal consolidations, the distributional impacts are also starting to receive attention. Many recent studies suggest that fiscal consolidation episodes are usually associated with increases in income inequality (Roe and Siegel, 2011; Ball, Leigh, Loungani, 2012; Furceri *et al.* 2013; Bova *et al.*, 2013; Agnello and Sousa, forthcoming; Agnello *et al.*, 2014).

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[1] In neoclassical models, fiscal policy affects economic activity by means of wealth effects, intertemporal substitution and distortions. If consolidation measures remove uncertainty with respect to fiscal sustainability (signaling tax cuts in the future and raising discounted disposable income), hence boosting confidence, then the negative impact on output may be limited or even give rise to an "expansionary fiscal contraction".

In this paper we examine the robustness of the link between fiscal consolidation and inequality. This is important for a couple of reasons. First, as noted above, the aggregate effects of fiscal consolidation appear to depend on how consolidation is measured. Are the distributional effects also sensitive to the measurement of consolidation?

Second, the measurement of inequality is also the subject of some controversy. Many of the studies use the Standardized World Income Inequality Database (SWIID). But there are concerns abut this data set because of the extensive use of interpolation and other assumptions to fill in missing data (Jenkins 2014). In light of this, we examine how robust the consolidation-inequality link is to the use alternate measures of inequality.

A third contribution of the paper is to revisit the issues of whether spending-based and tax-based consolidations have different effects on inequality and whether the consolidation-inequality link is symmetric (*i.e*., do fiscal *expansions* lower inequality?). Lastly, we carry out a number of technical robustness checks.

The remainder of the paper is organized as follows. Section 2 details the definitions and sources the data while Section 3 presents the econometric methodology. Section 4 analyses the main empirical findings and the last section concludes and discusses some policy considerations.

2 Data

2.1 Inequality and income shares

Many studies use the Standardized World Income Inequality Database (SWIID) because it provides long time-series of Gini coefficients for a large group of countries. But problems with comparability of data across years and countries, and with the imputation methodology used, have long been noted (see Atkinson and Brandolini, 2001) and have recently been reconfirmed in a comprehensive assessment by Jenkins (2014).

In light of such concerns, we test the robustness of the consolidation-inequality link using several measures of distributional outcomes. They comprise: (1) the Gini coefficient for disposable income (both gross and net concepts), taken from SWIID; (2) the shares of wage and profit in GDP, obtained from the OECD Analytical Database; (3) the Gini coefficient for disposable income retrieved from the OECD Stats; and (4) the combined "*all the Ginis*" index compiled by Branko Milanovic (2014) from merging several sources.[2]

2.2 Fiscal consolidation episodes

The literature addressing the identification of fiscal episodes is vast and has, for a long time, relied on changes in the cyclically adjusted primary balance (CAPB). Some caveats surrounding this approach have been highlighted recently. In particular, the CAPB approach could bias empirical estimates towards finding evidence of non-Keynesian effects (see Afonso and Jalles, 2014 for a recent study). Many non-policy factors, such as price fluctuations, influence the CAPB and can lead to erroneous conclusions regarding the presence of fiscal policy changes.[3] In addition, even when the CAPB accurately measures fiscal actions these include discretionary responses to economic developments, such as fiscal tightening to restrain rapid domestic demand growth.

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[2] Publicly available at: http://econ.worldbank.org/WBSITE/EXTERNAL/EXTDEC/EXTRESEARCH/0,,contentMDK:22301380~menuPK:64 214916~pagePK:64214825~piPK:64214943~theSitePK:469382,00.html

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

With these considerations in mind, an alternative "narrative approach" is considered, which relies on the identification of fiscal episodes on the basis of concrete policy decisions. The episodes are identified by looking at IMF and OECD historical reports and by checking what countries intended to do at the time of publication.[4] This policy-action based approach makes use of descriptive historical facts that usually describe what happened to the deficit in a particular period but they do not go into the details of policy makers' intentions, discussions and congressional records. Proponents of this approach argue that the estimated size of the fiscal measures during the episodes identified have the advantage of not being affected by the cycle (since their construction is "bottom-up"), can minimize identification problems,[5] and are unlikely to imply risks of reverse causation (Guajardo *et al.*, 2014). That said, the narrative approach could also have some drawbacks: it largely relies on judgment calls, and it may not eliminate entirely endogeneity problems (*i.e.*, fiscal policy reacting to the output performance and not the other way around).

The analysis that follows thus relies on both the narrative and CAPB-based approaches. On the former, the analysis uses the publicly available dataset compiled by Devries *et al.* (2011) based on the policy-action based method for 17 advanced economies between 1978 and 2009.[6] On the latter, the analysis relies on:

i) Alesina and Ardagna (1998), who adopted a fiscal episode definition that allows that some stabilization periods may have only one year. More specifically, they consider the change in the primary cyclically adjusted budget balance 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.

ii) 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 primary cyclically adjusted budget balance 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.

iii) Afonso (2010), who defines the occurrence of a fiscal episode when either the change in the primary cyclically adjusted balance is at least one and a half times the standard deviation (from the panel sample of 17 countries) in one year, or when the change in the primary cyclically adjusted balance is at least one standard deviation on average in the last two years.

Table 1 reports the fiscal episodes identified according to the above-mentioned four alternative methods. The number of fiscal contractions ranges from 29, in the approach proposed by Afonso (2010), to 43, using the approach from Alesina and Ardagna (1998). In the Devries *et al.*'s (2011) narrative approach the magnitude of the fiscal consolidation episode ranges between 0.1 per cent and about 5 per cent of GDP, with an average of about 1 per cent of GDP. Moreover, it reports a much higher number of years where fiscal contractions take place (171 years against an average of 70 for the CAPB approaches). For fiscal consolidations, the average duration of the reported fiscal episodes is, on average, 1.7 years for the CAPB approaches and around 3.8 years for the narrative approach. Moreover, the three CAPB-based methods essentially coincide in about 50 per cent of total number of years with those of the narrative approach.

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[4] Note, however, that this approach differs from the one used in Romer and Romer (2010), who identify exogenous tax policy changes by carefully analyzing US congressional documents.

[5] However, as Jorda and Taylor (2013) argue, fiscal shocks may not be exogenous and can be predicted.

[6] The countries are: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Italy, Japan, Netherlands, Portugal, Spain, Sweden, the United Kingdom and the United States.

Table 1

Fiscal Episodes Based on the Change in the Primary Cyclically-adjusted Budget Balance and on the Narrative Approach

Country	Devries *et al.* (2011)	Giavazzi and Pagano (1996)		Alesina and Ardagna (1998)		Afonso (2010)	
	Contractions	Expansions	Contractions	Expansions	Contractions	Expansions	Contractions
Australia	1985-88, 1994-99	2009	1987-88	1975, 2009	1987-88	2009	1987-88
Austria	1980-81, 1984, 1996-97, 2001-02,	1976, 2004	1997	1976, 2004	1984, 1997, 2001, 2005	2004	1984, 1997, 2001, 2005
Belgium	1982-87, 1990-97	1981, 2005, 2009	1982-87	1981, 2005, 2009	1982-85, 1993, 2006	1981, 2005, 2009	1982-85
Canada	1984-97	1975, 1977-78, 2002, 2009	1987, 1996-98	1977, 2001-02, 2009	1981, 1986-87, 1996-97	1975, 2009	1987, 1996-97
Denmark	1983-86, 1995	1975-76, 1982, 1991, 2010	1983-87	1975-76, 1982, 1990-91, 1994, 2009-10	1983-86	1975-76, 1982, 1991, 2010	1983-86
Finland	1992-97	1979-80, 1991-93, 2010	1976-77, 1997-98, 2000-1	1978-79, 1987, 1991-92, 2009-10	1976-77, 1981, 1984, 1988, 1996-97, 2000-01	1978-79, 1987, 1991-92, 2010	1976-77, 1996-97, 2000-01
France	1987-92, 1995-2000	2009-10		2009-10		2009-10	
Germany	1982-84, 1991-2000, 2003-07	1975, 1991, 2001-03		1975, 1990-91, 2001-02		1975, 1990-91, 2001-02	
Ireland	1982-88, 2009	1975, 1979, 2001-03, 2007-10	1976-77, 1983-86, 1988-9, 2010	1974-75, 1978-79, 1995, 2001-02, 2007-09	1976-77, 1983-84, 1988, 2010	1974-75, 1978-79, 2001-02, 2007-09	1976-77, 1983-84, 1988, 2010

Table 1 (continued)

Fiscal Episodes Based on the Change in the Primary Cyclically-adjusted Budget Balance and on the Narrative Approach

Italy	1991-98, 2004-07	2001	1977, 1982-83, 1992-94	1981, 2001	1977, 1982-83, 1992-93	1981, 2001	1977, 1982-83, 1992-93
Japan	1980-83, 1997-98, 2003-07	1993-95, 1998 2009-10	1998-2000, 2005-07	1975, 1994-95, 1998, 2009-10	1998-99, 2005-06	1993-94, 1998, 2009-10	1999-00, 2006-07
Netherlands	1981-88, 1991-93, 2004-05	2002, 2010	1991, 1993	2001-02, 2009-10	1991, 1993	2002, 2009-10	1991
Portugal	1983, 2000-07	1978-80, 2005, 2009-10	1977, 1983-84, 1986	1978-79, 1985, 1990, 1993, 2005, 2009-10	1977, 1983-84, 1986, 1988, 1992, 1995, 2006	1978-79, 1993, 2005, 2009-10	1977, 1983-84, 1986, 1988, 1992
Spain	1983-84, 1989-97	2008-10	1987	2008-09	1986, 1987, 2010	2008-09	1987
Sweden	1984, 1993-98	1974, 1979-80, 1991-94, 2002-03	1984, 1987, 1996-99	1974, 1979, 1991-93, 2002-03, 2010	1976, 1983-84, 1987, 1996-97	1974, 1979, 1991-93, 2002	1984, 1987, 1996-97
United Kingdom	1980-82, 1994-99	1972-75, 1992-94, 2001-04, 2009-10	1981-82, 1997-2000	1972-73, 1990, 1992-93, 2001-02, 2009-2010	1981, 1997-98, 2000	1972-73, 1992-93, 2001-03, 2009-10	1981, 1997-98
United States	1980-81, 1985-8	2001-02, 2007-10		2001-02, 2007-08		1974, 2001-02, 2007-08	
Years with episodes	171	95	73	95	79	78	59
Average duration (years)	3.8	2.0	2.1	1.6	1.5	1.6	1.6

Notes: all measures computed by the authors, except the Devries *et al.* (2011) one. See main text for definitions.

3 Methodology

To estimate the distributional impact of fiscal consolidation episodes over the short and medium run, we follow the method proposed by Jorda (2005) which consists of estimating impulse response functions directly from local projections. For each period *k* the following equation is estimated on annual data:

$$G_{i,t+k} - G_{i,t} = \alpha_i^k + Time_t^k + \sum_{j=1}^{l} \gamma_j^k \Delta G_{i,t-j} + \beta_k D_{i,t} + \varepsilon_{i,t}^k \quad (1)$$

with *k=1,…,8* and where *G* represents one of our measures of distributional outcomes; $D_{i,t.}$ is a dummy variable that takes the value equal to 1 for the starting date of a consolidation episode incountry *i* at time *t* and is 0 otherwise; α_i^k are country-fixed effects; $Time_t^k$ is a time trend; and β_k measures the distributional impact of fiscal consolidation episodes for each future period *k*. Since fixed effects are included in the regression the dynamic impact of consolidation episodes should be interpreted as compared to a baseline country-specific trend. In the main results, the lag length (*l*) is set at 2, even if the results are extremely robust to different numbers of lags included in the specification (see robustness checks and sensitivity presented in the next section). Equation (1) is estimated using the panel-corrected standard error (PCSE) estimator (Beck and Katz, 1995).

Impulse response functions are obtained by plotting the estimated β_k for *k*= 1,…,8, with confidence bands computed using the standard deviations of the estimated coefficients β_k. While the presence of a lagged dependent variable and country fixed effects may in principle bias the estimation of γ_j^k and β_k in small samples (Nickell, 1981), the length of the time dimension mitigates this concern.[7] Reverse causality is addressed by estimating the distributional effect in the years that follow a fiscal consolidation episode. In addition, robustness checks for endogeneity confirm the validity of the results.

An alternative way of estimating the dynamic impact of fiscal consolidation episodes is to estimate an ARDL equation of changes in inequality and consolidation episodes and to compute the IRFs from the estimated coefficients (Romer and Romer, 1989; and Cerra and Saxena, 2008). However, the IRFs derived using this approach tend to be sensitive to the choice of the number of lags this making the IRFs potentially unstable. In addition, the significance of long-lasting effects with ARDL models can be simply driven by the use of one-type-of-shock models (Cai and Den Haan, 2009). This is particularly true when the dependent variable is highly persistent, as in our analysis. In contrast, the approach used here does not suffer from these problems because the coefficients associated with the lags of the change in the dependent variable enter only as control variables and are not used to derive the IRFs, and since the structure of the equation does not impose permanent effects. Finally, confidence bands associated with the estimated IRFs are easily computed using the standard deviations of the estimated coefficients and Monte Carlo simulations are not required.

4 Empirical results

4.1 Gini coefficient for disposable income

The impacts of fiscal consolidation (using Devries *et al.* (2011) narrative approach to identifying episodes) on the four alternative definitions of the Gini index are shown in Figure 1. Each figure shows the estimated impulse response function and the associated one standard error bands (dotted lines). The horizontal axis measures years after the start of the episode of fiscal consolidation.

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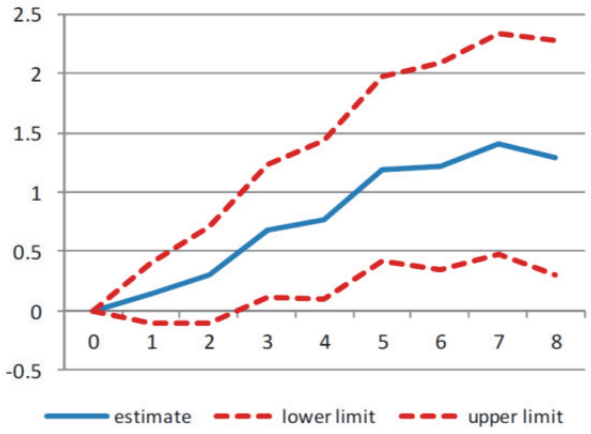
[7] The finite sample bias is in order of 1/*T*, where *T* in our sample is 32.

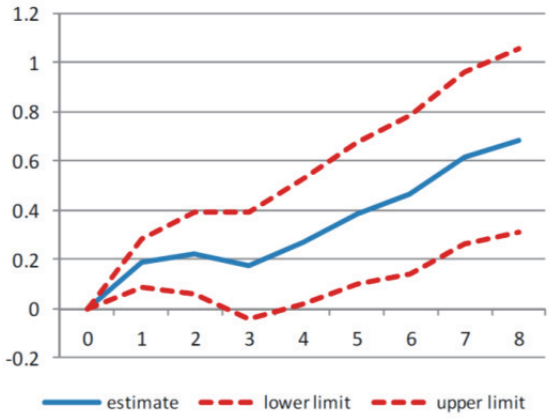
Figure 1

Impact of Fiscal Consolidation on Inequality-comparing Different Gini Indices

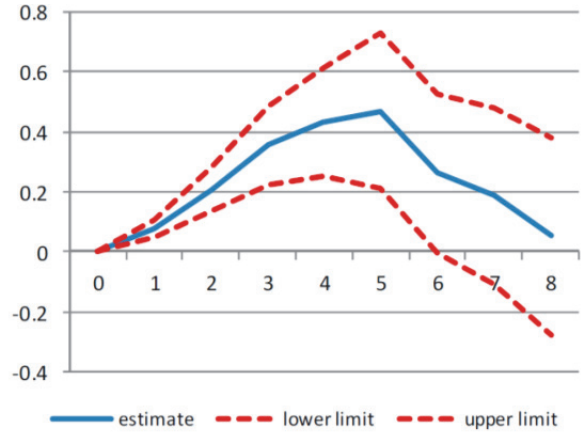
a).SWIID Gross Gini Index (Interpolated)



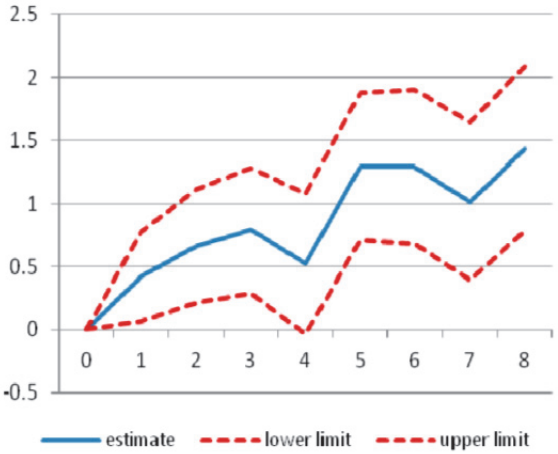
b).SWIID Net Gini Index (Interpolated)



c) OECD Gini Index (Interpolated)



d).Milanovic's *All Ginis* Index (Interpolated)



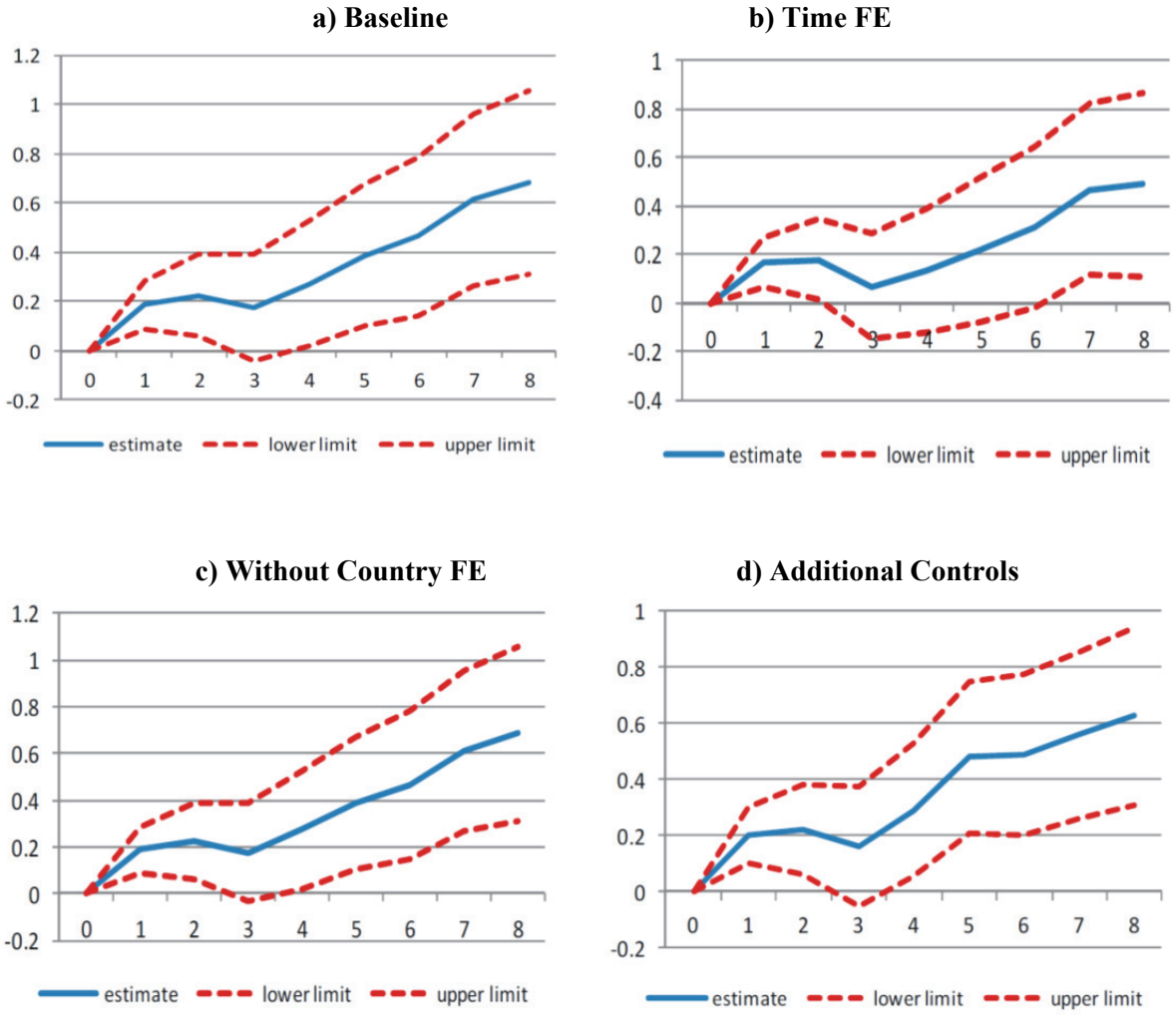
Note: Dotted lines equal one standard error confidence bands. See main text for more details.

In general, fiscal consolidation is followed by a persistent rise in income inequality. The Gini index increases by an average (across different proxies) of about 0.2 per cent in the short term (one year after the occurrence of the consolidation episode) and by nearly 0.9 per cent in the medium term (eight years after the occurrence of the consolidation episode). This is consistent with Agnello and Sousa (forthcoming) who find that fiscal consolidations lead to a short-term increase in the Gini of about 0.3 per cent.

The results of several additional robustness checks are shown in Figure 2. These results are shown for one particular measure of inequality, the SWIID net Gini index but similar findings hold for the other measures as well. First, equation (1) is re-estimated by including time fixed effects to control for specific time shocks, such as those affecting world interest rates. The results for this specification remain statistically significant and broadly unchanged (Figure 2 panel (b)).

Figure 2

Sensitivity and Robustness: Different Set of Regressors Using SWIID Net Gini Index (Interpolated)



Note: Dotted lines equal one standard error confidence bands. See main text for more details.

As shown by Tuelings and Zubanov (2010), a possible bias from estimating Equation (1) using country-fixed effects is that the error term of the equation may have a non-zero expected value, due to the interaction of fixed effects and country-specific arrival rates of consolidation episodes. This would lead to a bias in the estimates that is a function of *k*. To address this issue and check the robustness of our findings, Equation (1) was re-estimated by excluding country fixed effects from the analysis. The results reported in Figure 2 panel (c) suggest that this bias is negligible (the difference in the point estimate is small and not statistically significant).

Estimates of the impact of consolidation on inequality could be biased because of endogeneity, as unobserved factors influencing the dynamics of the Gini coefficient may also affect the probability of the occurrence of a consolidation episode. In particular, a significant deterioriation in economic activity, which would affect unemployment and inequality, may determine an increase in the public debt ratio via automatic stabilizers, and therefore increase the

Table 2

Panel Estimations of different Gini indices

Specification	SWIID Gini Index, Gross	SWIID Gini Index, Net	OECD Gini Index	Milanovic's *All Ginis* Index
Baseline	1.332** (0.646)	0.585** (0.297)	0.595*** (0.185)	1.491*** (0.418)
Robustness				
Time FE	0.672	0.241	0.598***	1.822***
	(0.631)	*(0.293)*	*(0.195)*	*(0.544)*
Without country FE	1.392**	0.564*	0.453*	1.478***
	(0.640)	*(0.301)*	*(0.263)*	*(0.459)*
Additional controls	0.915	0.487	0.685***	1.729***
	(0.699)	*(0.313)*	*(0.219)*	*(0.476)*

Note: The dependent variable is the 5th year forward difference of the corresponding inequality proxy as identified in the first row. The coefficients presented in the table denote the estimates of the consolidation episode (narrative approach). Each entry corresponds to an independent regression where non-relevant regressors (including a constant term) are omitted for reasons of parsimony. Robust standard errors are in parenthesis. *, **, *** denote statistical significance at the 10, 5 and 1% levels, respectively.

probability of consolidation. To address this issue, Equation (1) was augmented to control for: i) contemporaneous and past crises episodes (banking, debt and currency crises); ii) change in economic activity (proxied by real GDP growth); iii) change in total unemployment rate. The results of this exercise are reported in Figure 2 panel (d) and confirm the robustness of the previous findings.

As an additional sensitivity check, Equation (1) was re-estimated for different lags (l) of changes in the Gini coefficient. The results confirm that previous findings are not sensitive to the choice of the number of lags (results are not shown for reasons of parsimony but are available upon request).

Finally, as noted earlier, another concern is that the different Gini alternatives use interpolations where there are gaps in the inequality data. While this adds to the number of observations, it also adds some concerns about data quality. We have therefore used raw data and estimated panel regressions with the fifth forward difference of the relevant Gini index as the dependent variable. We find that the results are very robust (Table 2). Moreover, these results are also robust to a number of more technical checks as shown in the table, including: the inclusion of time fixed effects; the exclusion of country fixed effects; and inclusion of a different set of control variables in the estimated regressions.

4.2 The role of the composition of consolidation packages: spending vs. tax-based

Does the composition of fiscal consolidation (spending versus taxes-based) matter for inequality? There is a broad consensus in the literature that taxes-based consolidations are typically more contractionary than spending-based ones, particularly over the medium term (Alesina and Ardagna, 2010; IMF, 2010a). In normal times, spending cuts tend to be more successful in enhancing economic growth than tax increases (Alesina and Perotti, 1995; Alesina and Ardagna, 2012) because the former are generally perceived as more credible by economic agents (Hernández

de Cos and Moral-Benito, 2012).[8] At the same time, however, most of the direct redistributive impact of fiscal policy in advanced economies has been achieved through the expenditure side of the budget – especially non-means-tested transfers (Bastagli *et al.*, 2012). Therefore, whether taxes-based or spending-based consolidations are more harmful for income inequality is not a priori clear.

In order to test this hypothesis, Equation (1) is separately estimated for taxes and spending-based adjustments, by constructing starting dummies of taxes and spending consolidation episodes (in the Devries *et al.* (2011) dataset the average magnitude of both spending and taxes-based consolidation is about 1 per cent of GDP). The results presented in Figure 2, panel A for a selected measure of income inequality, namely the SWIID net Gini index (though results are consistent across alternative proxies), show that spending and tax-based programs have similar effect over the short and medium term. This result however has to be treated with caution given that most of past fiscal adjustments have involved both spending cuts and tax increases. In order to address this issue, following Guajardo *et al.* (2014), Equation (1) is separately estimated for: i) episodes where taxes-based adjustments have been larger than spending adjustments; ii) episodes where spending adjustments have been larger than tax based adjustments. These correspond to the "alternative definition" of tax and spending-based consolidations. The results obtained with this exercise suggest that spending-based consolidations tend to have larger effects – Figure 3, panel B. In particular, the short (medium)-term effect of fiscal consolidations on income inequality is about 0.24 (1.05) per cent after one (eight) year(s) for spending-based consolidations and 0.09 (0.13) per cent respectively for tax-based ones.[9]

4.3 Wage versus profit and rent income

Another way to assess the distribution effects of fiscal consolidation measures is to look at the effect of fiscal consolidations on different types of income. A traditional way of splitting total income is into wages, profits and rents. This harks back to times when the roles of workers, capitalists and landlords were fairly distinct. While these distinctions have eroded somewhat over time, the split between wages and other forms of income represents a starting point for describing how income is divided between the *Main Street* and *Wall Street*. To assess the effects of fiscal consolidations on the distribution of income between wage earners and others, Equation (1) is estimated for the share of wage income in GDP and the share of profits in GDP.

The results of this empirical exercise are reported in Figure 4.a and 4.b respectively for wage and profits. They suggest that fiscal consolidation measures typically reduce the slice of the pie going to wage earners and increase the slice of the pie going to profit recipients. These findings are consistent with the results resulted in panels B of these two figures which suggest that fiscal consolidations have a larger negative effect on the level of (inflation-adjusted) wage income than on the level of (inflation-adjusted) profit and rent incomes. Moreover, as before, spending-based adjustments seem to be the most detrimental, at least as far as wage incomes are concerned. In the case of profits such distinction does not matter much as evidenced by confidence bands above and below the horizontal axis.

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[8] The majority of the empirical literature also supports the view that expenditure-driven consolidations increase the likelihood of success of the episode of adjustment (see, e.g., Giavazzi and Pagano, 1996; McDermott and Wescot, 1996; Alesina and Ardagna, 1998; and Giavazzi *et al.*, 2000). There is also evidence that consolidations and particularly reductions in public expenditure can contribute to reducing sovereign debt spreads, and therefore the cost of servicing sovereign debt (Akitoby and Stratmann, 2006).

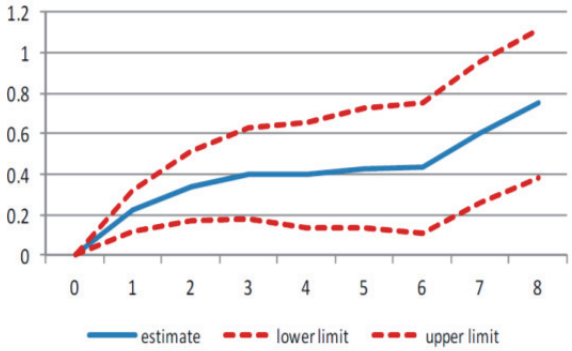
[9] It must be recognized that also this approach is imperfect. Indeed, to properly differentiate between spending versus tax-based consolidations one should consider episodes characterized by only spending or taxes-based adjustments. This however would dramatically reduce the number of "pure" spending and taxes-based consolidations in our sample.

Figure 3

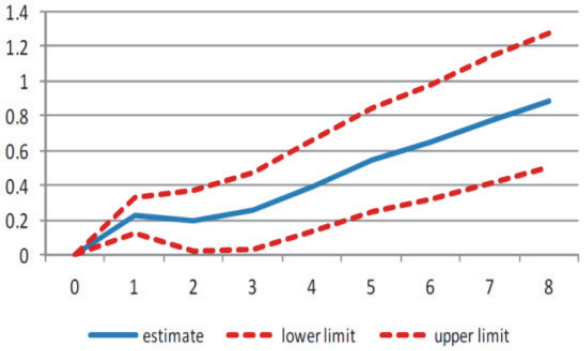
Composition of Fiscal Adjustments Using SWIID Net Gini Index (Interpolated): Tax vs. Spending Based

Panel A

Standard Definition, Spending Based

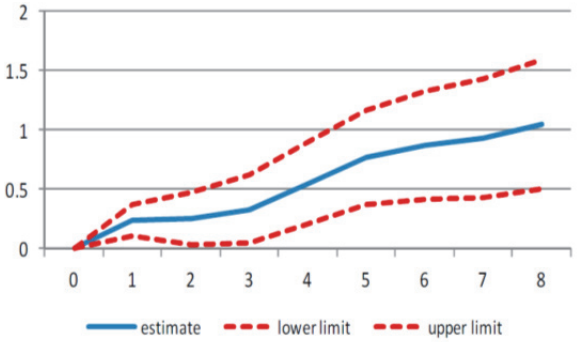


Standard Definition, Tax Based

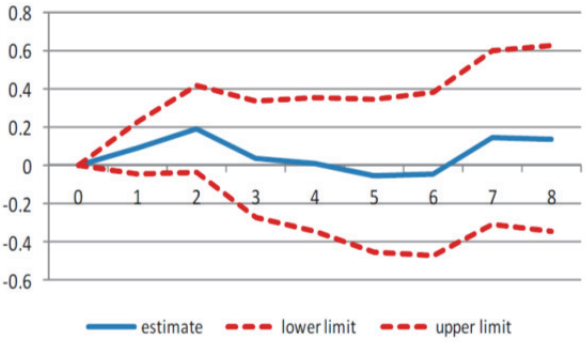


Panel B

Alternative Definition, Spending Based



Alternative Definition, Tax Based



Note: Dotted lines equal one standard error confidence bands. See main text for more details.
The standard definition denotes starting date dummies of taxes and spending consolidation episodes. Because most of past fiscal adjustments have involved both spending and taxes-based measures, we follow Guajardo *et al.* (2011) and redefine the dummies as follows: i) episodes where taxes-based adjustments have been larger than spending adjustments; ii) episodes where spending adjustments have been larger than taxes-based adjustments. This corresponds to the alternative definition.

4.4 Narrative approach vs. CAPB-based methods to identifying fiscal episodes

So far we have based our results on the use of the Devries *et al.* (2011) narrative approach dataset. What if we use the "traditional" method of identifying fiscal episodes using changes in the CAPB. Taking the three alternative approaches detailed in Section 2 and estimating Equation (1) for the SWIID net Gini index (though results are consistent across alternative proxies) gives the IRFs displayed in Figure 5. In general, we still find that fiscal consolidations lead to an increase in income inequality irrespectively of the approach under scrutiny.

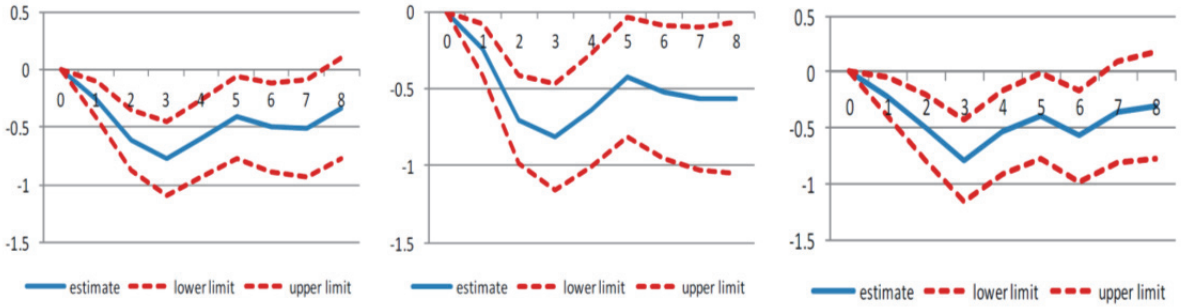
Picking one approach, say Afonso's (2010), one can observe in Figure 6 that our previous results are invariant to the choice of the dependent variable, *i.e.*, the source of the Gini index employed.[10]

[10] Using either Giavazzi and Pagano (1996) or Alesina and Ardagna (1998) instead does not qualitatively change our results.

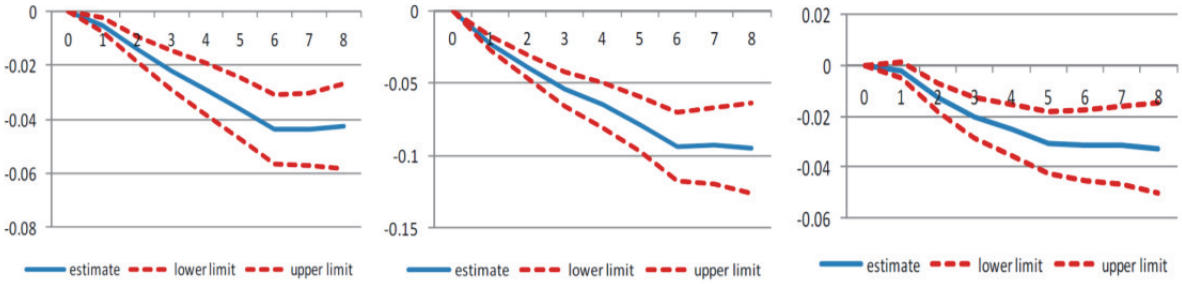
Figure 4.a

The Impact of Fiscal Consolidations on Wage Income

Panel A, Income
(percent of GDP)



Panel B, Income
(percent change)



Note: Dotted lines equal one standard error confidence bands. See main text for more details.

4.5 What about fiscal expansions?

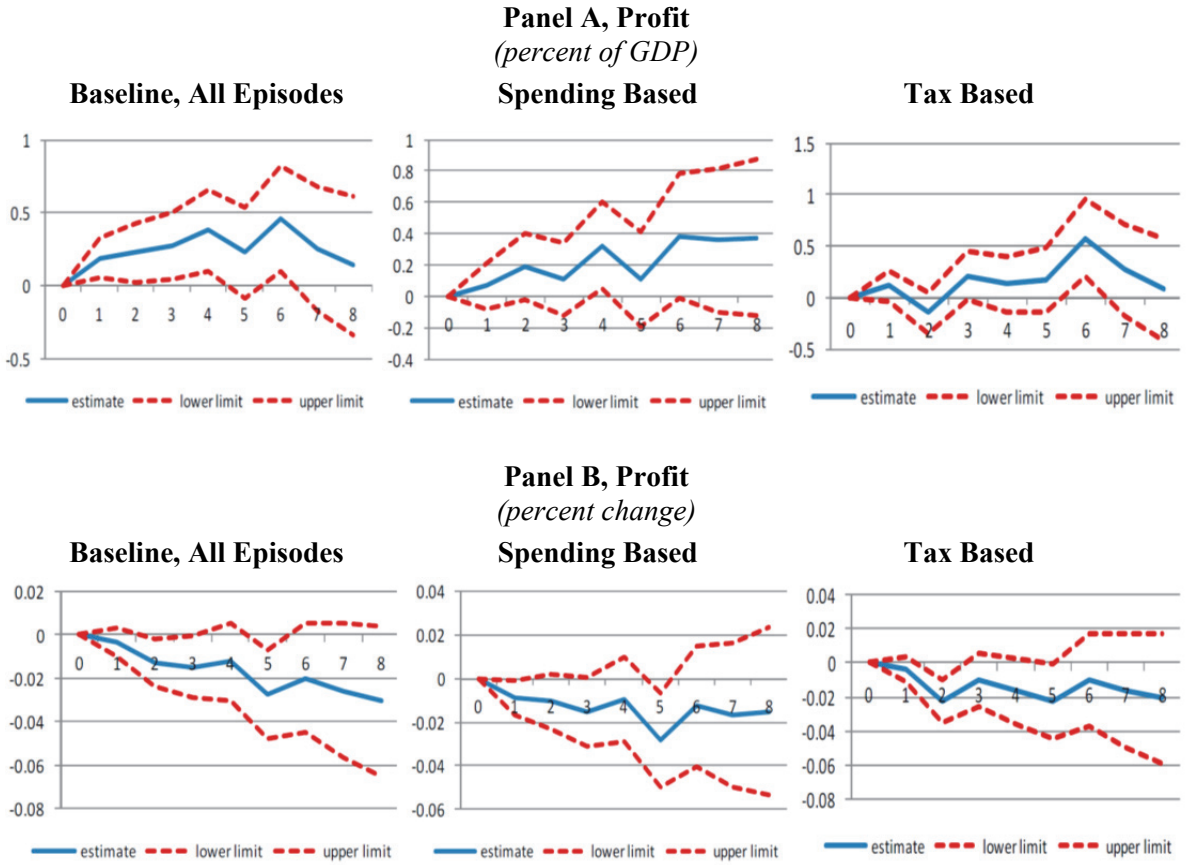
A final aspect is the following: to what extent is there symmetry in our results when one considers a fiscal expansion instead of a fiscal consolidation? In this case, only the CAPB-based methods can provide us with a tentative answer. Re-estimating Equation (1) and constructing a figure analogous to Figure 5 where now our $D_{i,t.}$ denotes the starting year of a fiscal expansion episode, yields the IRFs displayed in Figure 7. Results seem to suggest that the fiscal expansions lower inequality, but the impact is generally short-lived, dissipating after 2-3 years. This finding holds when using the SWIID net Gini index as well as the Milanovic's *all Ginis* index, but not in the case of the SWIID gross Gini index or the OECD Gini index – see Figure 8.

5 Concluding remarks and policy considerations

We find, for a sample of 17 OECD countries over the period 1978-2009, that fiscal consolidations tend to lead to an increase in income inequality in the short and medium term.

Figure 4.b

The Impact of Fiscal Consolidations on Profit Income



Note: Dotted lines equal one standard error confidence bands. See main text for more details.

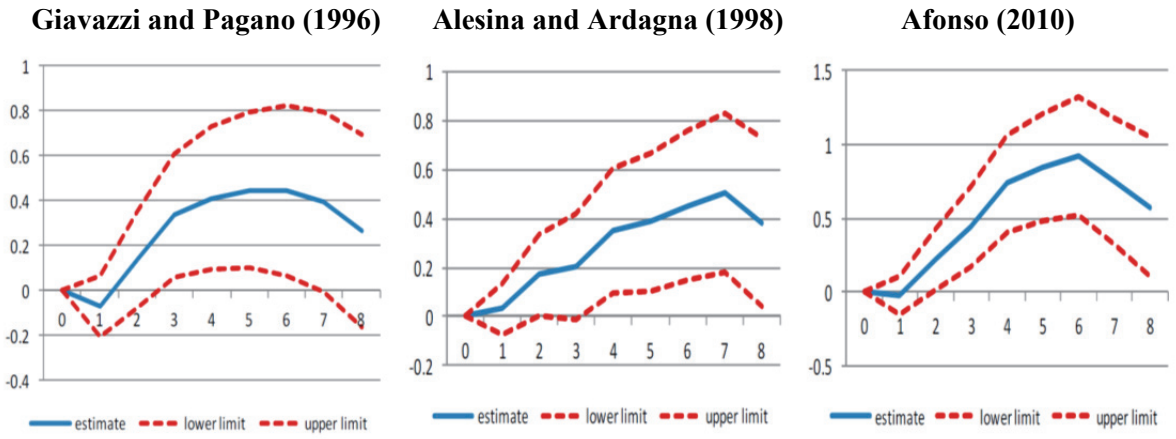
Typical fiscal consolidations lead to an increase in income inequality in the order of 0.2-1 per cent over the short and medium term. This main finding of our paper is robust to the use of alternate measures of consolidation (in particular the 'traditional' methods of identifying fiscal episodes based on changes in the cyclically-adjusted primary balance, CAPB) and to the use of alternate measures and sources of inequality data. The main finding is also robust to a vast array of technical checks such as inclusion of time fixed effects, the exclusion of country fixed effects, and inclusion of different sets of control variables. We also find that more work is needed to sort out the differences between tax-based and spending-based fiscal adjustments and on whether the consolidation-inequality link is symmetric.

Our findings do not imply that countries should not undertake fiscal consolidation. The results do suggest however that the benefits of fiscal adjustments should be weighed against their likely distributional impact. Many governments assign some weight to distributional outcomes and, as discussed in other chapters of the book, may have the flexibility to design the consolidation in a way that mitigates at least some of the distributional impacts. History shows that fiscal plans succeed when they permit "some flexibility while credibly preserving the medium term consolidation objectives" (IMF, 2010b; Mauro, 2011).[11] In general, the distributional effects of

[11] For instance, plans could specify that unemployment benefits would be shielded from cuts in the event of slower growth than assumed in the plan.

Figure 5

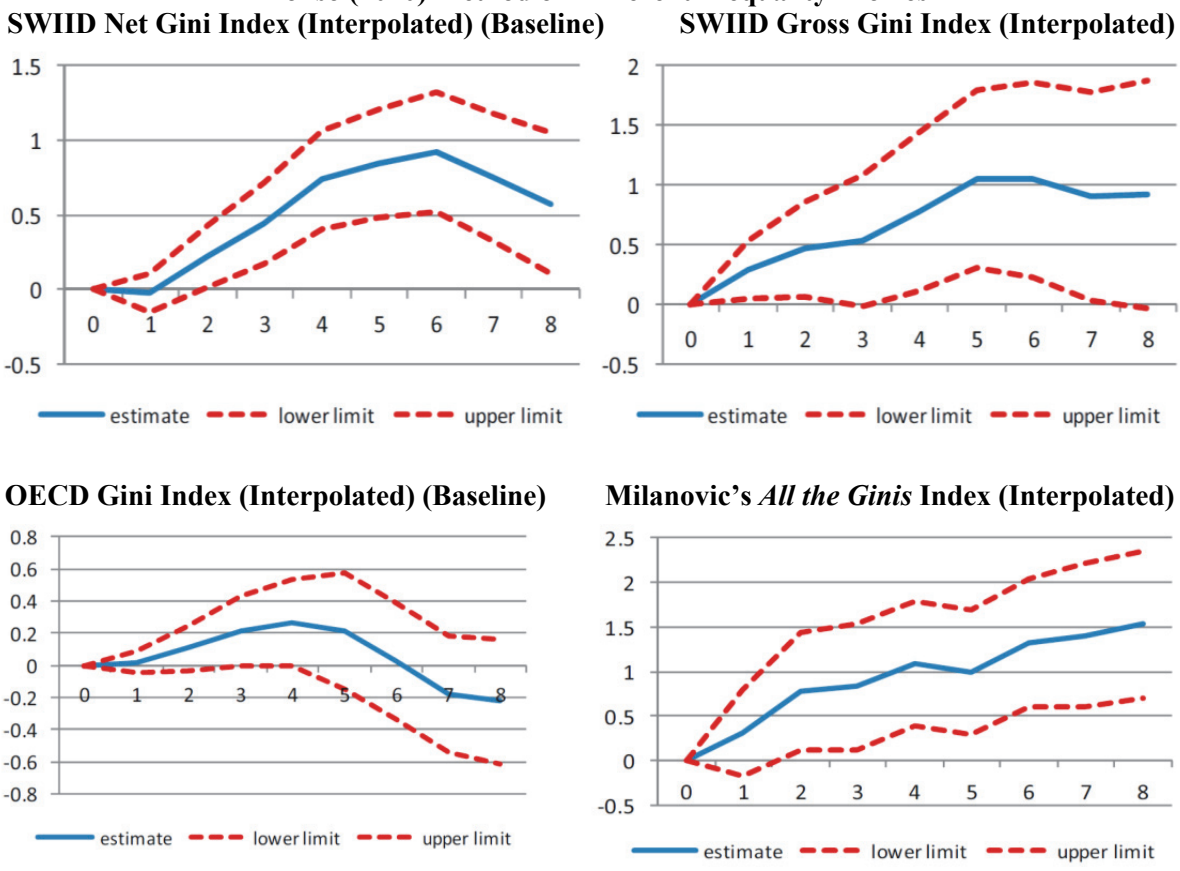
CAPB-based Identification of Fiscal Adjustments
Comparing 3 methods, SWIID Net Gini Index (Interpolated) (Baseline)



Note: Dotted lines equal one standard error confidence bands. See main text for more details.

Figure 6

Afonso (2010) Method on Different Inequality Proxies

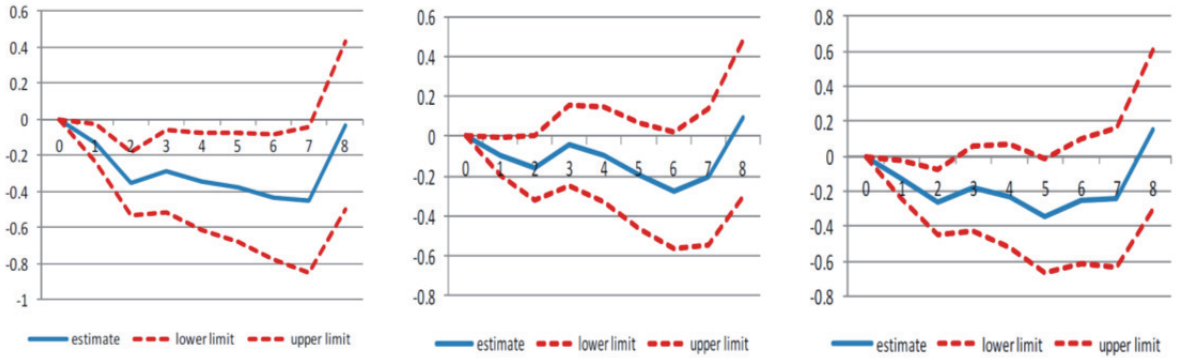


Note: Dotted lines equal one standard error confidence bands. See main text for more details.

Figure 7

CAPB-based Identification of Fiscal Expansions
Comparing 3 Methods, SWIID Net Gini Index (Interpolated) (Baseline)

Giavazzi and Pagano (1996) **Alesina and Ardagna (1998)** **Afonso (2010)**

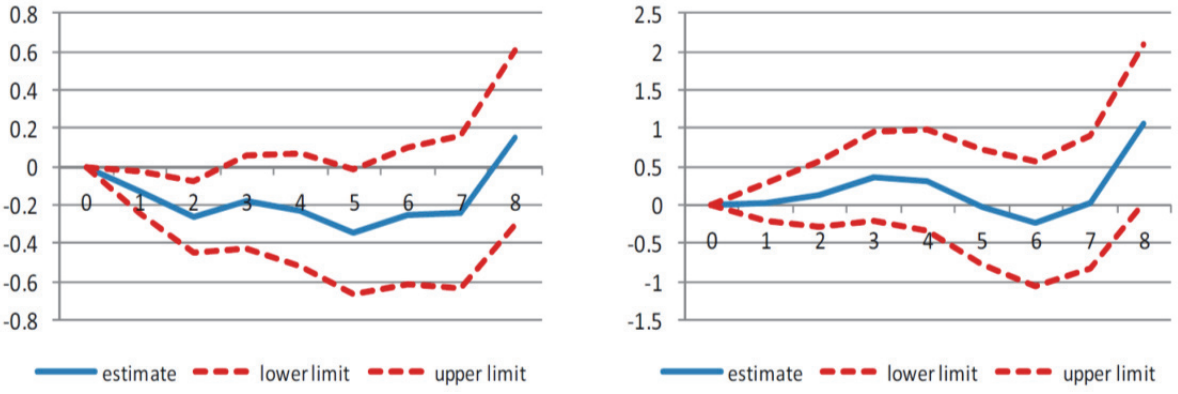


Note: Dotted lines equal one standard error confidence bands. See main text for more details.

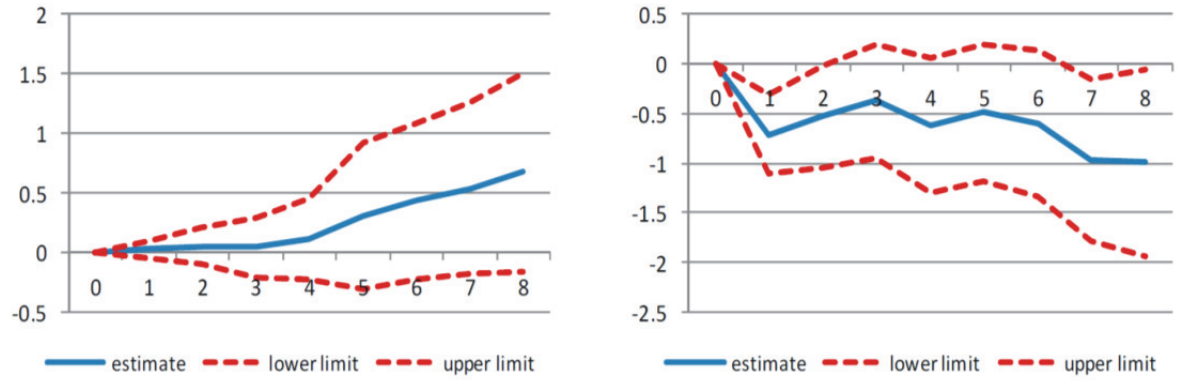
Figure 8

Fiscal Expansions: Afonso (2010) Method on Different Inequality Proxies

SWIID Net Gini Index (Interpolated) (Baseline) **SWIID Gross Gini Index (Interpolated)**



OECD Gini Index (Interpolated) (Baseline) **Milanovic's *All the Ginis* Index (Interpolated)**



Note: Dotted lines equal one standard error confidence bands. See main text for more details.

consolidation must be balanced against the potential longer term benefits that consolidation can confer benefits as interest rates decline and the lighter burden of interest payments permits cuts in distortionary taxes.

As noted in IMF (2013), the results on the impact of consolidation on equity "strengthens the case for better targeting of both spending and revenue measures." Specifically, the paper notes that "equity considerations suggest that a larger share of the adjustment burden could be borne by the rich, which could be achieved through revenue measures targeted at the higher income segments of the population. Revenue increases can therefore be an important component of consolidation packages, even in countries where the adjustment should focus on the expenditure side, as in a number of European countries. However, better targeted spending can also help achieve equity objectives, though there may be a trade-off between growth and equity concerns when choosing consolidation measures."

Overall, our results bolster the IMF's general fiscal policy advice to advanced economies. At the onset of the Great Recession, the IMF played a key role in making the case for – and helping coordinate through the auspices of the G20 – a coordinated global fiscal stimulus (Spilimbergo *et al.*, 2008). Since many governments entered the crisis with high debt-to-GDP ratios, attention turned to consolidation once financial conditions started to stabilize. But cognizant of the adverse impact of fiscal consolidation on growth (IMF, 2010b), the policy stance has been to support "a case-by- case assessment of what is an appropriate pace of consolidation" and to emphasize the need "to make fiscal policy more growth-friendly" (Lipton, 2013). The results here bolster that policy stance by suggesting that not only does consolidation lower aggregate incomes in the economy, but it adds to the pain of those who are likely to be already suffering the most – the people in lower income deciles.

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