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## The confidence effects of fiscal consolidations

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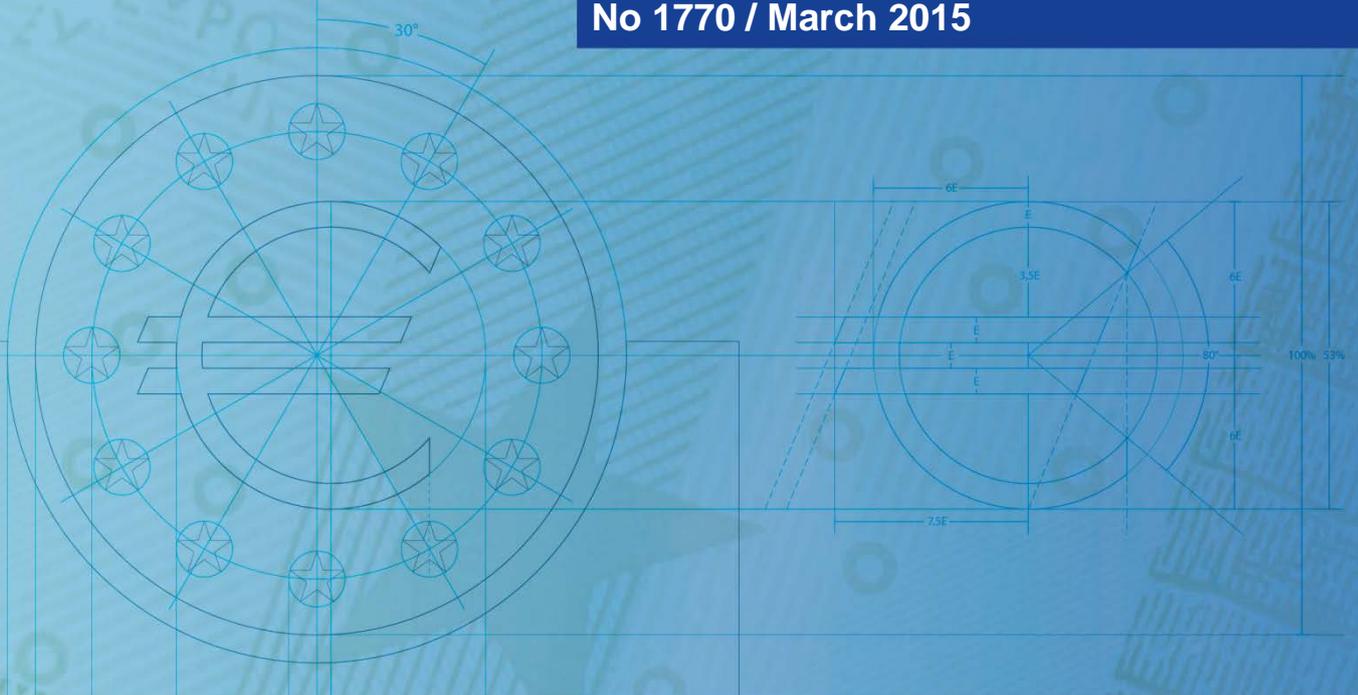
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#### ABSTRACT

We explore how fiscal consolidations affect private sector confidence, a possible channel for the fiscal transmission that has received particular attention recently as a result of governments embarking on austerity trajectories in the aftermath of the crisis. Panel regressions based on the action-based datasets of De Vries *et al.* (2011) and Alesina *et al.* (2014) show that consolidations, and in particular their unanticipated components affect confidence negatively. The effects are stronger for revenue-based measures and when institutional arrangements, such as fiscal rules, are weak. To obtain a more accurate picture of how consolidations affect confidence, we construct a monthly dataset of consolidation announcements based on the aforementioned datasets, so that we can study the confidence effects in real time using an event study. Consumer confidence falls around announcements of consolidation measures, an effect driven by revenue-based measures. Moreover, the effects are most relevant for European countries with weak institutional arrangements, as measured by the tightness of fiscal rules or budgetary transparency. The effects on producer confidence are generally similar, but weaker than for consumer confidence. Long-term interest rates, as a measure of confidence in the sovereign, tend to fall around spending-based consolidation announcements that take place in slump periods. Overall, if confidence is a concern and consolidation is unavoidable, spending-based measures seem preferable. Slump periods are not necessarily bad moments for such measures, while strengthening institutional arrangements may help in mitigating adverse confidence effects.

**Keywords:** consolidation plans, announcements, revenues, spending, consumer- and business confidence, long-term interest rates, institutional quality, event study.

**JEL codes:** H60, H61, H62.

## Non-technical summary

During the recent economic and financial crisis, many industrialized countries announced and implemented ambitious fiscal consolidation plans with a view to addressing the severe fiscal imbalances that emerged in this period. Against this background, it is important to understand how the announcement of fiscal adjustment plans may affect consumer and producer confidence. Indeed, as shown by several authors, private sector confidence plays a key role in influencing business cycle fluctuations and in the transmission of fiscal shocks to the real economy (see, e.g., Giavazzi and Pagano, 1990; Bachmann and Sims, 2012). Yet, although many authors have stressed the importance of consumer confidence in the fiscal transmission mechanism, with a few exceptions (e.g., Konstantinou and Tagkalakis, 2011) the quantification of the effect of fiscal measures on consumer confidence has attracted surprisingly little attention.

In this paper, we propose a new empirical analysis aimed at investigating how announcements of fiscal consolidations affect consumer and business confidence. The analysis is based on data for 17 OECD countries over the period 1978-2009. Our starting point is the dataset of fiscal consolidation episodes constructed by De Vries et al. (2011) based on an “action-based” approach, which was recently expanded by Alesina et al. (2014) to account for fiscal plans consisting of unanticipated and anticipated components.

We enrich Alesina et al. (2014)’s dataset further by identifying the specific *month* in which each consolidation measure is announced by fiscal authorities in each country. This enlarged monthly dataset – which represents an important value added of our work - is created by extracting information from the narrative account of fiscal consolidation episodes provided by De Vries et al. (2011) and by reviewing other institutional information and official documents. The resulting new monthly dataset of fiscal announcements is used in our empirical analysis to investigate the association between such announcements and movements in confidence. Indeed, a more accurate picture of how consolidations affect confidence can be obtained if we have a more precise (i.e. monthly) timing of the release of information of the consolidations.

The most important findings from our analysis are the following. Generally speaking, consolidation announcements are associated with a reduction in consumer and business confidence, with consumer confidence reacting more strongly. We find that the negative relationship between consumer confidence and consolidation announcements is mostly driven by the announcements of revenue-based consolidations, whereas spending-based

consolidations have positive effects on confidence under certain circumstances. Dissecting the observations based on economic state variables, we observe that announced consolidations in booms have a negative effect on consumer confidence, while the announcement of a consolidation during a slump tends to be associated with higher consumer confidence if it is expenditure-based. Moreover, instances of high public indebtedness lead to stronger negative effects than instances of low indebtedness. Splitting our sample into European and non-European countries shows that it is the revenue-based consolidations of the former group of countries that drive the overall results on consumer confidence. Other dissections of the European countries show that countries with weak fiscal rules and low transparency are accompanied by a strong and negative association between consumer confidence and consolidation announcements, while for countries with strong fiscal rules and high transparency there is no evidence of such a significantly negative relationship. Our findings for the association of announcements with business confidence are generally weaker. However, also in this case, it emerges that spending-based consolidations tend to be less harmful than tax-based ones.

In a final step, we investigate how consolidation announcements affect confidence in the sovereign, as measured by the long-term interest rate on public debt. We find that consolidation announcements tend to reduce long-term interest rates. This effect seems to be mainly driven by spending based consolidations. In addition, the interest rate reduction is particularly strong for European countries and during periods of slumps.

Our findings point to some potentially useful policy implications. If confidence is important and consolidation is unavoidable then there is a strong case for resorting to spending-based consolidation. In contrast to the rather commonly-held view, a slump period may not be a bad moment for a spending-based consolidation. Finally, solid institutional arrangements in the form of tight fiscal rules and transparent budgets could help in mitigating any negative confidence effects of fiscal consolidations.

## 1. Introduction

During the recent economic and financial crisis public deficits and debt increased dramatically. As a result, concerns about the sustainability of the public finances have pushed many industrialized countries into implementing ambitious fiscal austerity measures. The consensus view among economists was always that such fiscal austerity has negative short-run effects on economic activity. While this standard view was challenged in recent work by Alesina and Ardagna (1998, 2010 and 2012), who claim that austerity measures can generate expansionary effects on the economy,<sup>2</sup> the IMF (2010) shows that the claimed expansionary effects of austerity are the result of biases in the selection of fiscal consolidation episodes. Using the consolidations identified in the “action-based” dataset constructed by De Vries *et al.* (2011), Guajardo *et al.* (2011) find that the expansionary effects of fiscal consolidations may be exaggerated. Hence, while the expansionary consolidation hypothesis seems to have become untenable, the debate has shifted towards the role of the composition of the consolidation strategy in affecting the macro-economy. Alesina and Ardagna (2013) show that spending-based adjustments cause less contractionary effects than revenue-based adjustments.

At present still a lot is unknown about the channels through which consolidations affect the economy and what accounts for the different effects associated with composition of a consolidation. In this regard, commentators frequently point to the role of private sector confidence. In particular, they often seem to argue that Europe’s difficulties in escaping from the crisis are to blame on a lack of demand resulting from weak confidence.

In this paper we study the effects of consolidations on private sector confidence. The topic is very timely, because many countries are now consolidating their public balances. While the key role of confidence in the fiscal transmission mechanism is often stressed – for

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<sup>2</sup> Ardagna (2004) points to the so-called “expectations channel”. If the general public sees the need for a consolidation, then an increase in current taxes or a reduction in public spending would reduce the need for future taxes and this could stimulate the economy. However, for this mechanism to work in a context in which consumption depends only on lifetime net income, postponing a current contraction requires a more than proportional future contraction, so that the present value of resource for consumption falls. A possible channel is that the budgetary crisis resulting from the postponement produces a disproportionate increase in the interest paid on the public debt. Bertola and Drazen (1993) develop a model in which a cut in public spending leads to significantly lower expectations of future spending and taxes, thereby stimulating current consumption. In the overlapping generations model of Sutherland (1997) an increase in the public deficit when debt is already high may lead to a contraction in consumption, because a rise in taxes becomes more likely. Generally, in a non-Ricardian world in which consumption depends only on current income, e.g. because of the presence of credit constraints, expansionary contractions are implausible.

example, Hemming *et al.* (2002) emphasize the dependence of consumption and investment on the attitudes of households and firms – , the quantification of the effect of fiscal measures on confidence has attracted surprisingly little attention. An exception is Konstantinou and Tagkalakis (2011), who find evidence that expansionary fiscal policy can boost consumer and business confidence, which in turn stimulates private spending and economic activity. Other exceptions are Cimadomo *et al.* (2011), Alesina *et al.* (2014) and Kalbhenn and Stracca (2014). The latter do not find much evidence that fiscal consolidations affect variables like confidence and trust.

We start our analysis with annual panel regressions linking confidence to consolidations. The consolidation episodes are those that are identified in the “action-based” dataset constructed by De Vries *et al.* (2011). Our analysis is thus based on their data for 17 OECD countries over the period 1978-2009. Generally, consolidations affect consumer confidence negatively. We also explore separately the effects of the different components of consolidation plans, as identified in Alesina *et al.* (2014), both through a split into revenues and expenditure measures and a split into anticipated and currently implemented measures, unanticipated and currently implemented measures, and changes to planned future measures. The latter two play the largest role in affecting consumer confidence. This is consistent with a situation in which it is mostly new and credible information that affects confidence. Further, the (negative) confidence effects running through the revenues component of consolidations are larger and more significant than those running through the spending component. We also interact the consolidation measures and their components with economic and institutional variables, as measured by the tightness of fiscal rules or budgetary transparency. Significant negative effects of consolidations are found when debt is high and fiscal rules and budgetary transparency are weak. Systematic effects of consolidations on business confidence are hard to detect for these annual regressions.

A more accurate picture of how consolidations affect confidence can be obtained if we have a more precise timing of the release of information of the consolidations. For example, the announcement of many of the unanticipated and currently implemented measures in Alesina *et al.* (2014) can be traced back to the budget presented at the end of last year. This way it becomes easier to exclude confounding events and we can see in real time how such information affects confidence. Hence, based on the narrative account of the fiscal consolidation episodes identified by De Vries *et al.* (2011) and on other institutional information and official documents, we enrich the available data further by identifying the

specific month in which each consolidation measure is announced. We use an event study to explore the association between consolidation announcements and movements in confidence.

The most important findings from the event study are largely in line with the results from the annual panel regressions. Consolidation announcements are associated with a reduction in consumer confidence. This negative relationship is mostly driven by the announcements of revenue-based consolidations. Dissecting the observations based on economic state variables, we observe that announced consolidations in booms have a negative effect on consumer confidence, while the announcement of a consolidation during a slump tends to be associated with higher consumer confidence if it is expenditure-based. Moreover, instances of high public indebtedness lead to stronger negative effects than instances of low indebtedness. Splitting our sample into European and non-European countries shows that it is the revenue-based consolidations of the former group of countries that drive the overall results on consumer confidence. Other dissections of the European countries show that countries with weak fiscal rules and low transparency are accompanied by a strong and negative association between consumer confidence and consolidation announcements, while for countries with strong fiscal rules and high transparency there is no evidence of such a significantly negative relationship. Our findings for the association of announcements with business confidence are generally weaker. However, also in this case spending-based consolidations tend to be less harmful than revenue-based ones. In a final step, we investigate how consolidation announcements affect confidence in the sovereign, as measured by the long-term interest rate on public debt. We find that, in contrast to revenue-based consolidations, spending-based consolidations produce a significant reduction in the interest rate, especially for European countries and especially during periods of slumps.

Our findings suggest some potentially useful policy implications. If confidence is important and consolidation is unavoidable then there is a strong case for resorting to spending-based consolidation. In contrast to the rather commonly-held view, a slump period may not be a bad moment for a spending-based consolidation. Finally, solid institutional arrangements in the form of tight fiscal rules and transparent budgets could help in mitigating any negative confidence effects.

The remainder of this paper is structured as follows. Section 2 provides a brief literature review. Section 3 discusses the identification of consolidation episodes and the recent austerity measures resulting from the crisis. Section 4 describes the dataset, and in particular the construction of the monthly consolidation announcement data. Section 5 conducts the annual panel regression analysis investigating how consolidations affects

confidence. Section 6 presents the event study, while Section 7 concludes the paper and offers some policy implications.

## **2. Literature review**

Policymakers and the media often stress the role of private sector confidence in the fiscal transmission mechanism. Confidence important in this regard if fiscal policy decisions have a significant effect on confidence and if confidence affects the real economy. We start by reviewing existing evidence on the first part of the transmission, which is the focus of this paper, and then we move on to discussing the second part of the chain.

### *2.1. The effect of fiscal shocks on confidence*

Although many authors stress the key role of consumer confidence in the fiscal transmission mechanism, the quantification of the effect of fiscal measures on consumer confidence has attracted surprisingly little attention.

Giavazzi and Pagano (1990) were among the first to highlight the importance of confidence in the transmission of fiscal policies. The argument was that a drastic fiscal adjustment – as reflected in a sharp fall in long-term interest rates – tends to generate an increase in consumer and investor confidence. This is likely to compensate the depressive Keynesian effect of tax hikes and spending cuts, thus resulting in an overall economic expansion following an episode of fiscal consolidation. More specifically, the authors studied the experience of Denmark in the early eighties and Ireland at the end of the same decade and argued that these episodes represent cases of “expansionary fiscal adjustments”. While Giavazzi and Pagano (1990) and the following literature on the “non-Keynesian effects” of fiscal policy (see, e.g., Giavazzi and Pagano, 1996; Afonso, 2001) attributed an important role to confidence in the transmission of fiscal shocks, these papers did not provide direct econometric evidence on the effects of fiscal policies on measures of consumer and producer confidence.

More recently, some authors have tested directly the effects of fiscal policies on consumer and producer confidence indicators in advanced economies. Focusing on the U.S. and on the period 1981-2008, Cimadomo, *et al.* (2011) test the different effects of positive government spending shocks that are subsequently reversed, and of spending shocks that are

followed by further spending growth. It is found that consumer confidence reacts positively to fiscal shocks with reversal, suggesting that a temporary fiscal stimulus with future fiscal restraint is considered to be beneficial for overall economic conditions. Instead, fiscal shocks accompanied by further future spending growth have a muted effect on consumer confidence. Using quarterly data for nine OECD countries covering the period 1970-2007, Konstantinou and Tagkalakis (2011) show that cuts in direct taxes and increases in non-wage government consumption stimulate both consumer and business confidence. By contrast, higher government wage consumption and investment reduce confidence. Kalbhenn and Stracca (2014) analyse the impact of fiscal consolidations on four measures of public opinion in EU countries, namely (i) life satisfaction, (ii) consumer confidence, (ii) trust in national institutions (government and parliament) and (iv) trust in Europe and European institutions. Based on a panel of 26 EU countries over the period 1973-2013, they find that, overall, fiscal consolidation episodes have little or no impact on these measures of public opinion.

The paper that is closest to ours is Alesina *et al.* (2014). Based on a sample of 17 OECD countries over the period 1978-2009, they find that both consumer and business confidence fall when a fiscal adjustment is started. The effects on consumer confidence are larger. Moreover, for both confidence measures, the effects of revenue-based consolidation are larger than for spending-based consolidation. The current paper extends in several ways the analysis of confidence effects in Alesina *et al.* (2014), and other papers mentioned above. Our annual panel regression links confidence to the various components of the consolidation plan, while not only distinguishing between revenues- and spending-based consolidations, but also highlighting the role of economic circumstances and institutional variables. We further extend their data to the monthly frequency to more precisely pinpoint the moment of consolidation announcements. Hence, using an event analysis we explore in real time the anticipation and reaction of confidence to those announcements, also conditioning the confidence effects on economic and institutional variables.

## *2.2. How confidence affects the real economy*

The literature discusses various channels through which private sector confidence may affect the economy. The so-called “animal spirits” view, which recently regained attention (see, e.g., Akerlof and Shiller, 2009), suggests that surprise fluctuations in beliefs may have (temporary) effects on economic activity. For example, Blanchard (1993) regards exogenous movements in consumer confidence as a cause of business cycles and, more specifically, of the 1991-1992

recession. In such an environment, fiscal announcements may improve sentiment, given that they show policy-makers' commitment to macroeconomic stabilization, and this, in turn, would stimulate demand. The “information” or “news” view suggests that innovations to confidence largely reflect news about future fundamentals (see, e.g., Beaudry and Portier, 2006). The “news view” has been tested with mixed outcomes. Ludvigson (2004) finds that consumer confidence predicts a relatively modest amount of variation in future consumer spending. However, recent research points to more sizeable effects. In particular, Barsky and Sims (2012) show for the U.S. economy that confidence innovations are associated with a modest immediate response of real activity, but with sizeable and prolonged subsequent consumption and income growth. Others focus on the possibility that households fail to perfectly observe fundamentals, but use observables like aggregate output to form beliefs about their true values (see Lorenzoni, 2009). After a recession, beliefs about improving fundamentals may be slow to catch up, thereby slowing down the recovery. Fiscal (and monetary) authorities may implement expansive policies to signal that fundamentals have improved. This, in turn, boosts confidences and helps the recovery to take off.

A direct test of the role of confidence in the transmission of fiscal shocks is provided by Bachmann and Sims (2012), which focuses on the US economy. They allow fiscal policy to have a direct effect on the economy, i.e., through the traditional Keynesian multiplier channel, and an indirect effect, i.e., through confidence. In their VAR framework, they use a counterfactual experiment to isolate the importance of this latter channel. They find that the endogenous response of confidence explains almost all of the fiscal-driven output expansion in recessions, whereas its role in normal times is minor. The positive responses of output and productivity to fiscal stimulus in times of slack are mild on impact, but tend to rise in a gradual and prolonged way. This also provides support to the “news” hypothesis.

In this paper, we show that fiscal consolidations can have significant effects on confidence and that those effects depend on the economic and institutional situation. The findings described above suggest that these confidence effects of consolidations may have important consequences for economic activity.

### **3. Identifying fiscal consolidations**

Recent years have seen a substantial amount of research trying to identify fiscal shocks and exploring how fiscal consolidations affect the macro-economy. The most common way of

identifying fiscal consolidations is to look at the cyclically-adjusted primary balance (CAPB), defined as the primary balance minus the component of the balance that is automatically, i.e. for given policies, driven by the business cycle. While the general concept of CAPB is the same, there are various ways to operationalise it.<sup>3</sup> With the automatic effect of the business cycle taken out, swings in the CAPB must be the result of discretionary policy changes. Hence, using this method fiscal consolidations are defined as periods in which the CAPB increases (significantly).

The use of the CAPB to identify fiscal consolidations (and discretionary fiscal shocks in general) has been criticised for various reasons. First, changes in the CAPB typically include measurement errors that are likely to be correlated with other economic developments (IMF, 2010). Second, changes in the CAPB can be the result of discretionary reactions of fiscal policy to cyclical conditions. Third, as Wolswijk (2007) argues, the conventional way of calculating the CAPB wrongly assumes that the automatic response of tax revenues is constant over time, while tax elasticities may change over time, which can lead to inaccurate estimates of the CAPB at any moment.

To avoid these shortcomings, De Vries *et al.* (2011) identify fiscal consolidations by using the “action-based” approach of looking closely at the motivation behind the consolidation. Specifically, they identify consolidations as episodes of austerity measures that were primarily motivated by the desire to reduce budget deficits and not by a response to (prospective) economic conditions, for example a desire to restrain domestic demand. To this end they examine historical sources, such as Budget Reports, Budget Speeches, Central Bank Reports, EU Convergence and Stability Programs, IMF Reports, OECD Economic Surveys and country-specific sources.<sup>4</sup> The IMF (2010) and Guajardo *et al.* (2011) show that identifying fiscal consolidations using the CAPB creates a bias towards finding that austerity is expansionary. By contrast, when the action-based identification is used, fiscal

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<sup>3</sup> For instance, Blanchard (1990) argues that public spending (revenues) is negatively (positively) related to GDP due to build-in stabilizers like unemployment benefits (the progressive tax system). A contraction causes the deficit to rise, because it leads to an automatic increase in public spending and an automatic reduction in tax revenues. To purge these automatic effects, Blanchard suggests to estimate spending and revenues had the unemployment rate remained constant at the level of the previous year. The OECD instead subtracts from the current primary deficit the primary deficit that would have prevailed had expenditure in the previous year grown with potential GDP and revenues with actual GDP. The IMF uses the same calculation except that they use as a benchmark not the previous year, but a year in which potential output close to actual output (see Alesina and Perotti, 1995).

<sup>4</sup> Hence, this builds on “narrative approach” of Romer and Romer (2010), who investigate the macroeconomic effects of tax changes selected on the basis of the motivation behind them. Specifically, based on the Economic Reports of the President, Presidential speeches and statements, Annual Reports of the Secretary of the Treasury on the State of Finances and the Budget of the United States Government, they select only those tax changes for which the motivation was not correlated with other developments that could affect output.

consolidations turn out to be associated with slumps. While the CAPB-method has its disadvantages, the narrative approach itself has its weaknesses, which are mainly related to the difficulty in defining the benchmark of “unchanged policy” against which to assess the impact of government actions.

Our empirical analysis will be based on the consolidation episodes identified by De Vries *et al.* (2011). Because this dataset runs until 2009, it excludes consolidation episodes resulting from the Great Recession. While the initial reaction to the outburst of the crisis was massive fiscal expansion, the deterioration in the public finances forced countries to shift towards austerity. This was the case, in particular, in the Eurozone, where countries are subject to the restrictions imposed by the Stability and Growth Pact. Because the Pact acts as an exogenous motivating force, many of Europe’s austerity measures would probably fulfil the eligibility criteria for consolidations in De Vries *et al.* (2011). Our analysis of how consolidations affect confidence may offer lessons about the austerity choices that the authorities have made in the aftermath of the Great Recession. Box 1 discusses those choices.

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### **BOX 1: Fiscal consolidation in the euro zone during the crisis**

The global economic and financial crisis, which erupted in September 2008 with the collapse of Lehman Brothers, was accompanied by a rapid deterioration of public finances in the euro zone and led to a “sovereign debt crisis” in some countries as of mid-2010. In response to rapidly rising government deficit and debt-to-GDP ratios, in 2010 and 2011 most euro area governments announced ambitious multi-annual fiscal consolidations plans. The main motivation behind the approval of these adjustment plans was to address fiscal imbalances and market’s concerns regarding the sustainability of public finances. Therefore, as such, these adjustment plans could be considered to be exogenous with respect to the cycle, i.e., they were not implemented with a view of stabilising cyclical fluctuations. Indeed, in most countries, fiscal consolidation packages were passed during a still depressed cyclical phase, with the output gap being in the negative territory for most countries during this period.

Figure 1 provides some summary statistics on the consolidation effort put in place by euro zone Member States between 2009 and 2013, together with the change in the overall government budget balance over the same period. The size of the fiscal consolidation effort is

gauged in two ways: first, as typically done in the literature (see, e.g., Galí and Perotti, 2003), as the change in the government structural primary balance (SPB), i.e., the cyclically-adjusted government primary balance net of temporary and one-off measures, and, second, in terms of cumulated discretionary fiscal measures approved by governments in the same period. The budgetary impact of these measures has been recently evaluated by the European Commission based on a “bottom-up” or “narrative” approach (see European Commission, 2013). In this context, the discretionary fiscal effort is measured as the sum of the values that government authorities attributed to the measures in their budget at the time of adoption. Figure 1 suggests that the fiscal adjustment effort was very sizeable in many euro area countries, as reflected in both the improvement in the SPB (red bars) and the cumulated “narrative” discretionary measures (green bars) over the 2009-2013 period. For the euro area as a whole, the SPB improved by 3.3 percentage points of GDP, while the narrative discretionary measures indicate an improvement of 4.7 percentage points of GDP. The SPB rose especially in those countries that were subject to an IMF/EC/ECB financial assistance programme (Greece, Portugal, Ireland, Cyprus) - but also in other countries (e.g. Slovakia and Italy) – indicating that, in general, countries at the centre of market turbulence during the crisis were the most active in the fiscal adjustment process. The discretionary adjustment effort put in place in euro zone countries generally led to an improvement in the overall government budget. For the aggregate euro area, the budget balance rose by 3.3 percentage points of GDP – i.e., from -6.3% of GDP to -3.0% of GDP - between 2009 and 2013. However, the developments in the overall balance were also driven by other factors. In particular, the economic cycle - through the operation of the automatic stabilisers – and one-off bank recapitalization operations played an important role. Therefore, for some countries, the sizeable fiscal consolidation effort was not fully reflected in an equivalent improvement in the headline deficit.<sup>5</sup>

An important dimension of the debate on the fiscal consolidation process in the euro zone was related to the composition of the fiscal adjustment. Indeed, the composition of the fiscal consolidation may have implications for the success of the consolidation process, in terms of both its sustainability and its macroeconomic effects (e.g. von Hagen and Strauch, 2001). In this context, recent empirical literature suggests that an expenditure-based consolidation strategy is generally preferable to a revenue-based one. In fact, past consolidation episodes often show that spending-based adjustments tend to cause milder and shorter contractions

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<sup>5</sup> In Slovenia, for instance, the government balance deteriorated from -4.0% of GDP in 2012 to -14.7% of GDP in 2013, but this was mainly the consequence of one-off sizeable bank recapitalization costs (of about 10% of GDP).

than revenue-based ones (Alesina *et al.*, 2002, and Alesina and Ardagna, 2013): private investor confidence recovers faster if the consolidation relies more on expenditure cuts than on tax increases that tend to depress private investment and consumption.

Against this background, Figure 2 sheds more light on the composition of the fiscal adjustment in the euro zone during the crisis. In particular, Figure 2 shows the contribution of structural revenue and primary expenditure to the change in the SPB over the 2009-2013 period. It emerges that, for the euro area as a whole, the adjustment was rather balanced, although somewhat more tilted toward the revenue side: increases in structural revenues contributed by 1.8 percentage points of GDP of the total 3.3 percentage points of GDP improvement in the SPB, whereas cuts expenditure contributed by 1.5 percentage points of GDP. Interestingly, for the most ‘vulnerable’ countries, which are also the ones that implemented the most sizeable consolidation effort, the adjustment was mostly expenditure-based (e.g. Greece, Spain, Ireland), whereas for countries with a fiscal consolidation effort smaller than the euro zone average, the adjustment was predominantly revenue-based (e.g. France, Slovenia, Netherlands, Belgium, Austria).

Finally, Figures 3 and 4 zoom in on how individual revenue and expenditure items have changed during the crisis. For these charts, unadjusted time series are used, given the absence of data for cyclically-adjusted revenue and expenditure subcomponents. Therefore, developments for these variables are not only driven by discretionary measures, but also by the business cycle (especially as regards revenues) and other factors, e.g., bank recapitalization operations, as regards expenditure. More specifically, Figure 3 focuses on the contribution of individual revenue items to the total revenue-to-GDP ratio change in period 2009-2013. It emerges that both direct and indirect tax increases contributed significantly to the revenue improvement in most euro zone economies. In particular, these two revenue items accounted for by more than 50% of the total revenue increase in France, Portugal, Spain and Ireland. With the exception of the Netherlands, increases in social security contributions were less sizeable. At the same time, for some countries (e.g. Greece and Slovenia), hikes in other taxes – in particular capital taxes – contributed by a large amount to the overall revenue increase. As regards government expenditures (Figure 4), cuts in government consumption (mainly, government wages and intermediate consumption) and reductions in transfers to households contributed the most to the expenditure restraint. However, in some countries (e.g. Ireland, Spain, Cyprus), government investment was also significantly reduced. Finally,

Greece and Slovenia posted a large increase in other primary spending, which was however mostly driven by 2013 developments related to rescue operations in the banking sector.

Overall, this analysis suggests that the design of the euro zone fiscal adjustment often reflected the principles put forward by the advocates of expenditure-based consolidations (e.g., Alesina *et al.*, 2002, and Alesina and Ardagna, 2013), although in some cases at the expense of sizeable cuts in the most growth-friendly spending items, in particular government investment.

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## 4. The data

### 4.1. Data sources and sample

We make use of different datasets from various sources. First, we have the action-based dataset of De Vries *et al.* (2011), which dictates the sample. It spans 17 countries for the years 1978-2009. The countries included are Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Italy, Japan, Netherlands, Portugal, Spain, Sweden, the United Kingdom and the United States. The dataset contains the budgetary impact (as a percentage of GDP) of fiscal policy measures implemented in a given year as part of a fiscal consolidation. It only includes fiscal consolidation episodes that are not undertaken in view of output stabilization. Accordingly, we treat all policy measures in the dataset as independent of contemporaneous business cycle dynamics.

The De Vries *et al.* (2011) dataset has been augmented by Alesina *et al.* (2014) by converting the set of consolidation measures into “fiscal plans” that in each period consist of anticipated measures  $CS^A$  that were announced in previous periods and that are implemented in this period, unanticipated measures  $CS^U$  implemented in this period, and shifts in fiscal variables announced at time  $t$  for implementation in the future.

Analogous to this latter component we construct the variable  $CS_{it}^P \equiv \sum_{j=1}^2 (CS_{i,t,j}^A - CS_{i,t-1,j+1}^A) / (1+IRS)^j + CS_{i,t,3}^A / (1+IRS)^3$ . It consists of the discounted sum of changes to previously planned measures for future periods plus new measures announced for implementation in future periods. For the discount factor we use the short-term interest rate

*IRS* taken from the OECD. Further,  $CS_{i,t,j}^A$  captures the measures planned in period  $t$  for period  $t+j$ , so that  $CS_{i,t,j}^A - CS_{i,t-1,j+1}^A$  is the change between what was planned in the previous period for period  $t+j$  and what is planned this period for period  $t+j$ . In the data, planning is virtually always for a maximum of three years ahead. Hence, the final term in the expression for  $CS_{it}^P$  does not enter as a difference (i.e.,  $CS_{i,t-1,4}^A = 0$ ). In other words,  $CS_{it}^P$  is to be interpreted as the present discounted sum of all unanticipated *extra* (positive or negative) consolidation planned in period  $t$  for the future.

Alesina *et al.* (2014) also construct  $REV_{it}^A$  and  $EXP_{it}^A$  as the revenue and spending measures implemented in period  $t$  that were anticipated from announcements in previous years, and  $REV_{it}^U$  and  $EXP_{it}^U$  as the unanticipated revenue and spending measures implemented in period  $t$ . Fully analogously to  $CS_{it}^P$ , we construct  $REV_{it}^P$  and  $EXP_{it}^P$  as the present discounted sum of all unanticipated additional consolidation through revenues (spending) planned in period  $t$  for the future. All these variables are expressed in shares of GDP. The *current* implementation of consolidation measures is defined as  $CS_{it} \equiv CS_{it}^A + CS_{it}^U$ , where  $CS_{it}^A \equiv CS_{i,t,0}^A$ . We also have  $CS_{it} \equiv REV_{it} + EXP_{it}$ , where  $REV_{it} \equiv REV_{it}^A + REV_{it}^U$  and  $EXP_{it} \equiv EXP_{it}^A + EXP_{it}^U$ . Obviously,  $CS_{it}^j \equiv REV_{it}^j + EXP_{it}^j$  for  $j = A, U$  and  $P$ .

Consumer confidence indices are collected from the OECD, which in turn obtains them from national statistical institutes, government agencies, banks and private and other research institutes. The indices have been standardized by the OECD to make them comparable across countries. The consumer confidence measures are based on questionnaires sent out to a random sample of the population. Each of the questionnaires contains four, sometimes five, questions on the current and expected future personal and general economic situation. For example, for the EU harmonized consumer confidence indicator the following information is collected:

- Expected change in the *financial situation* of the household over the next 12 months;
- Expected change in the *general economic situation* over the next 12 months;
- Expected change in *unemployment* over the next 12 months;
- Expected change in the *savings of household* over the next 12 months.

Each of the questions has five possible answers: a lot better, a little better, the same, a little worse and a lot worse. The answers are balanced (positive over negative) and weighed to create an index.<sup>6</sup> Although the specific questions may differ from country to country, the general format is the same. For business confidence, we use the OECD indicator based on business tendency surveys for manufacturing.<sup>7</sup> The confidence indicator is the arithmetic average of the balances (in percentage points) of the answers to the following questions:

- How do you expect your production to develop over the next 3 months? Possible answers are: it will increase, remain unchanged or decrease.
- Do you consider your current stock of finished products to be too large (above normal), adequate (normal for the season) or too small (below normal)?
- Do you consider your current overall order books to be sufficient (above normal), sufficient (normal for the season) or not sufficient (below normal)?

The series for consumer and producer confidence are standardised as follows. First, they are smoothed using the Hodrick-Prescott (HP) filter, where cycles shorter than 6 months are removed. Then, they are normalised by subtracting their mean and dividing this difference by their standard deviation. After the normalisation, they are amplitude-adjusted to the de-trended indices of GDP, used as a proxy of the business cycle, and, finally, they are centred around 100 (for further detail, see OECD, 2006, 2014a).

We obtain our macroeconomic variables from the OECD Economic Outlook. These include the output gap defined as the deviation of actual from potential GDP in percent of potential GDP, public debt in percent of GDP, per-capita real-GDP growth, inflation, the long-term interest, the unemployment rate and OECD-wide per-capita real-GDP growth. For Germany, we link all series of Western Germany for the first part of the sample with those for Germany for the second part of the sample.

Information that quantifies aspects of policy-making institutions comes from various sources. The index of the tightness of fiscal rules is obtained from the European Commission (2014) and it is described in, for example, Debrun *et al.* (2008) and Beetsma *et al.* (2009). In short, the index combines the strength and coverage of all rules in force for the various government sectors (general, central, regional, local and social security). Strength is

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<sup>6</sup> The EC assigns double weights on the extremes: a lot better/a lot worse get weight 1, a little better/a little worse get weight 0.5 and the same gets weight zero.

<sup>7</sup> Other sectors (construction, retail trade and other services) were not included since data availability is scarce among non-European Union OECD member countries.

determined on the basis of the statutory or legal base of the rule, the nature of the bodies in charge of monitoring and enforcing the rule, the enforcement mechanism and the degree of media visibility. Tighter fiscal rules imply a higher value for the index. We also make use of the Bernoth and Wolff (2008) “Audit” index for fiscal transparency. It is based on whether governments are externally audited for their finances, the degree of independence of the auditing, and the extent to which the obtained information is disseminated.

#### *4.2. Extension to the monthly timing of the announcements*

We create also a new monthly dataset of announcements of action-based fiscal consolidation measures. The De Vries et al. (2011) dataset provides detailed descriptions of the implemented consolidation measures for each year. These descriptions often also contain some information about the date when these measures were announced, and, where available, we use this information. We confirm any announcement dates mentioned in De Vries et al. (2011) with the information provided in the Calendar of Economic Events of the OECD Economic Surveys. When the De Vries et al. (2011) dataset contains no information about the announcement date, we match the implementation with the announcement information provided in the OECD Economic Surveys, based on the description of the measures in the consolidation and on the budgetary process of the country. For example, if a VAT hike of 17% was implemented, we match this with the announcement of a VAT hike of 17% done in the years preceding the consolidation. The Calendar of Economic Events of the OECD Economic Surveys also codes implementations as events, and, when it does, it sometimes mentions when these were agreed upon or proposed. If no information is provided by De Vries *et al.* (2011) or the OECD Economic Surveys, we use national sources, these being official documents and newspaper archives. Using the description of the measures introduced with each announcement, based on what is indicated as their predominant character, we can classify the announcements into revenue- and spending-based. However, in many instances, we do not have accurate numbers on the magnitude of these measures.

In coding the information in a consistent way, we apply the following main rules:

- A year is only classified as a consolidation year, if it is designated as such by the IMF dataset. For the components of the consolidation measures in such a year, we try to establish the months in which they were announced.

- If the government explicitly signals its commitment to a fiscal plan, we consider this an announcement, but only if the government was recently elected, the idea being that this should provide information on the likelihood that the plan will be carried out.
- Whenever possible, we classify the consolidation into government spending and revenues.

Further details on the construction of the new monthly consolidation announcement data is contained in the appendix.

#### *4.3. Summary statistics for confidence and consolidation announcements*

Our monthly dataset, which spans the same countries and time period as the annual data, consists of 6,528 observations, of which 221 are announcements of new consolidation measures. In most cases, we were able to establish whether announcements were spending-based and revenue-based.<sup>8</sup> Of the total, a fraction of 51.6 was spending-based, a fraction of 31.2 was revenue-based and a fraction of 1.8 was equal. The remaining 15.4% of the observations we were not able to classify. Figure 5 shows the frequency distribution of announcements over months of the year. While each month features a number of announcements (the minimum being nine for the month April), a relatively large part of the announcements are made in the fall with the introduction of the new budget for countries that use the calendar year for their budgetary cycle. Finally, even though the budgetary adjustments we consider are not motivated by the state of the economy, a large fraction of 66% of the announcements is made when the output gap is negative in the year that the announcement takes place. Hence, 33% of the announcements are done when the output gap is positive in the year of the announcement.

Table 1 reports summary statistics for the consumer confidence index (*CCI*) and the business confidence index (*BCI*) pooled over all observations. For both indices some observations are missing. There are 18 consolidation announcements (about 8% of the total) for which *CCI* is missing and there are 75 announcements (34% of the total) for which *BCI* is missing. The average values of the indices over all observations is roughly 100. All values of

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<sup>8</sup> The cases where this was not possible were cases when commitment to consolidation was announced, but no precise measures were mentioned (and there was no impact recorded for the measures either). Examples are “The Treasurer announced the intention of the newly elected Government to return the budget to underlying balance”, “The Government announced a budget consolidation package comprising also measures to promote economic growth”, “The government decides the budgetary framework for the years 1993-1995” and “A corrective plan was announced to reduce the deficit”.

*CCI* are located within an interval of 4% on either side from the mean. The observations of *BCI* are spread over a slightly wider interval.

Figure 6 shows the frequency distributions of *CCI* and *BCI* over all observations. Both distributions show slight evidence of negative skewness, but clearly for both *CCI* and *BCI* the far majority of the observations is located in an interval of  $\pm 2\%$  from the mean. Further, Figure 7 shows the average (over all observations) percent change in *CCI* and *BCI* in each month for months without and with announcement. Despite the fact that the OECD has purged the confidence series of seasonality, we observe a slight amount of seasonality in the data without announcement. On average, over all months, the changes seem to be close to zero. Switching to the subsample with announcements, we see that variation across the months is substantially larger, while, moreover, most (nine) months with announcements feature on average a deterioration of *CCI* and seven months feature on average a deterioration in *BCI*. For this subsample the variation across months is most likely due to the announcements themselves, rather than seasonality in the confidence indicator.

## 5. Annual panel regressions

Using the consolidations narratively identified by De Vries *et al.* (2011) and the fiscal plan decompositions by Alesina *et al.* (2014), this section uses annual panel regressions to explore how consolidations affect confidence. Fiscal consolidations can come in different formats. They can be (largely) based on revenue increases or on reducing expenditures. Hence, we will also investigate the role of the orientation of the consolidation in this regard. The sample consists of our 17 OECD countries over the period 1978-2009.

### 5.1. Baseline regressions

Our baseline is formed by the following panel regression framework for consumer and business confidence:

$$\begin{aligned}
 xCI_{it} = & \mu_i + \lambda_t + \alpha(L) xCI_{i,t-1} + \beta_1 CS_{it}^A + \beta_2 CS_{it}^U + \beta_3 CS_{it}^P + \gamma_1 GROWTH_{it} \\
 & + \gamma_2 \Delta u_{it} + \gamma_3 INFL_{it} + \gamma_4 INT_t + \gamma_5 \Delta STOCK_{it} + v_{it},
 \end{aligned} \tag{1}$$

where subscript  $i$  ( $t$ ) refers to the country (year),  $\mu_i$  is a country-fixed effect,  $\lambda_t$  a year-fixed effect,  $xCI_{it}$  ( $xCI = CCI, BCI$ ) the log of the confidence index,  $GROWTH_{it}$  is per-capita real GDP growth in percent,  $\Delta u_{it}$  is the first difference in the unemployment rate in percentage points,  $INFL_{it}$  is the CPI inflation rate in percent,  $INT_{it}$  is the long-run interest rate in percent,  $\Delta STOCK_{it}$  is the (log) change in the stock price index in percent and  $v_{it}$  a mean-zero error term.<sup>9</sup> Variables  $CS_{it}^A$ ,  $CS_{it}^U$  and  $CS_{it}^P$  were defined earlier and are all in percent of GDP. We will also estimate variants in which we impose restrictions on the  $\beta$ -coefficients.

Specification (1) allows for country- and year-fixed effects, lags in the dependent variable and, following Konstantinou and Tagkalakis (2011), a set of control variables. These include standard macro-controls that capture current country-specific economic conditions. The disadvantage of these controls is that they ignore the possibility that confidence might depend more on their expected future values than on their current or past values. Therefore, we also include as forward-looking controls the long-term interest rate and the stock price index. The interest rate controls for the reaction of financial markets to fiscal consolidations, which could have a separate effect on confidence. The stock price index serves as a general proxy for private sector expectations about future economic conditions.

Before we estimate (1), it is useful to explore to what extent consolidations can be treated as given within our regression framework. Additional Appendix A (not for publication) shows the results of panel probit regressions for the prediction of a consolidation announcement or its components in the current period, i.e. whether  $CS$ ,  $CS^A$  and  $CS^U$  differ from zero or not. As explanatory variables we include lags of consumer confidence, as well as of the macroeconomic variables in (1), debt, and OECD-wide GDP growth (in the spirit of Jorda and Taylor, 2014). We find that there is no predictive power from confidence, suggesting that feedback effects from confidence onto consolidations are absent. Of the macroeconomic variables, lags of debt, inflation and the long-term interest rate have the highest predictive power. Higher debt and higher long-term interest rates raise the likelihood of consolidation, possibly because they undermine the long-run budgetary sustainability. Higher inflation reduces the likelihood of consolidation, most likely because it relaxes the government budget constraint, given the outstanding stock of public debt. However, we find

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<sup>9</sup> A priori, it is not obvious whether consumer confidence should depend on the level rather than the change of some of our control variables. This is in particular the case for the inflation rate, the unemployment rate and the long term interest rate. We end up using the level of the inflation rate and the long-term interest rate and the first difference of unemployment rate, because they have the best fit. However, our main results are robust to alternative transformations of the control variables.

that unemployment and national and OECD-wide GDP growth have no effect on the likelihood of consolidation.

We estimate our model using ordinary least squares (OLS) with heteroskedasticity- and autocorrelation robust standard errors. It turns out that only the first lag of the dependent variable is significant.<sup>10</sup> Further, we use the end-of year indicator for confidence, to avoid potential endogeneity biases resulting from a feedback of confidence onto the right-hand side variables. We found, however, that using year-average instead of year-end confidence indicators hardly yields any differences.

Table 2 reports the main empirical results for consumer confidence and total consolidations, i.e. the sum of the revenues and spending measures. Both country and time fixed effects are included. Following the more “traditional” approach, Column (1) uses the CAPB as the variable measuring the amount of discretionary fiscal changes. There is a fair amount of persistence: the first lag of confidence enters with a highly significant coefficient of about 0.5. Of the controls, only GDP growth and the change in stock prices are significant. Both have the expected positive sign. An increase in growth by one percentage point raises consumer confidence by about 0.18 percentage points, while a one-percentage point higher growth in stock prices raises confidence by 0.02 percentage points. However, the CAPB plays no role in explaining confidence. Column (2) repeats the regression in Column (1), but setting the CAPB to zero for country-year combinations that are not identified in the De Vries *et al.* (2011) dataset as consolidation events. All coefficient estimates are essentially unchanged. Column (3) replaces the CAPB with the sum  $CS$  of the anticipated and unanticipated consolidation measures implemented in the current period. We see that this total of consolidation measures comes out significantly. A one percentage point of GDP additional implementation results in a 0.12 percentage points reduction in consumer confidence.<sup>11</sup>

Splitting current-period implementation into its anticipated and unanticipated components  $CS^A$  and  $CS^U$  (Column (4)) shows that the significance of the aggregate  $CS$  is

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<sup>10</sup> As is well-known, OLS with fixed effects and a lagged dependent variable as regressor generally leads to the so-called Nickell-bias in the coefficient estimates. However, this bias is small when the number of observations in the time dimension is substantial, which is the case here. Using the least squares bias-correction based on Bruno (2005) indeed shows that the bias is marginal (results available upon request from the authors). Hence, we continue using OLS for our panel regressions.

<sup>11</sup> We did the same regression replacing the nominal interest rate and inflation with the ex-post real interest rate. Both the magnitude and the significance of the other coefficients are unchanged – we report them in Table B.1 of Additional Appendix B (not for publication). Here, we also report the estimates for the case in which we limit the sample to those observations for which business confidence is also available. The negative effect of consolidations on consumer confidence is not driven by the sub-sample of observations for which business confidence is not available – in fact, the effect become even more strongly negative. Finally, in Table B.1 we report on the absence of possible spill-overs from consolidations elsewhere.

driven by the unanticipated component. The coefficient on  $CS^U$  is significantly negative, in contrast to that on  $CS^A$ , which, while still negative, is insignificant and smaller in absolute magnitude. Indeed, to the extent that consolidations are credible and have confidence effects, we would expect these effects to occur mostly when new information about a consolidation becomes available. Hence, on this line of reasoning the unanticipated component of the consolidation would affect confidence, but not the anticipated component. We also test formally whether the coefficients of  $CS^U$  and  $CS^A$  are equal. The results of this and other tests of the equality of coefficients are reported in Additional Appendix C (not for publication). We cannot reject the hypothesis that the coefficients of  $CS^U$  and  $CS^A$  are equal (see Table C.1). Column (5) adds to the specification in Column (4) the announced changes to the future consolidation measures ( $CS^P$ ). The coefficient on  $CS^P$  comes out significantly, again suggesting that it is new information on consolidations that is driving confidence. Moreover, the coefficient on  $CS^P$  is substantially larger in absolute magnitude than the coefficients on  $CS^U$  and  $CS^A$ . An announced increase in future consolidation by one percent of GDP reduces consumer confidence by almost 40 basis points. However, the coefficients are not so precisely estimated that we can formally reject their equality for all the three variables  $CS^A$ ,  $CS^U$  and  $CS^P$ , or for any pair among them. Column (6) restricts the coefficients on the latter two components to be identical. As expected, only this coefficient is (highly) significant, while the coefficient on  $CS^A$  is not. Again, a test for equality of the coefficients on  $CS^A$  and on  $CS^U+CS^P$  does not reject the equality hypothesis.

Table 3 splits consolidation measures into revenue and spending measures, using their actual values in percent of GDP. Concretely, in (1) we replace  $CS_{it}^x$  ( $x = A, U$  or  $P$ ) with either  $EXP_{it}^x$ , which is its component based on spending measures, or  $REV_{it}^x$ , which is its component based on revenues measures. Note that  $CS_{it}^x = EXP_{it}^x + REV_{it}^x$ . Since the estimates of the coefficients of the control variables are very close to those in Table 2, we do not report these estimates. The same is the case for that on the first lag of consumer confidence, which is always close to 0.5. Column (1) includes the full current implementation of revenues and spending measures and shows that both enter with a negative coefficient, but that only that of revenues is (highly) significant. A one percent of GDP increase in consolidation effort through revenues reduces consumer confidence by 0.22 percentage points. In a formal statistical sense, the coefficients on revenues and spending measures do not differ, although the test is not far from significance at the 10% level. A split into anticipated and unanticipated measures in Column (2) shows that all four components enter with a negative sign, but that

only the coefficient on unanticipated current revenues  $REV^U$  is statistically significant, a result in line with those reported in Table 2 and in the previous column. The coefficient on  $REV^U$  is also statistically different at the 10% level from that on  $EXP^U$ . In Column (3) we add the changes to the planned future measures  $REV^P$  and  $EXP^P$  to the specification in Column (2). Again, only the coefficient on  $REV^U$  is significantly negative, and it is again statistically different at the 10% level from that on  $EXP^U$ . Finally, Column (4) only distinguishes between anticipated current measures and the sum of unanticipated current measures plus planned future changes. While all coefficients are negative, only that on the latter variable enters significantly.

We can summarise the main results from Tables 2 and 3 as follows. First, consolidations tend to affect consumer confidence negatively. Second, this negative effect is largely associated with the release of new information about the consolidations. Third, revenue-based measures exert a stronger negative effect on consumer confidence than spending-based measures.

Table 4 is the analogue of Table 2, but for business confidence. The first lag is always positive but insignificant. As in the case of consumer confidence, the only relevant controls are real GDP growth and the change in stock prices, both entering with highly significant positive coefficients. The  $CAPB$  and  $CAPB\_IMF$  measures have no effect on business confidence. Neither has  $CS$  or its subcomponents  $CS^A$  and  $CS^U$ . However, planned changes in future consolidation measures  $CS^P$  do exert a significantly negative effect – see Column (5). This is in line with their effect on consumer confidence, also in terms of order of magnitude. Moreover, the coefficient on  $CS^P$  is statistically different from that on  $CS^A$  and  $CS^U$  at, respectively, the 5% and the 10% level. In Column (6) we restrict the coefficients on  $CS^U$  and  $CS^P$  to be equal. The common coefficient is significantly negative at the 10% level and it is also significantly different at the 10% level from that on  $CS^A$ . Analogous to Table 3, Table D.1 in Additional Appendix D (not for publication) reports how the revenues and spending components of consolidations affect business confidence. The results are not very clear-cut. We observe that  $EXP^A$  enters with a significant positive coefficient in Columns (2) and (3), while the coefficient of  $EXP^P$  in Column (3) is significantly negative.

Overall, the negative confidence effects are weaker for business confidence than for consumer confidence. Possibly, the business sector has a more sanguine view of consolidations, because it realises better their necessity for the long-run health of the public finances. Nevertheless, the effects on consumer and business confidence are much in line with each other, as far as the unanticipated components of consolidations are concerned.

## 5.2. Interaction effects

We can think of two broad sets of variables that potentially affect the link from consolidations to confidence. The first are economic circumstances. Knowledge of the economic circumstances that are most instrumental in avoiding negative confidence effects, may allow governments to strategically choose the appropriate moment to engage in consolidation measures. The second are variables capturing institutional aspects. If certain institutional features are conducive to avoiding negative confidence effects of consolidations, then this might provide leads for better institutional design. In this subsection we will interact our consolidation variables with variables of both types. We confine ourselves to consumer confidence, since the effects of consolidations on business confidence were weaker. The general format of our panel regression equation is now as follows:

$$\begin{aligned}
 CCI_{it} = & \mu_i + \lambda_t + \alpha(L) CCI_{i,t-1} + \beta_{1L} OBSL_{it} CS_{it}^A + \beta_{1H} OBSH_{it} CS_{it}^A \\
 & + \beta_{2L} OBSL_{it} (CS_{it}^U + CS_{it}^P) + \beta_{2H} OBSH_{it} (CS_{it}^U + CS_{it}^P) \\
 & + \gamma_1 GROWTH_{i,t} + \gamma_2 \Delta u_{i,t} + \gamma_3 INFL_{i,t} + \gamma_4 INT_{i,t} + \gamma_5 \Delta STOCK_{i,t} + v_{i,t}, \quad (2)
 \end{aligned}$$

where  $OBSL_{it}$  refers to all observations in one group (usually the group for which the relevant split criterion is low) and  $OBSH_{it}$  refers to the remaining observations (usually the group for which the relevant split criterion is high). In view of our earlier findings, we limit ourselves to a split between the anticipated and currently implemented measures  $CS_{it}^A$  and the new current and future measures  $CS_{it}^U + CS_{it}^P$ .

Table 5 reports the estimates of (2). We do not report the coefficient estimates of the controls and the first lag of consumer confidence, because they are similar to those reported earlier in Table 2 and because they hardly vary across the various specifications. Column (1) allows the coefficients on the consolidation variables to depend on whether debt is higher or lower than the average over the sample. (Negative) significance is only detected for the non-anticipated part of the consolidation plan  $CS^U + CS^P$  and only for the higher-than-average debt observations. In this case, a one percent of GDP increase in  $CS^U + CS^P$  reduces consumer confidence by about 0.25 percentage points. The difference in the coefficients of the two sub-samples is significant at the 10% level. In Column (2) we let the coefficients on

the consolidation variables depend on whether the output gap is positive or negative. This is a relevant split, because recently a substantial number of contributions (e.g., Auerbach and Gorodnichenko (2012), Owyang et al. (2013) and Jordà and Taylor, 2014) have explored whether fiscal multipliers depend on the state of the economy. By now, there is quite some evidence that the latter is indeed important in this regard. In turn, this begs the question whether the response of confidence, being a transmission variable, to consolidation announcements depends on the state of the economy. The dependence on the state is not very clear-cut, however. Hence, to the extent that confidence is a transmission variable to real economic activity, this is not fully in line with some of the abovementioned literature mentioned. The coefficient on  $CS^A$  is insignificant for both positive and negative output gaps, while the coefficient on  $CS^U + CS^P$  is significantly negative in both states, but larger in absolute magnitude for positive output gaps. However, the coefficients under the two states are not significantly different.

Now we turn to the interactions with the institutional variables. We have these only for the European countries. Hence, we lose observations for four countries. We split the European countries into those that on average over the years have a fiscal rules index higher than the average across the entire group of European countries and those that have an index lower than the average. The former group consists of Denmark, Finland, Germany, the Netherlands, Spain, Sweden and the United Kingdom, while the latter group consists of Austria, Belgium, France, Ireland, Italy and Portugal. Based on the “Audit index” from Bernoth and Wolff (2008), we also do a similar split into groups featuring higher-than-average and lower-than-average fiscal transparency. The high-transparency group is Austria, Belgium, Denmark, Finland, Ireland, Netherlands and Sweden, while the low-transparency sample is France, Germany, Italy, Portugal, Spain and United Kingdom. We see that all the action is in the coefficients of  $CS^U + CS^P$ . They are significantly negative in the case of lower-than-average values of the fiscal rules index (Column (3)) or the transparency index (Column (4)).<sup>12</sup>

We now split the consolidation measures into their revenues and spending components. Table 6 reports the estimates, where we confine ourselves to the coefficients on the variables of interest, i.e. those on the interaction terms. The split into high- and low-debt observations no longer yields significant coefficients, possibly because the number of observations in each bin becomes too small. Splitting the sample according to the output gap, we observe that the previously unanticipated revenues measures  $REV^U + REV^P$  enter with a

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<sup>12</sup> However, they are not statistically different from the corresponding coefficient estimates for the groups with a higher-than-average fiscal rules index or a high transparency index.

significantly negative coefficient when the output gap is negative. Splits according to the quality of institutions yield results largely in line with those found earlier. In the case of a low fiscal rules index or a low transparency index, the coefficient of  $REV^U+REV^P$  is highly significantly negative. The negative coefficient of  $EXP^A$  may be a bit puzzling, but it may indicate the effect of the realisation of consolidation announcements that were not fully credible until now.

Summarising, confidence tends to respond more to the unanticipated than to the anticipated part of a consolidation plan. The negative impact of the unanticipated component is particularly relevant when debt is relatively high, fiscal rules are weak and transparency is low. The impact of these interactions with the unanticipated component stems mainly from measures on the revenue side.

## 6. Event study with monthly data

Compared to our annual analysis, with our monthly dataset we can more precisely investigate the role of consolidations for confidence, because we can more precisely pinpoint the release of information about the consolidations and establish in real-time how confidence reacts to this information. Our confidence variables are de-trended first by taking the residual from a regression on a country-specific linear time trend. Since there is essentially no trend visible in any of the confidence variables, the de-trending has virtually no effects on the results for the confidence variables. We perform our analysis on the full sample and a number of motivated sample splits. Sweden is excluded from the analysis of the confidence effects, because the confidence data are only available as of 1995, so that there is no information in the months for which we recorded consolidation announcements.

Concretely, for the various  $t$  we estimate the constant from the following regression:

$$\ln(xCI_{k,t}) - \ln(xCI_{k,0}) = c_t + \varepsilon_{k,t} \quad (3)$$

where  $\ln(xCI_{k,t})$  is the natural logarithm of the confidence indicator ( $xCI = CCI$  or  $xCI = BCI$ ) in month  $t$  relative to the normalised moment 0 that a consolidation measure is announced,  $c_t$  is the constant to be estimated and  $\varepsilon_{k,t}$  is an error term. Further, for each  $t$ , we  $k$  counts over the set of announcements. Finally,  $t$  runs over -6, -5, ..., 5, 6. Hence, we explore

the average movement of confidence over a period of two quarters before the announcement until two quarters after. In all instances the standard errors are robust to heteroskedasticity.

### *6.1. Consumer confidence*

Based on the regression in (3), Figure 8 depicts for the full sample the average movements of consumer confidence around announcement dates plus an error band of  $\pm 1.645$  standard deviations around the central line, so 10% margin on either side of the confidence band. To read the figure, take as an example the value of 0.1 of the central line at  $t = -5$ , which says that five months before the consolidation announcement ( $t = 0$ ), the confidence indicator is on average 0.1% higher than at the moment of the announcement. The figure reveals significant movement in the confidence index, both before and after the announcement, although the movement after the announcement is short-lived. The maximum overall movement within the window is on the order of 0.15%. While this number may not seem very large, it should be seen in relation to the highly-concentrated frequency distribution of consumer confidence in Figure 6, which showed that the overwhelming majority of the observations lies within  $\pm 2\%$  of the mean. Of particular relevance is the overall movement of confidence over the event window. On the one hand, a movement that fully reverses itself within a couple of months is likely to be less consequential for the economy than a more permanent movement. On the other hand, if we make the event window wider, the likelihood of other factors affecting the movement of confidence becomes larger. Hence, we consider as a reasonable compromise an event window of  $\pm 6$  months. The final column of Table 7 reports the average movement of confidence over the entire window. The overall fall is about 0.12 percentage points. The figure is close to significance at the 10% level.

There could be a concern that the consolidations are not exogenous, because they are anticipated as the downward movement in the index suggests. However, some anticipatory movements of confidence should not be too surprising if consolidations do indeed affect confidence. Many of the announcement moments coincide with the presentation of next-year's budget, while the budgetary process is closely followed by the media. In addition, there may be discussions in parliament, hints by politicians and leakages to the press. Such anticipation effects do not by themselves invalidate the assumption that the consolidation is exogenous. The exogeneity assumption would be invalid if confidence itself influences the choice to consolidate, but that would mean that consolidation decisions are made within a couple of months after an initial movement in confidence. However, it is extremely

implausible that confidence movements of the magnitude that we observe by themselves trigger consolidations and, moreover, that consolidation decisions take place so quickly after an initial movement in confidence.

Nevertheless, following our annual investigation, we explore in Additional Appendix A (not for publication) the predictability of consolidations at the quarterly and the monthly level. The investigation at the quarterly level still allows us to also include our macro variables. For the investigation at the monthly level, we need to limit ourselves to confidence, stock prices and the interest rate. As in the case of the annual regressions, at the quarterly level only lagged debt, inflation and the long-term interest rate have predictive power. In the case of the monthly regressions, there is one instance in which the lagged change in confidence has some predictive power. However, as argued above, this is mostly likely not the result of a causal effect. Changes in confidence over longer periods have no predictive power.<sup>13</sup>

Figure 9 depicts the outcomes of a split of the full sample of announcements into the subset of spending-based and revenue-based announcements. The split yields noticeable results. Announcements of spending-based consolidations do not appreciably affect confidence. By contrast, announcements of revenue-based consolidations do have a significantly negative confidence effect. Relative to the overall sample, the maximum confidence deterioration more than doubles, while the full deterioration over the entire event window is now more than 0.4 percent – see Table 7. Based on the estimation of (3) as a system for spending and taxes, the final column in Table 7 shows that the test that the full-window movements of confidence for spending and taxes are equal rejects at the 5% level. If confidence indeed plays a role in transmitting the effects of consolidations to economic activity, the combination of these findings is consistent with the findings of Alesina *et al.* (2014) and related papers that spending-based consolidations have less adverse effects on the economy than revenue-based consolidations.

Table 7 also reports confidence movements based on a dissection of the observations into those associated with lower- and higher-than-average public debt over the sample period. For the low-debt observations confidence falls significantly in the period before the announcement, while for the high-debt observations there is some significant movement of

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<sup>13</sup> A potential other concern is that the observed negative confidence effect of consolidations is actually the result of the severe contractions at the end of the sample and their effect on confidence. However, the plots in Additional Appendix E (not for publication) show that there is relatively little consolidation activity in the last two sample years 2008 and 2009, i.e. the crisis years. Hence, this possibility can be refuted.

confidence around the announcement date. However, the overall movement of confidence over the entire window is very similar and the equality test does not reject.

Consistently with our annual analysis, we also explore whether the effects of announced consolidations on the economy differ depending on the state of the economy, as measured by the output gap. Table 7 reports the results. The response of confidence does indeed depend strongly on the state of the economy and the pattern is noticeable. When the output gap is negative, the consolidation announcement is actually followed by an improvement in confidence, which becomes significant after 6 months. However, in the case of a positive output gap we observe a strong and highly significant fall in confidence, both before and after the announcement. Over the full window, the fall is almost 0.7 percent. The difference in overall movement with the other sub-sample is also highly significant. The most likely explanation for the confidence deterioration when the output gap is positive is that the consolidation announcement signals that the underlying public finances are weaker than perceived thus far.

Because the output gap appears to be an important determinant of the confidence effects, we do a further split of each of the negative and positive output gap subsamples into spending- and revenue-based consolidations. This yields some interesting patterns with potential policy relevance. In the case of a negative output gap, spending-based consolidations lead to a strong and highly significant confidence improvement, while revenue-based consolidations lead to a (non-significant) deterioration of confidence. The difference over the full event window is significant at the 5% level. Hence, potential worries that the confidence channel of a consolidation may negatively affect an already ailing economy seem to be misplaced for spending-based consolidations. When the output gap is positive, both spending- and revenue-based announcements produce a significant deterioration of confidence. The deteriorations take place both before and after the announcement.

We can also dissect the sample into country sub-samples. The most obvious dissection is a split into European and non-European countries. For the non-European sub-sample, most likely due to the presence of too few observations, there is no significant movement in confidence and, hence, we do not report the results. This suggests that the effect of the announcements is largely confined to the European countries. For the European subsample we find indeed a 10% significant deterioration of confidence by 17 basis points over the full event window. If we split further into revenue-based and spending-based consolidations for the European sub-sample, we do not observe significant confidence movements associated with spending-based consolidations, but we observe (highly) significant negative movements

associated with revenue-based consolidations, both before and after the announcement. The deterioration over the full window is 0.6 percent and this is (highly) significantly different from the confidence movement in the case of spending consolidations.

Again, we split the European countries into those with a higher-than-average and those with a lower-than-average fiscal rules index. Table 7 exhibits remarkable differences in the behaviour of confidence for the two groups. Countries with a relatively strong fiscal rules index exhibit no movement in confidence, while countries with relatively weak fiscal rules exhibit a highly significant decline in confidence both before and after the announcement. The difference in movement over the entire window for the two sub-samples is also significant. A potential explanation for the confidence behaviour in the group with weak fiscal rules is that private agents do not expect the consolidation to solve anything, but only to harm their own economic situation, for example by reducing their disposable income or by causing more unemployment. To see whether the findings for this group depend on the presence of specific EU periphery countries, in Additional Appendix F (not for publication) we drop one periphery country at a time from the weak-rules group. However, the figures for the movement of confidence around the announcement date are always unaffected.

Table 7 also reports the results for a split of the countries into those with low and high transparency. The results are very similar to those for the split into countries with weak and strong fiscal rules. This is not surprising, since the country groups overlap to a substantial extent.<sup>14</sup> Additional Appendix F (not for publication) shows also here that the behaviour of confidence for the low-transparency group does not depend on the inclusion of specific periphery countries.

Finally, we also construct a country group with both strong rules and high transparency and a country group with both weak rules and low transparency. The first group consists of Denmark, Finland and Netherlands, while the second group consists of France, Italy and Portugal. Table 7 shows that the confidence movement patterns for the second group are similar to those for the countries with either weak rules or low transparency. The figures for the countries with both strong rules and high transparency now even reveal an increase in confidence surrounding announcements, even though this is not significant when taken over the entire event window.

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<sup>14</sup> We also did a split based on the index constructed by Hallerberg et al. (2005). Here, the high transparency group was Finland, France, Germany, Ireland, Netherlands, Spain and United Kingdom, while the low transparency group was Austria, Belgium, Denmark, Italy and Portugal. The resulting figures look similar to those for the Bernoth-Wolff index.

Summarising, consolidation announcements are associated with a fall in consumer confidence. The effect is essentially driven by revenue-based measures, it is strong then the output gap is positive and it is confined to European countries. For the latter group the negative announcement effect is stronger for countries with weak fiscal rules or low transparency.

## *6.2. Business confidence*

In a number of respects the behaviour of business confidence around consolidation announcements is quite similar to that of consumer confidence. However, the results for business confidence tend to be quantitatively and statistically weaker.

Figure 10 shows the behaviour for business confidence for the full sample. There appears to be no systematic behaviour for business confidence. This changes if we split into spending- and revenue-based consolidations – see Figure 11. Here, at least qualitatively, the results are similar to those for consumer confidence: there is no systematic effect for spending-based consolidations, while revenue-based consolidations reveal a fall in confidence before and after the announcements. The fall over the entire event window is about 0.4 percent and it is highly significant. It is also significantly different from the full movement of confidence under spending-based consolidations.

Splitting the sample into high- and low-debt observations shows little difference between the two groups. By contrast, splitting the sample into observations with negative and positive output gaps shows effects similar to those for consumer confidence – see Table 8. When the output gap is negative, confidence tends to increase after a consolidation announcements, while it exhibits a (highly) significant decrease both before and after the announcement in a boom period. The full-window deterioration of confidence is almost 0.6 percent, which differs significantly from the movement in confidence for positive output gaps. A further split of the negative and positive output gap subsamples into spending- and revenue-based shows results that are qualitatively very similar to what we find for consumer confidence. If anything, spending-based consolidations stimulate business confidence in a slump. However, in boom periods, both types of consolidation are associated with a strongly negative effects on confidence.

Focussing on European countries only, there is a non-significant deterioration of business confidence around announcement dates. Splitting the European sample further into spending- and revenue-based consolidations, we observe that spending-based consolidations

do not do anything, while revenue-based consolidations produce a strong and highly significant reduction in business confidence – see Table 8. The full-window difference in behaviour is also significant. We also split the European sub-sample into countries with strong and weak fiscal rules and with high and low transparency. However, now there is not much action in confidence in any of the sub-samples.

Overall, the effects of consolidation announcements on business confidence are weaker than on consumer confidence. Nevertheless, also for business confidence, revenue-based measures are more harmful than spending-based measures, while again consolidation measures are most adverse when the output gap is positive.

### *6.3. Broadening the concept of confidence*

Another form of confidence refers to confidence in the sovereign. More confidence in the sovereign implies lower borrowing costs, so a lower real debt burden and, hence, more resources for consumption. This form of confidence may also impact on economic activity. This became particularly clear during the recent European sovereign debt crisis, when for some vulnerable countries financial markets priced in a higher likelihood of default as reflected in higher sovereign yields. This eventually resulted in higher private sector lending rates and an overall credit contraction in this period (e.g., see Bofondi *et al.*, 2013, and Popov and Van Horen, 2013).

Here, we explore the behaviour of the long-term public debt interest rate around announcements of consolidations. The impact of fiscal policies on sovereign yields and spreads has been investigated by a number of authors, but with mixed findings. For example, based on a dataset including 17 advanced economies over the 1989-2012 period, Dell’Erba and Sola (2013) find that fiscal consolidations tend to be associated with a decline in long-term interest rates. Moreover, after an increase in the public deficit, long-term interest rates increase more in countries characterized by macroeconomic or institutional weaknesses. Based on a panel of advanced and emerging countries for the period 1990-2013, Born *et al.* (2014) indeed find that cuts in government consumption tend to reduce spreads, but only during expansions. Instead, fiscal consolidations tend to trigger increases in public interest spreads during recessions and periods of fiscal stress.

First, we de-trend the long-term interest rate. Then, we express it in differences relative to the announcement moment. For the full sample, we observe a significant fall in the long-term interest rate following a consolidation announcement (Figure 12). A split of the

sample into spending- and revenue-based consolidations shows that there is no systematic movement of confidence around revenue-based announcements, while there is a highly significant and long-lasting fall in the interest rate after the announcement of a spending-based consolidation (see Figure 13). This suggests that financial markets have confidence that a spending-based consolidation produces a fall in sovereign risk, while this is not the case for a revenue-based consolidation.

A split into high- and low-debt observations yields very similar confidence dynamics for the two groups. By contrast, splitting the sample into observations with negative and positive output gaps reveals a significant fall in the long-term interest rate following a consolidation announcement in the former case, while no effect is detected in the latter case (see Table 9). Splitting the negative and positive output gap sets of observations further into revenue-based and spending-based observations, we observe that the action is essentially confined to spending-based announcements when the output gap is negative. The full reduction by 0.4 percentage points over the entire window is statistically highly significant and also substantial.

Confining ourselves to the European countries we find again a significant decline in the long-term interest rate over the full window. Splitting the European observations into spending- and revenue-based observations, we confirm what we find for the full sample: spending-based consolidations produce a significant decline (by almost 0.4 percentage points) over the entire window, while revenue-based consolidations lead to hardly any movement in confidence over the window. The difference in overall movement for the two consolidation regimes is also significant. Finally, we split the European sample on the basis of the tightness of the fiscal rules and the degree of transparency. The picture that emerges is not very clear-cut. The decline in the long-term interest rate over the full window is significant in the case of weak fiscal rules and of high transparency. Probably, when fiscal rules are weak, confidence in the sovereign may be relatively weak, implying substantial potential room for a reduction in the interest rate. If we consider only countries with both strong fiscal rules and high transparency and countries with both weak fiscal rules and low transparency, we observe for both groups a reduction in the long-term interest rate over the full window. However, these reductions are not statistically significant.

Summarising, announcements of spending-based consolidations lower the public debt long-term interest rate. This is in particular the case when the output gap is negative. The role of institutional quality is not clear-cut, with weak fiscal rules and high transparency being conducive to lowering the interest rate.

## 7. Concluding remarks and policy implications

This paper has explored how fiscal consolidations affect consumer and business confidence. For this purpose, we have used the dataset by De Vries *et al.* (2011), as well as its extension by Alesina *et al.* (2014). In addition, we have expanded the existing data to the monthly frequency and included the moments at which consolidation measures are announced. In our view, studying how consolidations affect confidence is important, because confidence may affect economic activity. It has been regularly argued that the difficulties that the Eurozone experiences in escaping from its current stagnation are at least partly the result of a lack of confidence.

We started our empirical analysis using annual panel regressions, in which we linked confidence to consolidation plans and their components, i.e., anticipated and currently implemented measures, the unanticipated and currently implemented measures, and the planned changes to future measures. We established that the largest role in affecting consumer confidence was reserved for the latter two components. This may not be surprising, as these components capture the release of new information. Generally speaking, the negative confidence effects running through the revenues component of consolidations were larger and more significant than those running through the spending component. We have also interacted the consolidation measures and their components with economic and institutional variables. Confidence effects of consolidations turned out to be more negative when debt was high and institutional arrangements were weaker.

In the next step, we used our monthly dataset of consolidation announcements to study the real-time reaction of confidence to such announcements. Generally speaking, announcements were associated with a reduction in consumer confidence. Consistent with previous studies on the composition of consolidations, we found that the negative association of consumer confidence with consolidation announcements was driven by the announcements of revenue-based consolidations. Splitting the sample into European and non-European countries showed that it is the revenue-based consolidations of the former that are driving the results on consumer confidence. Dissecting the European countries according to the tightness of their fiscal rules or the transparency of their budget revealed that weaker fiscal rules and lower transparency are driving the negative association between consumer confidence and consolidation announcements. Our findings for the association of announcements with business confidence were generally weaker, but in line with those for consumer confidence, in

that the more negative effect for revenue-based relative to spending-based consolidations was preserved.

Finally, we have explored how consolidation announcements affected confidence in the sovereign, as measured by the interest rate on long-term government securities. In contrast to revenue-based consolidations, spending-based consolidations produced a significant reduction in the interest rate, especially for European countries. In addition, it appeared that the reduction in interest rates was particularly strong during periods of economic slowdowns.

Our findings point to a number of potentially useful policy insights on the “optimal” design of fiscal consolidations in terms of timing, composition and institutional factors. First, taking the need for consolidation as given, spending-based consolidations have less detrimental effects on (consumer) confidence than revenue-based measures. If the role of confidence is a concern, then consolidations should take place via spending. Second, since the confidence effects are mainly driven by those measures that were not anticipated, a careful timing of what information on consolidations is given, and when, may be important. Third, while it is often asserted that periods of boom are more suitable for consolidation than slump periods, this is not borne out by our monthly sample. In fact, spending-based consolidations do no harm to private sector confidence in slump periods, while they tend to produce a reduction in long interest rates during slumps. This may provide a rationale for the consolidation packages announced and adopted in many European countries during the recent crisis. In this context, consolidation announcements are likely to have signalled commitment by governments to restore financial markets’ trust in the long-term sustainability of the public finances, which could have triggered a reduction in the financing cost for these countries. Fourth, the quality of institutions is important for the confidence effect. There seems to be a high correlation of the different dimensions of institutional quality. Nevertheless, the results suggest that tight fiscal rules in particular play an important role in mitigating the confidence effects of announced consolidations. Since fiscal consolidations may be inevitable from time to time, for example because of adverse developments in financial markets or in the economies of trading partners, governments of countries with no or weak fiscal rules would do well to consider the adoption of tighter rules. When credible, these reduce the chances of a need for consolidation and, if this need emerges nevertheless, then the macroeconomic consequences via negative confidence effects are likely to be smaller.

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## **Appendix: Details on the construction of the data**

### *Monthly consolidation announcements:*

Regarding the identification of consolidations, we have taken the following decisions:

- Consolidation years are identified solely from the IMF dataset of De Vries *et al.* (2011) database; if a year is not mentioned there, then we do not treat it as a consolidation year.
- We do not treat EU convergence plans as announcements involving a consolidation.

We include the description of each consolidation from the OECD Economic Surveys. We document the classification we have applied to the elements of the consolidation and the timing, i.e. the identification of the precise month for each year.

Regarding the coding of the timing of measures, we have taken the following decisions:

- We base the timing on the existing budgetary process in the country. Measures that are part of a new budget are considered announced at the moment the government presents the budget to parliament.
- The date the Parliament votes about the budget is not considered an announcement, unless the Parliament significantly modifies the plan of the Government. These amendments to the new budget are considered announced at the moment they are reported and, in case they are not reported before, they are considered announced at the moment of the vote on the budget in parliament.
- If the Parliament adopts the budget with “minor modifications” (as is commonly stated in documents), we do not consider this an announcement.
- Other measures becoming known outside this period are considered implementations of previously announced measures. Specifically, and as a rule of thumb, if a measure is first mentioned in January, we consider it as having been announced in the budget for the year starting in January. Therefore, January generally is an implementation month.

Further, because the OECD data do not explicitly distinguish between the announcement and the implementation of measures, we had to interpret some verbs as signaling one or the other:

- “a new tax is introduced” is treated as the implementation of a measure introduced in the budget for that year and the corresponding moment of announcement is the moment that the budget for that year was presented.
- “Excise duties are increased” is treated as the implementation of an earlier announced measure.
- “The Government takes additional fiscal measures” is treated as the announcement of a new measure.

*Construction of confidence indicators:*

The consumer confidence indicator is constructed from national-level consumer opinion surveys. For OECD members which are not part of the European Union (EU), confidence indicators are compiled according to national definitions. For OECD members which are also part of the EU, the harmonized consumer confidence indicator is used. The harmonized European series are seasonally adjusted by the European Commission using the DAINIES software, applied on aggregated national unadjusted series. In case seasonality remains in the data, the OECD performs an in-house adjustment using Demetra+. For OECD countries where survey-based data were not available at the monthly frequency the confidence series was created at the desired frequency using simple linear interpolation of the quarterly data. In our sample, this was the case for Australia and Japan.

## Tables

**Table 1: Summary statistics of confidence variables**

*(a) Monthly frequency, values*

	N	mean	st.dev	min	max
<i>CCI</i>	5,900	100.1	1.44	94.01	103.7
<i>BCI</i>	4,753	99.98	1.41	94.19	105.4

*(b) Annual frequency, end-of-the-year values*

	N	mean	st.dev	min	max
<i>CCI</i>	494	100.0	1.47	94.45	103.7
<i>BCI</i>	396	99.95	1.46	94.97	105.4

Note: "st.dev" is "standard deviation".

**Table 2: Baseline regressions using end-of-period CCI**

<i>CCI</i>	(1)	(2)	(3)	(4)	(5)	(6)
<i>CCI(-1)</i>	0.498*** (0.053)	0.509*** (0.049)	0.495*** (0.055)	0.496*** (0.057)	0.489*** (0.057)	0.491*** (0.056)
<i>CAPB</i>	0.035 (0.021)					
<i>CAPB_IMF</i>		0.029 (0.033)				
<i>CS</i>			-0.120* (0.057)			
<i>CS<sup>d</sup></i>				-0.066 (0.166)	-0.050 (0.159)	-0.076 (0.160)
<i>CS<sup>U</sup></i>				-0.125** (0.050)	-0.144** (0.065)	
<i>CS<sup>P</sup></i>					-0.394** (0.176)	
<i>CS<sup>P</sup> + CS<sup>U</sup></i>						-0.163*** (0.054)
<i>GROWTH</i>	0.175** (0.063)	0.169** (0.059)	0.167*** (0.057)	0.166*** (0.058)	0.164** (0.058)	0.166** (0.058)
<i>Δu</i>	-0.038 (0.073)	-0.052 (0.069)	-0.050 (0.069)	-0.052 (0.070)	-0.051 (0.065)	-0.051 (0.067)
<i>INFL</i>	-0.058 (0.041)	-0.061 (0.039)	-0.070* (0.040)	-0.071 (0.041)	-0.065 (0.044)	-0.074 (0.042)
<i>INT</i>	0.044 (0.053)	0.045 (0.054)	0.054 (0.053)	0.055 (0.054)	0.044 (0.055)	0.053 (0.053)
<i>ASTOCK</i>	0.020*** (0.003)	0.020*** (0.003)	0.021*** (0.003)	0.021*** (0.003)	0.020*** (0.003)	0.021*** (0.003)
Obs.	450	451	451	451	451	451
R-squared	0.707	0.705	0.707	0.707	0.711	0.709
Countries	17	17	17	17	17	17
Country FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES

Notes: Robust standard errors are reported in parentheses. Further, \* = significance at the 10% level, \*\* = significance at the 5% level and \*\*\* = significance at the 1% level.

**Table 3: Baseline regressions for subcomponents using end-of-period CCI**

<i>CCI</i>	(1)	(2)	(3)	(4)
<i>REV</i>	-0.216** (0.076)			
<i>EXP</i>	-0.050 (0.073)			
<i>REV<sup>A</sup></i>		-0.023 (0.212)	0.013 (0.232)	-0.062 (0.193)
<i>EXP<sup>A</sup></i>		-0.118 (0.255)	-0.121 (0.250)	-0.111 (0.251)
<i>REV<sup>U</sup></i>		-0.246*** (0.073)	-0.291** (0.108)	
<i>EXP<sup>U</sup></i>		-0.013 (0.095)	-0.013 (0.102)	
<i>REV<sup>P</sup></i>			-0.437* (0.248)	
<i>EXP<sup>P</sup></i>			-0.403 (0.404)	
<i>REV<sup>P</sup> + REV<sup>U</sup></i>				-0.326** (0.125)
<i>EXP<sup>P</sup> + EXP<sup>U</sup></i>				-0.069 (0.087)
Obs.	451	451	451	451
R-squared	0.708	0.708	0.713	0.710
Countries	17	17	17	17
Country FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES

Notes: Robust standard errors are reported in parentheses. Further, \* = significance at the 10% level, \*\* = significance at the 5% level and \*\*\* = significance at the 1% level.

**Table 4: Baseline regressions using end-of-period BCI**

<i>BCI</i>	(1)	(2)	(3)	(4)	(5)	(6)
<i>BCI(-1)</i>	0.029 (0.063)	0.034 (0.064)	0.034 (0.064)	0.040 (0.063)	0.044 (0.063)	0.041 (0.062)
<i>CAPB</i>	0.023 (0.027)					
<i>CAPB_IMF</i>		-0.007 (0.029)				
<i>CS</i>			-0.027 (0.058)			
<i>CS<sup>d</sup></i>				0.156 (0.142)	0.184 (0.131)	0.118 (0.118)
<i>CS<sup>U</sup></i>				-0.043 (0.068)	-0.058 (0.037)	
<i>CS<sup>P</sup></i>					-0.463** (0.196)	
<i>CS<sup>P</sup> + CS<sup>U</sup></i>						-0.113* (0.054)
<i>GROWTH</i>	0.378*** (0.035)	0.378*** (0.037)	0.377*** (0.036)	0.375*** (0.036)	0.371*** (0.037)	0.371*** (0.037)
$\Delta u$	0.059 (0.071)	0.053 (0.074)	0.053 (0.072)	0.052 (0.074)	0.049 (0.071)	0.053 (0.073)
<i>INFL</i>	-0.026 (0.046)	-0.024 (0.046)	-0.026 (0.046)	-0.029 (0.046)	-0.022 (0.044)	-0.032 (0.048)
<i>INT</i>	-0.060 (0.035)	-0.059 (0.037)	-0.057 (0.037)	-0.050 (0.037)	-0.069* (0.037)	-0.047 (0.037)
$\Delta STOCK$	0.018*** (0.006)	0.018*** (0.005)	0.018*** (0.005)	0.018*** (0.005)	0.018*** (0.005)	0.018*** (0.005)
Obs.	379	379	379	379	379	379
R-squared	0.722	0.722	0.722	0.723	0.728	0.724
Countries	16	16	16	16	16	16
Country FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES

Notes: Robust standard errors are reported in parentheses. Further, \* = significance at the 10% level, \*\* = significance at the 5% level and \*\*\* = significance at the 1% level.

**Table 5: Consumer confidence effects of interactions**

<i>CCI</i>	(1) Debt	(2) Gap	(3) FRI	(4) TR
<i>CCI (-1)</i>	0.468*** (0.069)	0.494*** (0.056)	0.474*** (0.067)	0.475*** (0.069)
<i>CS<sup>d</sup>_H</i>	-0.181 (0.175)	-0.221 (0.249)	-0.055 (0.287)	-0.147 (0.288)
<i>CS<sup>d</sup>_L</i>	0.108 (0.175)	-0.034 (0.182)	-0.084 (0.106)	0.007 (0.176)
<i>CS<sup>U</sup>+CS<sup>P</sup>_H</i>	-0.248*** (0.069)	-0.251** (0.097)	-0.013 (0.079)	-0.058 (0.059)
<i>CS<sup>U</sup>+CS<sup>P</sup>_L</i>	-0.031 (0.070)	-0.133* (0.071)	-0.174*** (0.052)	-0.156** (0.064)
Observations	414	443	339	339
R-squared	0.707	0.706	0.715	0.714
Countries	17	17	13	13
Country FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Equality tests for announcement variables	F(1,16)= 3.87 p=0.066	F(1,16)= 0.83 p=0.376	F(1,12)= 3.26 p=0.096	F(1,12)= 1.07 p=0.321

*Notes:* Robust standard errors are reported in parentheses. Further, \* = significance at the 10% level, \*\* = significance at the 5% level and \*\*\* = significance at the 1% level. Legend: *CS<sup>d</sup>\_H* stands for coefficient on *CS<sup>d</sup>* when public debt is high, the output gap is positive, the fiscal rules index is high or transparency is high. *CS<sup>d</sup>\_L* stands for coefficient on *CS<sup>d</sup>* when public debt is low, the output gap is negative, the fiscal rules index is low or transparency is low. *CS<sup>P</sup>+CS<sup>U</sup>\_H* and *CS<sup>P</sup>+CS<sup>U</sup>\_L* are analogously defined for the coefficient on *CS<sup>P</sup>+CS<sup>U</sup>*. The equality tests for announcement variables tests whether the coefficient of *CS<sup>U</sup>+CS<sup>P</sup>\_H* and *CS<sup>U</sup>+CS<sup>P</sup>\_L* are equal.

**Table 6: Consumer confidence effects of interactions with revenues and spending**

		$REV^d$	$EXP^d$	$REV^U+REV^P$	$EXP^U+EXP^P$
<i>DEBT</i>	high	-0.168 (0.202)	-0.217 (0.292)	-0.365* (0.184)	-0.172 (0.167)
	low	0.045 (0.392)	0.137 (0.194)	-0.183 (0.116)	0.043 (0.080)
Equality (high/low)		F(1,16)=0.22 p=0.647	F(1,16)=1.10 p=0.309	F(1,16)=0.64 p=0.434	F(1,16)=1.03 p=0.325
<i>GAP</i>	positive	-0.481 (0.544)	-0.087 (0.245)	-0.315 (0.208)	-0.214 (0.217)
	negative	0.011 (0.204)	-0.119 (0.314)	-0.313* (0.159)	-0.042 (0.102)
Equality (pos./neg.)		F(1,16)=0.79 p=0.387	F(1,16)=0.01 p=0.935	F(1,16)=0.00 p=0.991	F(1,16)=0.38 p=0.544
<i>FRI</i>	strong	-0.243 (0.480)	0.040 (0.305)	-0.099 (0.091)	0.002 (0.102)
	weak	0.024 (0.142)	-0.425** (0.162)	-0.494** (0.210)	0.083 (0.099)
Equality (strong/weak)		F(1,12)=0.37 p=0.556	F(1, 12)=2.02 p=0.180	F(1, 12)=3.00 p=0.108	F(1,12)=0.27 p=0.616
<i>TR</i>	high	-0.879 (0.552)	0.087 (0.193)	-0.173 (0.236)	-0.053 (0.093)
	low	0.128 (0.180)	-0.485 (0.311)	-0.348* (0.175)	0.078 (0.099)
Equality (high/low)		F(1,12)=4.13 p=0.065	F(1,12)=2.43 p=0.145	F(1,12)=0.39 p=0.545	F(1,12)=1.21 p=0.294

*Notes:* Robust standard errors are reported in parentheses. “Equality” is an F-test for the equality of the coefficients on the consolidation components for the two sub-samples under consideration. We also report the p-value for the tests. Further, *DEBT*, *GAP*, *FRI* and *TR* denote, respectively, the debt/GDP ratio, the output gap, the fiscal rules index and the transparency index. Finally, \* = significance at the 10% level, \*\* = significance at the 5% level and \*\*\* = significance at the 1% level.

**Table 7: Average deviation consumer confidence from level at announcement**

	t=-6	t=-3	t=-1	t=+1	t=+3	t=+6	t=-6/+6	equality
all	.111*	.075*	.035**	-.026**	-.033	-.012	-.123	
spending	.085	.027	.006	.003	.048	.111	.026	5.19**
revenue	.261**	.193**	.094***	-.090***	-.156**	-.153	-.414***	
high debt	.030	.041	.037*	-.042**	-.085*	-.088	-.118	0.02
low debt	.165*	.108	.037*	-.010	.024	.073	-.093	
neg. gap	.016	.021	.008	.003	.055	.171**	.156	28.1***
pos. gap	.297***	.182***	.088***	-.083***	-.206***	-.370***	-.667***	
spend, neg. gap	-.012	-.025	-.018	.033*	.150***	.325***	.337***	4.03**
rev, neg. gap	.128	.085	.050	-.068*	-.137	-.100	-.228	
spend, pos. gap	.356**	.172*	.075**	-.080**	-.236**	-.486***	-.841***	0.95
rev, pos. gap	.407**	.311**	.142***	-.114***	-.177**	-.211*	-.618***	
Europe	.104	.067	.035**	-.032**	-.058	-.064	-.168*	
Europe, spending	.029	.001	.002	.001	.030	.065	.035	10.5***
Europe, revenue	.277**	.172**	.092***	-.108***	-.255***	-.331***	-.608***	
strong fiscal rules	.024	.040	.018	.000	.020	.054	.030	4.71**
weak fiscal rules	.193**	.096	.053**	-.067***	-.143***	-.193**	-.386***	
high transparency	-.003	.024	.021	-.015	-.013	.009	.011	3.48*
low transparency	.213**	.110*	.049**	-.049**	-.103*	-.137	-.350**	
strong fiscal rules, high transp.	-.213*	-.060	-.009	.015	.032	.056	.269	6.64***
weak fiscal rules, low transparency	.125	.064	.046	-.078**	-.204**	-.310**	-.435**	

*Notes:* The table reports the average deviation of the consumer confidence index in percent relative to the moment of the announcement of the consolidation. It does this for various moments around the announcement moment: “t=-6” denotes six months before, etc. The column under header “t=-6/+6” gives the total average percent movement over the entire event window from six months before to six months after the announcement. Robust standard errors are reported in parentheses. Further, \* = significance at the 10% level, \*\* = significance at the 5% level and \*\*\* = significance at the 1% level. The column under “equality” tests the difference in the total movement over the entire event window for the cases under consideration. It is always a chi-square test with two degrees of freedom. Finally, “rev” is “revenue”, “spend” is “spending”, “neg.” is negative, “pos.” is “positive” and “transp.” is “transparency”.

**Table 8: Average deviation business confidence from level at announcement**

	t=-6	t=-3	t=-1	t=+1	t=+3	t=+6	t=-6/+6	equality
all	.055	.019	-.011	.011	-.017	-.025	-.080	
spending	-.020	-.024	-.026	.025	.053	.110	.130	3.75*
revenue	.214*	.132*	.038	-.039	-.145	-.212	-.426**	
high debt	.077	.029	.021	-.022	-.065	-.060	-.137	0.02
low debt	.044	.008	-.033	.034	-.006	-.055	-.099	
neg. gap	-.023	-.040	-.049*	.056**	.102	.182*	.206	10.9***
pos. gap	.191**	.122**	.057***	-.069***	-.224***	-.386***	-.577***	
spend, neg. gap	-.110	-.073	-.055	.051	.126	.242	.352	1.59
rev, neg. gap	.205	.085	.008	.018	.009	.038	-.167	
spend, pos. gap	.232	.114	.055	-.048	-.149	-.258*	-.490*	.28
rev, pos. gap	.223	.177*	.066**	-.094**	-.294***	-.451***	-.674**	
Europe	.093	.028	-.012	.005	-.051	-.092	-.186	
Europe, spending	.011	-.027	-.034	.027	.031	.039	.027	4.58**
Europe, revenue	.280**	.183**	.061**	-.072**	-.226***	-.355***	-.635***	
strong fiscal rules	.010	-.017	-.037	.031	-.054	-.215	-.224	.06
weak fiscal rules	.171	.069	.012	-.020	-.049	.021	-.150	
high transparency	.068	.058	-.028	.022	-.093	-.232	-.300	.29
low transparency	.109	.009	-.002	-.005	-.026	-.007	-.116	
strong fiscal rules, high transp.	-.125	-.001	-.051	.054	-.152	-.531	-.406	.25
weak fiscal rules, low transp.	.107	.039	.016	-.020	-.063	-.033	-.140	

Note: See Notes to Table 7.

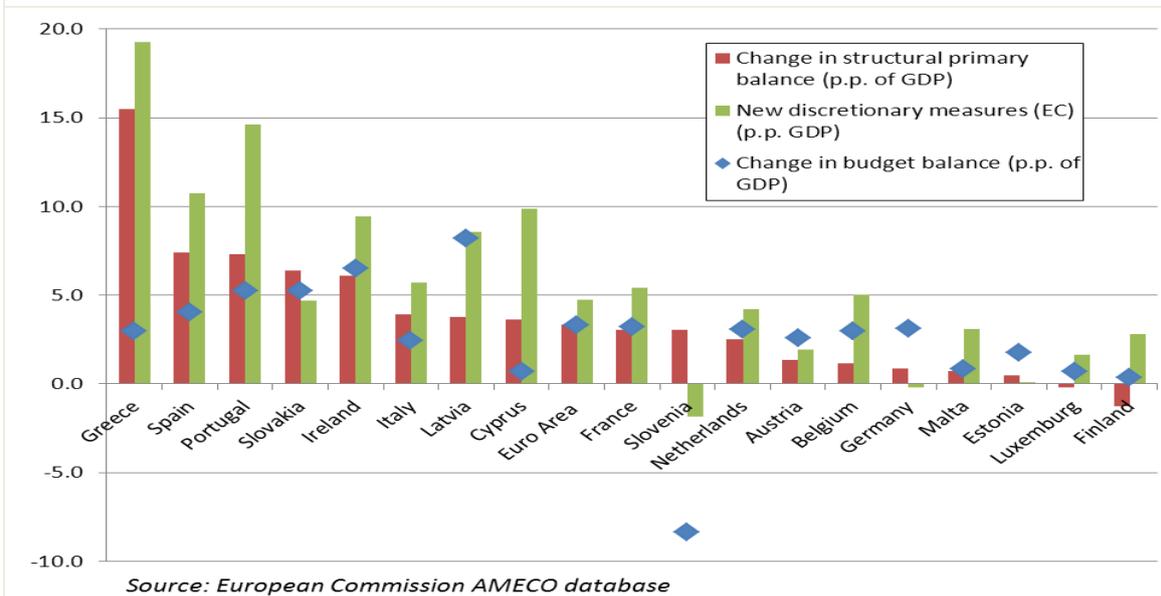
**Table 9: Average deviation long-term interest rate from level at announcement**

	t=-6	t=-3	t=-1	t=+1	t=+3	t=+6	t=-6/+6	equality
all	.041	-.003	.023	-.037	-.082	-.146**	-.187	
spending	.085	.053	.051	-.081***	-.166**	-.230**	-.315**	1.32
revenue	-.016	-.032	.007	-.012	-.022	-.048	-.064	
high debt	.000	-.003	-.004	-.028	-.087	-.115	-.115	.01
low debt	.052	-.051	.007	-.032	-.014	-.088	-.140	
neg. gap	.068	.008	.031	-.057**	-.152**	-.220**	-.289**	2.06
pos. gap	-.022	-.030	.006	.009	.080	.024	.046	
spend, neg. gap	.073	.050	.067*	-.103***	-.211***	-.346***	-.418***	.38
rev, neg. gap	.209	.044	.024	.020	-.077	-.033	-.242	
spend, pos. gap	.128	.065	-.003	-.005	-.015	.155	.027	.10
rev, pos. gap	-.211	-.120	-.013	-.051	.043	-.066	.145	
Europe	.007	-.002	.016	-.057**	-.162***	-.238***	-.245*	
Europe, spending	.070	.054	.049	-.122***	-.240***	-.319***	-.389**	2.80*
Europe, revenue	-.143	-.113	-.040	.029	-.027	-.096	.047	
strong fiscal rules	-.094	-.072	-.024	-.073***	-.143**	-.157	-.063	2.31
weak fiscal rules	.125	.078	.062	-.038	-.183*	-.331***	-.457**	
high transparency	-.022	.023	.043	-.093**	-.266***	-.382***	-.360*	.81
low transparency	.037	-.029	-.012	-.019	-.053	-.088	-.125	
strong fiscal rules, high transp.	-.118	-.092	-.012	-.096***	-.216**	-.311*	-.192	.17
weak fiscal rules, low transp.	.148	-.008	.015	.010	-.046	-.199	-.347	

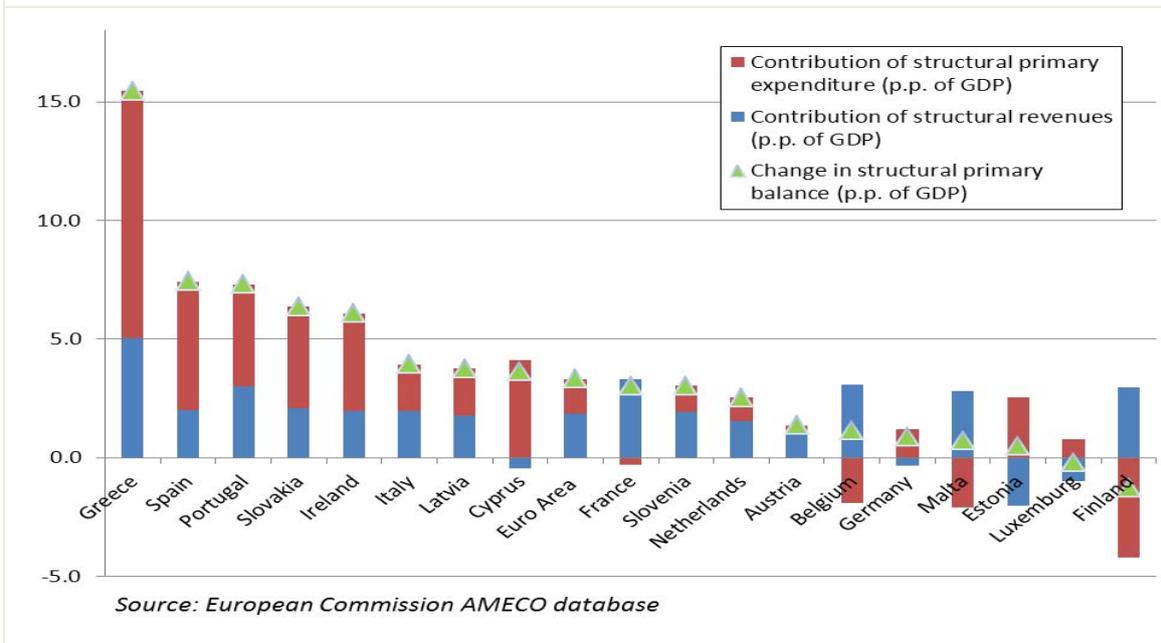
Note: See Notes to Table 7.

## Figures

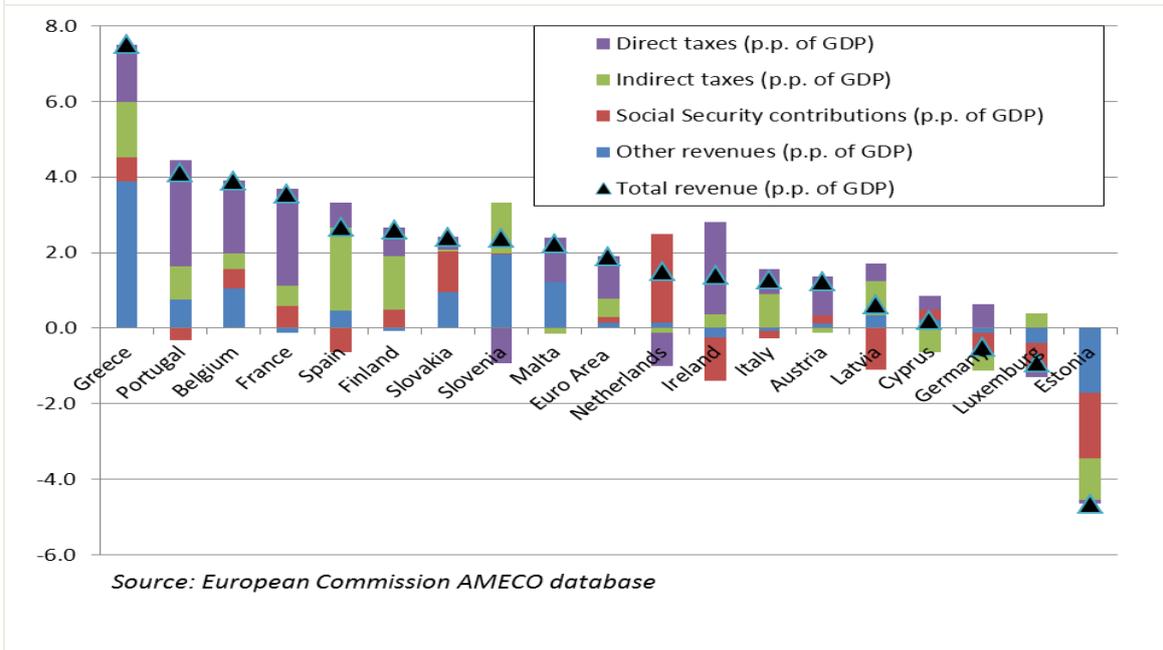
**Figure 1: Cumulated discretionary measures over the period 2009-2013 in the euro area and changes in the structural primary and actual balances.**



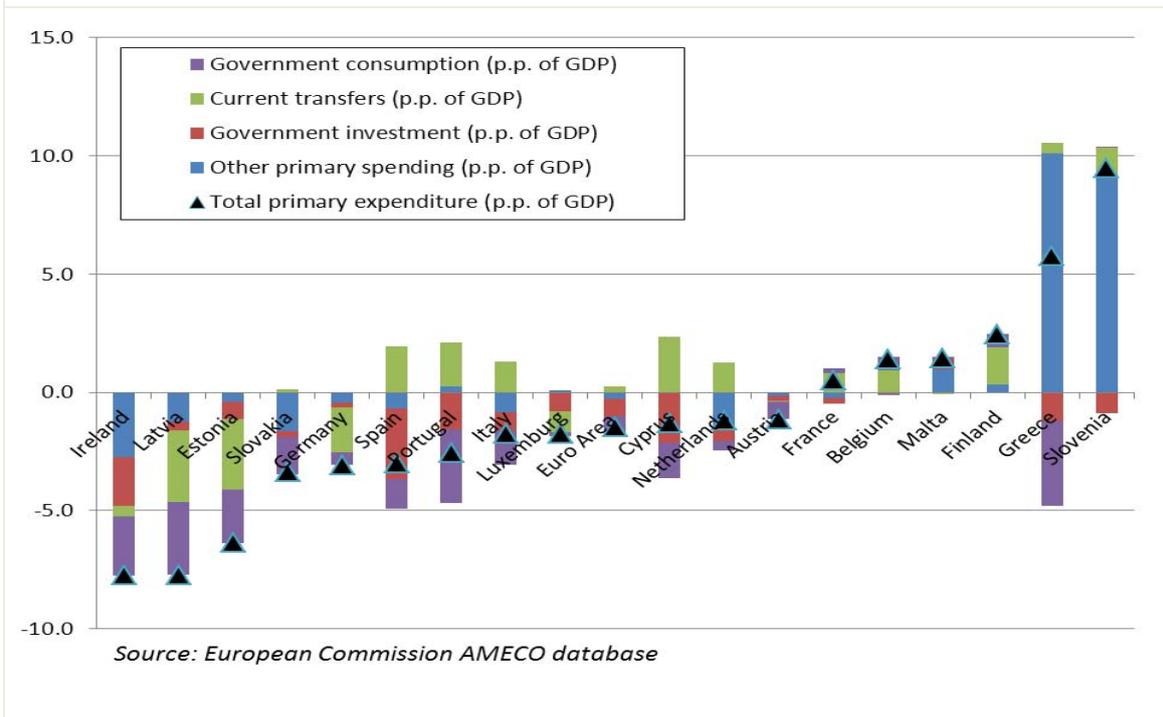
**Figure 2: Contribution of structural revenues and structural primary expenditure to the change in the structural primary balance over the period 2009-2013.**



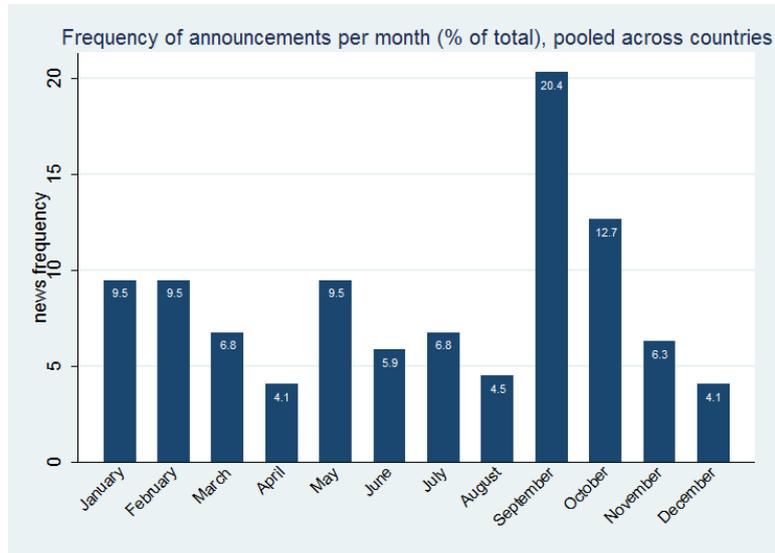
**Figure 3: Contribution of different revenue categories to the change in the total revenue-to-GDP ratio over the period 2009-2013.**



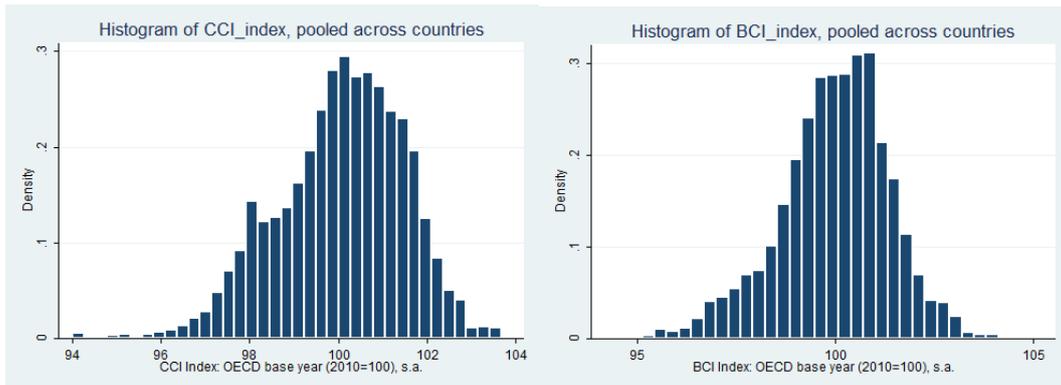
**Figure 4: Contribution of different expenditure categories to the change in the primary expenditure-to-GDP ratio over the period 2009-2013.**



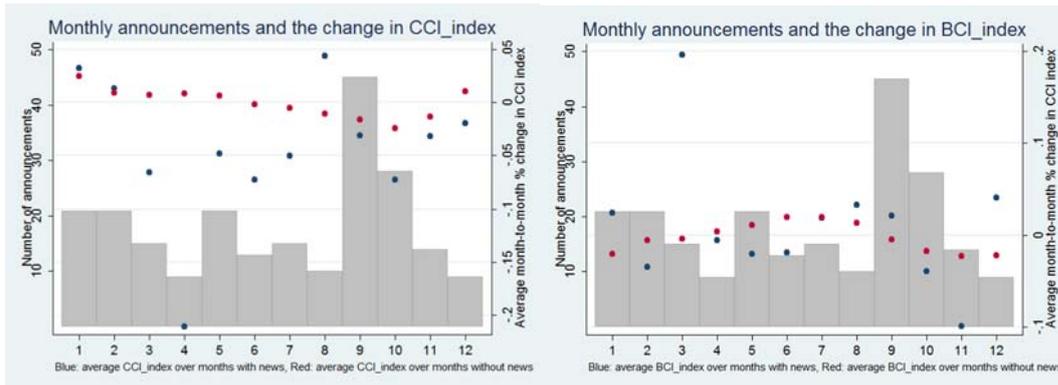
**Figure 5: Frequency of announcements**



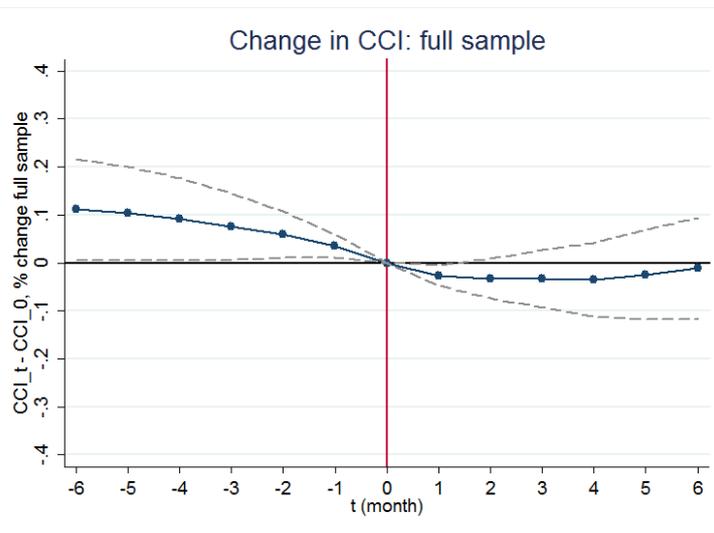
**Figure 6: Histograms of confidence indices**



**Figure 7: Distribution of changes in confidence over months**

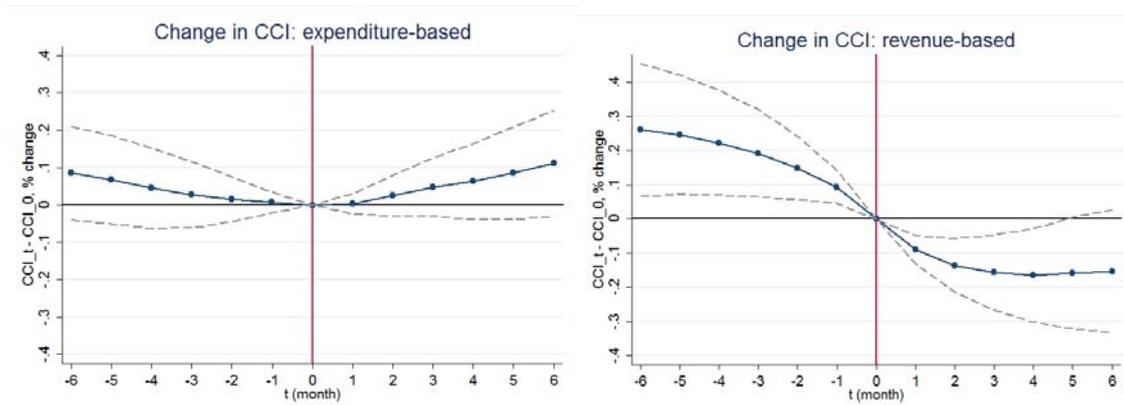


**Figure 8: Effect on consumer confidence for full sample**



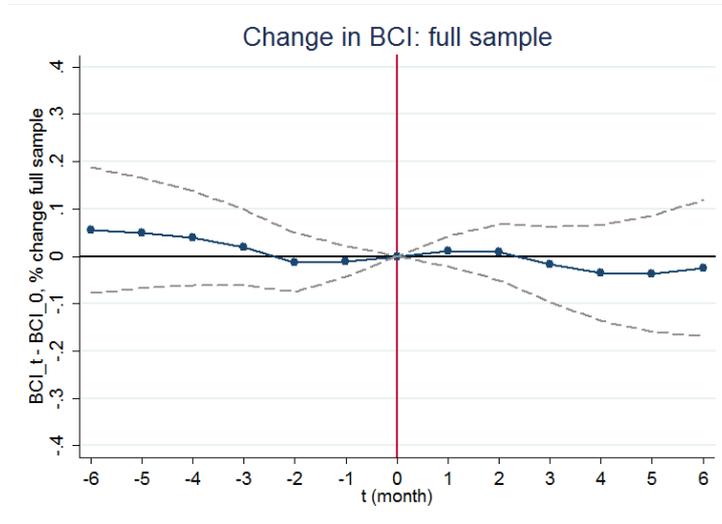
Note: the figure depicts the average deviation in percent of consumer confidence relative to announcement date, plus an error band of  $\pm 1.645$  standard deviations around the central line.

**Figure 9: Spending and revenue-based consolidations**



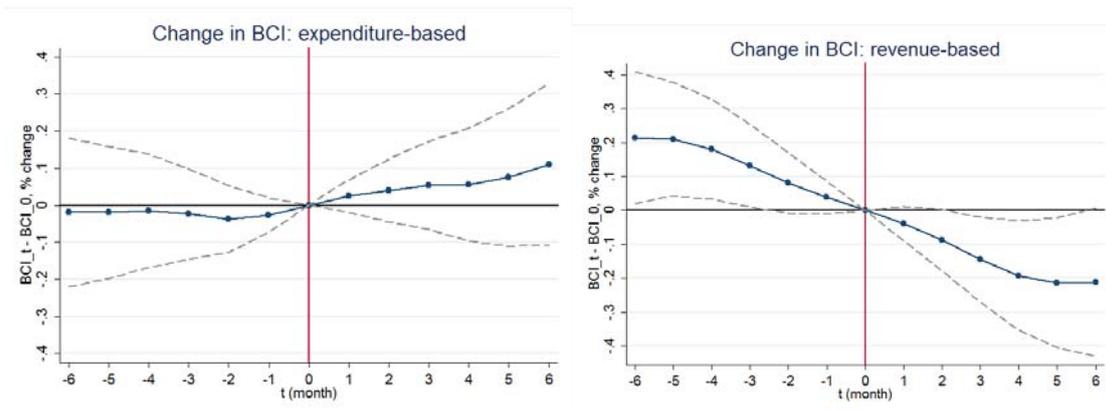
Note: see Note to Figure 8.

**Figure 10: Effect on business confidence for full sample**



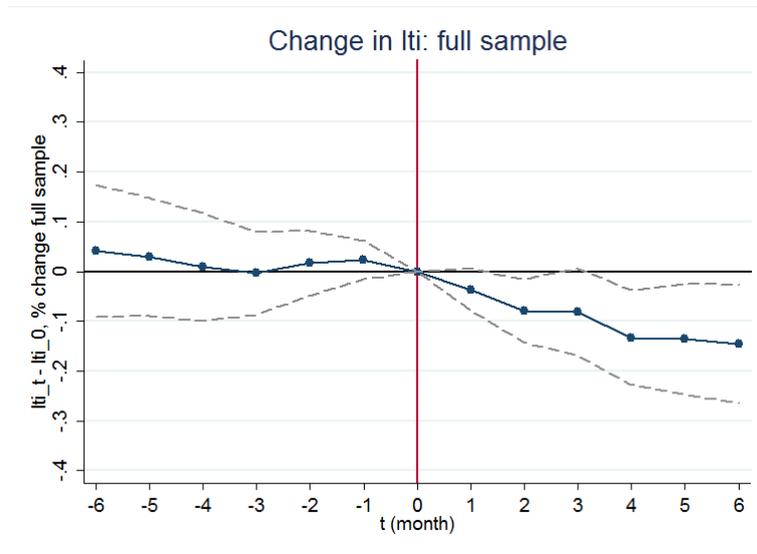
Note: see Note to Figure 8.

**Figure 11: Spending and revenue-based consolidations – business confidence**



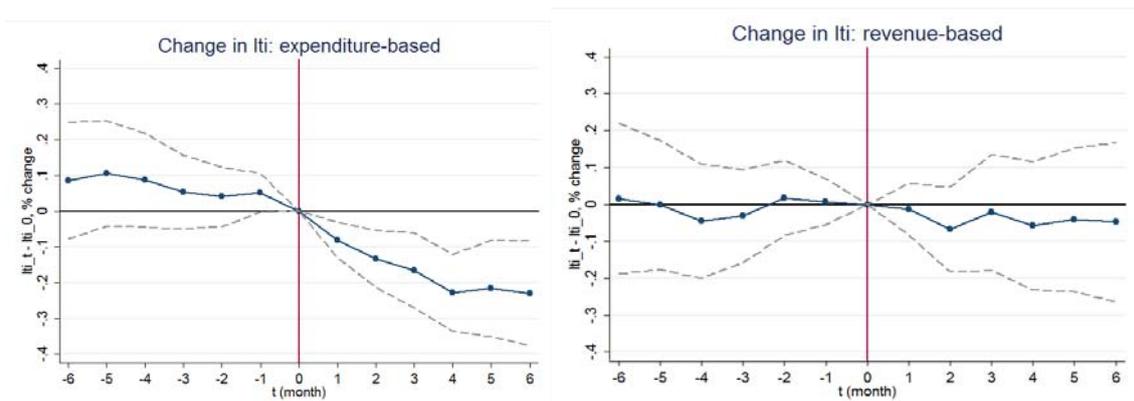
Note: see Note to Figure 8.

**Figure 12: Public debt interest rates**



Note: see Note to Figure 8.

**Figure 13: Spending and revenue-based consolidations – public debt interest rates**



Note: see Note to Figure 8.