The Design of Fiscal Adjustments

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Abstract

This paper offers three results. First, in line with the previous literature we confirm that fiscal adjustment based mostly on the spending side are less likely to be reversed. Second, spending based fiscal adjustments have caused smaller recessions than tax based fiscal adjustment. Finally, certain combinations of polcies have made it possible for spending based fiscal adjustments to be associated with growth in the economy even on impact rather than with a recession. Thus, expansionary fiscal adjustments are possible.

1 Introduction

Two are the critical questions regarding fiscal adjustments, defined as decisive reductions of government deficits. First: what is the effective mix between tax increases and spending cuts in order to achieve a relatively permanent reduction of the debt/GDP ratio? Second: how large are the output and employment losses associated with fiscal adjustments? Is it possible to completely eliminate them?

This paper offers new evidence on these questions. We find the following results. First, in line with the previous literature we confirm that fiscal adjustments based mostly on the spending side have been less likely to be reversed and have lead to more long lasting reductions of debt over GDP ratios. Second, expenditure based fiscal adjustments are correlated with smaller recessions than tax based fiscal adjustments. In some cases, during and in the immediate aftermath of spending based fiscal adjustments GDP growth is actually higher than in the years before. These episodes of "expansionary"fiscal adjustments are more likely to occur when they are accompanied by a growth oriented policy

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mix such as labor market and goods market liberalization. A sense of "regime change"in which expectations are turned around may also be important and may affect investors' confidence.

The present paper builds upon a rich and lively literature based on "episodes". The first paper in this series was by Giavazzi and Pagano (1990), who 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". The argument was that an increase in consumers and investors' confidence, associated with the drastic fiscal change and reflected in a sharp fall in long-term interest rates, compensated the Keynesian effect of tax hikes and spending cuts. A large literature has followed that paper making two points: spending based adjustments are less contractionary and are more likely to lead to a permanent stabilization or a reduction of the debt to GDP ratio; second, in some cases spending based adjustments have been associated with no recession at all, even in the short-run, thus producing an expansionary fiscal adjustment. The first paper looking at the universe of large fiscal adjustments was Alesina and Perotti (1995). Many other papers followed along similar lines confirming those results.[1]

One difficult issue in this literature is how to identify episodes of large discretionary policy changes. Up until a paper by Alesina and Ardagna (2010) the identification criteria was based upon observed outcomes: a large fiscal adjustment was one where the cyclically adjusted primary deficit over GDP ratio fell by a certain amount (normally at least 1.5 per cent of GDP)[2]. The idea was that such a large adjustment in the cyclically adjusted primary deficit was unlikely to be driven by the business cycle and was, instead, an indication of a discretionary active fiscal adjustment package. A recent paper by economists at the IMF (IMF 2010) suggested a different way of identifying large, exogenous fiscal adjustments. Following the narrative approach pioneered by Romer and Romer (2010) they picked cases that according to their criteria were attempts by governments to reduce deficits aggressively. Although the presentation of that paper emphasized the differences with earlier work, the findings were essentially in line with the results summarized by Alesina and Ardagna (2010) in the sense that both agree that spending based adjustments lead to much smaller downturns in output. The IMF study finds that on average, in the episodes their identification technique picks up, adjustments cause in the short-run (modest) recessions. The IMF findings, however, have been revisited and a later IMF paper (Devries et al. 2011), using the same methodology, revised the set of fiscal stabilization episodes (see Favero, Giavazzi and Perego 2011 for a comparison of the results obtained using the two sets of data). About a third of the episodes are reclassified from the 2010 to the 2011 version. We consider the later revisions as the correct and final version of episodes. Alesina, Favero, and Giavazzi (2012) show using the IMF definitions that the results regarding the composition of spending versus tax changes is robust. Spending cuts have been

[1] An incompletre lsit includes Alesina, Perotti and Tavares (1998), Broadbent and Daly (2010), IMF (1996), Mc Demott and Wescott (1996), Von Hagen and Strauch (2001).

[2] The results are not unduly sensitive to the choice of the threshold.

associated with very small or no recessions while tax increases have been associated with large recessions. Both the current paper and Alesina, Favero, and Giavazzi (2012) find that contrary to the claim by IMF (2010) and Devries et al. (2011) monetary policy is not the explanation of the systematic differences between tax based and expenditure based adjustments.

But there are other possible policies. In fact Alesina and Ardagna (1998) and Perotti (2012) note that fiscal adjustments are multiyear rich policy packages and that one can learn a lot from detailed case studies. One lesson of these case studies is that several accompanying policies (in addition to spending cuts or tax increases) favor the success of a fiscal adjustment and can moderate the contractionary effects on the economy. For instance, income policies (wage agreements) help, and such policies are helped by fiscal programs that slowdown the dynamics of public sector wages. Wage moderation, and sometimes, but schematically, exchange rate devaluation help competitiveness inducing an export boom. The behavior of private investment is often central if entrepreneurs react positively to a change in the fiscal package (Alesina et al. (2002) and Alesina, Favero and Giavazzi (2012)).

As far as the channels through which fiscal adjustments can affect the economy, the appropriate policy-mix has effects on the economy both on the demand side and on the supply side of the economy. The relatively small negative effects of spending cuts on growth via the demand side can be compensated by the positive effect that accommodative monetary policies have on the demand side and/or by the positive effect that cuts to current spending and liberalization reforms have via the supply side of the economy. In some cases, expectations about a change in the policy regime generated a positive wealth effect and a reduction in risk premia on long-term interest rates. This had positive effects on private consumption and investment. While we do not test for the channels through which fiscal adjustments affect the economy in this paper, we have done so in our previous research. In particular, Alesina et al. (2002) show that spending cuts have a positive effect on private investment while increases to taxes, particular labour taxes, hurt investment through the labour market and firms' profitability. The size of fiscal policy shocks on firms' profits and private investment is large enough to explain the boom (fall) in private investment that accompanied expansionary and spending based (contractionary and tax based) fiscal adjustments. Hence, we concluded that there might be nothing special around large fiscal adjustments in terms of the reaction of expectations but that the composition of the adjustment and its effects on the labour markets can explain the different outcomes. A similar conclusion is also reached by Ardagna (2004) that running a horse race between the so-called expectation channel and the labour market channel finds more evidence in favour of the latter than the former. Finally, Alesina and Perotti (1995) find evidence that spending cuts have a positive effect on exports' competitiveness, while increases in taxes work in the opposite direction.[3]

[3] See also Ardagna (2007), Daveri et al. (2000) and Finn (1998) for models that formalize the effects of changes to the government wage bills, transfers and labour tax increases on the

The present paper takes on from this line of papers. It uses both the IMF classification of fiscal adjustments and the earlier one based upon the size of changes of the cyclically adjusted primary deficit over GDP ratio. We try to clarify the differences between the two both methodologically and empirically. In addition, we expand the analysis to include the effects of a vast set of policies which constitute the "package"accompanying the fiscal cuts. By considering many alternative definitions of fiscal adjustments we can do much robustness checks on our previous results and we confirm that they are robust. The main results which we obtain is that the key message regarding the composition of fiscal adjustments is the same regardless of the definition used to identify episodes of fiscal adjustments (i.e.: our definition using actual outcomes on the cyclically adjusted deficit and the IMF definition based upon announced plans for cuts). The same result is obtained by the VAR analysis of Alesina Favero and Giavazzi (2012) who focus in particular on the confidence channel and by Biggs et. al. (2010).

Before proceeding it is worth mentioning two disclaimers. First, we do not plan to review here the vast recent literature on empirical fiscal policy, the size of spending multipliers, etc. We refer to several chapters in Alesina and Giavazzi (2012) for this task. Second, we offer no policy discussion on the size, timing and opportunity of the current fiscal adjustments in Europe or the US. The reader can draw his/her own conclusion based upon the historical evidence and empirical analysis which we present.[4]

This paper is organized as follows. In the next section, we discuss data and definitional issues. In particular, we consider alternative definitions of what a fiscal adjustment is. In section 3, we use our outcome based definition to investigate successful and expansionary adjustments versus unsuccessful and contractionary ones. Section 4 discusses the policy mix which leads to success versus failure. Section 5 uses the Weo definition of fiscal adjustments and repeats the same analysis of success versus failure. Section 6 provides econometric evidence on the effect of different types of fiscal adjustments on the economy using the same methodology proposed by the IMF (2010). The last section concludes.

2 Data and definitions

2.1 Data

We consider data on 21 OECD countries from 1970 to 2010. The countries included in the sample are Australia, Austria, Belgium, Canada, Denmark, France, Finland, Germany, Greece, Italy, Ireland, Japan, the Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, the United Kingdom, and the United States. The variables' definitions and the source of the variables

economy in the context of unionized or perfectly competitive labour markets.

[4] See Nielsen (2012) for an analysis of current fiscal consolidation programs undergoing in Europe.

are indicated in Table 1. These are the countries which were members of the OECD group for the entire sample period.[5]

2.2 Definitions of fiscal adjustments

Defining an episodes of fiscal adjustment is challenging for two reasons. The first difficulty lies in the endogeneity of fiscal variables, that is the reduction of the deficit over GDP ratio may be due to an increase in the denominator and may have nothing to do with a discretionary policy action. Obviously, one can (and should) use cyclically adjusted fiscal variables but the cyclical correction is notoriously imperfect and arbitrary to some extent. Thus, one has to worry about the fact that in a boom not only spending may go down because of automatic stabilizers, but the government may choose to cut discretionary spending. If one does not take that into account one is lead to the wrong conclusion. Second, it is often difficult to identify the precise timing since fiscal adjustments are often multi-year events. For instance, imagine a country in which the deficit over GDP ratios falls by 2 per cent in year t, by 0.1 per cent in year t+1, and 2 per cent in year t+2. Does one consider the three year period one fiscal adjustment or does one consider year t and year t+2 as two separate episodes? Depending on what choice one makes the results might be different.[6]

The literature on episodes adopted definitions that considered only single years large adjustments or consecutive years in which the adjustment in each year was smaller but always in the range of 1-2 per cent as this range seemed a high enough one to isolate large episodes but not so large as to have too few episodes.[7] The rationale for these definitions is that a year with such a large reduction of the primary deficit cannot be "business as usual", therefore it must indicate a change in the policy stance.

In the present paper, however, we consider only multi-year adjustments and we allow for the possibility of small reductions in the primary deficit in a particular year, provided that this happens in a period of consecutive years when we observe sizable improvements in the fiscal balance. In particular, we use the following definition.

Definition 1 *A fiscal adjustment is either: 1) a two year period in which the cyclically adjusted primary balance/GDP improves in each year and the cumulative improvement is at least two points of the balance/GDP ratio; 2) a three or more year period in which the cyclically adjusted primary balance over GDP*

[5] We exclude the tiny Luxembourg.

[6] See Perotti (2012) for a detailed illustration of this problem.

[7] Alesina and Ardagna (2010) define a period of fiscal adjustment as a year in which the cyclically adjusted primary balance improves by at least 1.5 per cent of GDP. Alesina and Perotti () defined a period of fiscal adjustment as a year in which the cyclically adjusted primary balance improves by at least 2 per cent of GDP per year or a period of consecutive years in which the cyclically adjusted primary balance improves by at least 1 per cent of GDP per year.

The qualitative nature of the results did not change and conclusions were also robust to changes in the threshold chosen.

improves in each year and the cumulative improvement is at least three points of the balance/GDP ratio.

The list of our episodes of fiscal adjustments captured by this definition is in Table 2. This definition allow us to avoid the problem highlighted above of "stop and go"adjustments a problem which we had in Alesina and Ardagna (2010). Also, it allow us to provide evidence on the robustness of the results of the previous episodes literature and to focus on episodes that in terms of their duration are closer to what OECD countries will experience this time around. In fact, given the size of the budget deficit that many OECD countries have accumulated, fiscal adjustments are likely to be multi-year processes. Finally, note that we use the primary deficit, (i.e.: the difference between current and capital spending, excluding interest rate expenses paid on government debt, and total tax revenue), rather than the total deficit, to avoid that episodes selected result from the effect that changes in interest rates have on total government expenditures. Figure 1 illustrates the ten largest fiscal adjustments based upon this definition. Of the 52 episodes of fiscal adjustments, 24 last two years, 8 last 3 years and the longest (only one) lasts 9 years.

We are interested in two measures of results of fiscal adjustments. One is whether they managed to reduce substantially the debt over GDP ratio, the second is a measure of costs in terms of downturn for the economy. With regard to the first question we label "successful"an episode of fiscal adjustment which has lead to a reduction of the debt/GDP ratio and "unsuccessful"those with the opposite feature. We should emphasize that one should not give a normative interpretation to this term but simply consider it as a label which refers specifically to the effect of the fiscal adjustment on the debt/GDP ratio. We label "expansionary"those episodes which have not lead to a downturn and recessionary those which did. More precisely, we use the following definitions.

Definition 2 *A period of fiscal adjustment is successful if the debt to GDP ratio two years after the end of a fiscal adjustment is lower than the debt to GDP ratio in the last year of the adjustment.*

This definition selects 25 episodes of successful fiscal adjustments and 24 unsuccessful. Note that the total (49) is lower than the 52 observations of the previous table since three cases of adjustments are too close to the end of the sample to allow us a classification based upon this definition. In Table A1 in the Appendix we list all the episodes.

Definition 3 *A period of fiscal adjustment is expansionary if real GDP growth during the adjustment period is higher than the average growth the country experienced in the two years before.*

This definitions selects 35 episodes of expansionary fiscal adjustments and 17 contractionary. Table 2 lists all the episodes.

In order to avoid that the world business cycle may lead us to incorrectly classify adjustments because external factors may be important for small open

economies we also use a second definition to select expansionary and contractionary fiscal adjustments.

Definition 4 *An expansionary fiscal adjustment is one in which the average growth in difference for the G7 average growth during the adjustment was higher than the average growth in the two year before the adjustment relative to the G7 average growth.*

This definition isolates 28 cases of expansionary fiscal adjustments and 24 unsuccessful. Table 2 lists the episodes.

We should be very clear on the following point. This correlation between fiscal adjustments and the economy which highlights the occurrence of "expansionary"episodes, should not be considered "casual"at this point. We cannot say that austerity is growth promoting per se. We can only note at this point a correlation. In what follows we explore this correlation to investigate whether certain types of fiscal adjustments rather than others are more likely to be contractionary or expansionary.

3 Different types of fiscal adjustments

In this section we explore based upon our two outcome definitions reported above the characteristics of episodes, distinguishing those which have been successful versus unsuccessful and expansionary versus contractionary.

3.1 The composition of fiscal adjustments

Table 3 presents some basic summary statistics on the successful versus unsuccessful episodes. Interestingly they are almost exactly the same in number (24 versus 25). By definition the successful ones lead to a reduction of the debt over GDP ratios and the others do not. Successful fiscal adjustments were slightly longer in time. More interestingly, successful fiscal adjustments were associated with higher growth during the adjustment. Needless to say the higher growth is what might have helped in making the adjustment successful in the first place. In terms of word business cycle proxied by G7 growth, successful and unsuccessful adjustments are indistinguishable. This hints to the fact that success or failure depend on domestic factors rather than the world business cycle. More on this below.

Table 4 shows some basis statistic regarding expansionary versus contractionary episodes using our two definitions; Table 4a using definition 1 and Table 4b using definition 2. As mentioned above according to definition 1 there were more expansionary than contractionary episodes (35 versus 17). According to the second they were about half and half (28 versus 24). Note how the G7 growth is virtually identical on average for all types of fiscal adjustments.

Table 5a presents evidence on the composition of the episodes of fiscal adjustments using definition 1. The key observation here is that there is a significant difference between successful and unsuccessful and contractionary versus

expansionary: the successful and expansionary ones were those based mostly upon spending cuts rather than tax increases. This is the same results we had obtained earlier in Alesina and Ardagna (2010). All the components of spending except for public investment are reduced more during successful than unsuccessful adjustment. Public employment grows less in successful adjustments. All these differences are statistically significant at standard conventional levels. Interestingly the size of the reduction of the cyclically adjusted deficit is virtually identical for expansionary and contractionary adjustments, while, perhaps not surprisingly the size is much larger for successful one versus unsuccessful one. A breakdown of different types of taxes does not yield significant differences (results are available from the authors). More detailed research on this point is warranted.

Note that comparing successful versus unsuccessful adjustments, it is apparent that the reduction in total deficit is much larger than that of primary deficit. This indicates a strong reaction in interest rates, which may be due to investors' confidence effects. Alesina, Favero and Giavazzi (2102) investigate more formally this confidence effects finding that indeed confidence "moves"but it is unclear whether it follows or precede movement of output. Note also that the yearly reduction in the primary deficit is lower than 2%, on average,[8] and that although in successful and expansionary adjustments the cumulative reduction of the primary deficit is larger, its size is not statistically different from that in unsuccessful and contractionary episodes. Table 5b uses as a definition of expansionary versus contractionary definition 2. The results are broadly quite similar to those of Table 5a. From now on we use definition 1 for all the other tables which we present. The results using the other definition are quite similar and are available from the authors.

Table 6 investigates differences in initial conditions. There do not seem any statistically different initial conditions when comparing successful versus unsuccessful episodes. Growth was higher for successful ones, unemployment though was also higher. The results are striking for the case of expansionary versus contractionary. In this case, it is pretty clear that expansionary episodes started with worse initial conditions, growth was lower and unemployment higher. There are two possible interpretations of this result. One is that growth was picking up on its own and continued to pick up "despite"the fiscal adjustment. This would imply that the measure of cyclical adjustment on the deficits are imperfect. The other interpretation is that the fiscal adjustment was part of a package that generated a "major change"in the policy stance which favored at the same time austerity and growth.[9] The results presented in the next section point toward the second interpretation because the policy mix of expansionary fiscal adjustments included pro growth supply side reforms. This

[8] See Stehn et al. (2011) for evidence on the non-linear effect on the speed of fiscal tightening and the possibility that fiscal consolidations that are too large induce a large contraction in economic activity and undermine the deficit reduction.

[9] An important point for future research relate to long run unfunded liabilities of governments. like social security funds. To what extent these major policy changes" include fixing long term trend of certain programs, like medicare in the US?

interpretation would be consistent with the case studies analyzed by Alesina and Ardagna (1998) and Perotti (2012). In their view, episodes of large fiscal adjustments are a complex combination of policy actions including both supply side and demand side policy reforms, an issue to which now we turn to.

3.2 The policy mix

In this section, we illustrate which other policies have been associated with the episodes of successes and expansions versus unsuccess and contractions.

3.2.1 Labor and goods market liberalizations

The expansionary fiscal consolidation episodes were those which were accompanied by goods and labor market liberalizations. Our interpretation is that these supply side reforms more than compensated the (small) recessionary effects of spending cuts on the demand side. Table 7 summarizes the results. This table highlights two points. The first one (Table 7a) is that the countries which experienced expansionary fiscal consolidations are those which were on average less regulated both in the case of goods market that labor market. The definition of the regulatory indices is in Table 1. In particular, union density and various measures of product market regulation were lower (i.e. less regulation) in countries (and times) which experience lower fiscal adjustments. When in Table 7b we look at changes we find a reduction in virtually all indices of regulation suggesting that more deregulation has accompanied fiscal consolidations. Even though differences are not always statistically significant, successful and expansionary episodes were characterized by a larger decrease in the various indices. This is encouraging since deregulation should affect directly growth and through growth favour the reduction of the debt/GDP ratio. These results are consistent with the case studies of Alesina and Ardagna (1998) and Perotti (2012).

3.2.2 Macroeconomic Variables and Confidence Indicators

We now explore the effects of the policy mix on various macro variables. Table 8 reports a few basic measures of monetary conditions and interest rates. The interesting result here is that long-term interest rates (both nominal and real) fall more during expansionary rather than contractionary fiscal adjustments and for successful rather than unsuccessful. Credit conditions also appear to be easier during successful and expansionary episodes. The reduction in long-term interest rates may be associated with an increase in confidence. In fact, Table 9 shows an increase in confidence during expansionary and successful adjustments. Whether it is an improvement in economic conditions which improves confidence or the other way around, remains to be seen.[10] The reduction in nominal interest rates may also be the result of monetary easing, which could be endogenous to the fiscal adjustment. If the monetary authority perceives a credible policy

[10] See Alesina, Favero and Giavazzi (2012)

package of fiscal consolidation, it might be more likely to "ease". The importance of interest rate movements is highlighted in Table 10 which reports a breakdown of the various component of GDP. This table shows that all components of GDP increased during successful and expansionary adjustments relative to unsuccessful and contractionary ones. However, the effect seems especially strong on private investments, which are more likely to be sensitive to interest rates. This result is in line with Alesina et al. (2002) and Alesina, Favero and Giavazzi (2012). An additional interesting observation also in line with Alesina, Perotti and Tavares (2004), Alesina and Ardagna (1998) and Perotti(2012)) is that net export improves during expansionary and successful adjustments. We then now turn to examine competitiveness and exchange rate movements.

3.2.3 Unit labor costs and competitiveness

Table 11 reports results on unit labors cost and competitiveness. The first row shows that during successful and expansionary adjustments unit labor costs have grown less than during unsuccessful and contractionary ones. Line 2 shows that the same holds not only in absolute terms but relative to trading partners. Finally, line 3 shows results along the same line with respect to productivity. This evidence is consistent with that of labor and goods' market deregulation presented above. It shows that supply side reforms and possibly wage moderation and agreements with the unions (see also Perotti (2012) on this point) have facilitated the fiscal adjustment. In other words the negative Keynesian effect on the demand side of spending cuts have been overturned with the help of supply side reforms.

3.2.4 The exchange rate

A few authors (Lambertini and Tavares (2007) , Weo (2010) and Devries et al. (2011)) have argued that devaluations have been an important factor in explaining the success of fiscal adjustments, namely those which were expansionary were so because they were accompanied by large and permanent devaluations. In our view, this point is overstated. As a first pass in Figure 2 we show the (lack of) correlation between the reduction in the debt over GDP ratio in all the episodes of fiscal adjustments against the rate of growth of the nominal effective exchange rate, (a decrease in the exchange rate corresponds to a devaluation). As the figure shows there is no correlation. The same lack of correlation appears in Figure 3 when we plot the same variable against the total (over the entire adjustment period) nominal exchange rate change. But, is there a difference between successful, unsuccessful and expansionary and contractionary? Table 12 provides rather inconclusive answers. For the case of expansionary versus contractionary in both case we have on average a devaluation before the adjustment. During the adjustment in both cases we have an appreciation but smaller for expansionary episodes. The difference is, however, small and not statistically significant. In the case of successful versus unsuccessful episodes, the appreciation is actually larger than during unsuccessful ones, but, again,

the difference is not statistically significant. Thus, at least based upon these basic statistics the role of the nominal exchange rate does not appear to be so predominant.

4 The IMF "Narrative"Method

In this section, we perform the same analysis, to the outcome based definition of Devries (20100). We find results which are remarkably similar to those presented above. Thus, the claim (Weo (2010) and Devires at al. (2011)) that the results based on episodes identified via the "narrative" method were substantially different from those of the preexisting literature (and in particular of Alesina and Perotti (1995) and Alesina and Ardagna (2010)) are largely unsubstantiated. In particular, we show below that the claims that the composition does not matter, but it is the monetary stance that explains the differential effect of spending based versus tax based adjustment is not supported by a careful data analysis.

4.1 Definitions

The IMF Weo (2010) proposed a different approach based upon the narrative approach pioneered by Romer and Romer (1989) for monetary policy and applied by the same authors on fiscal policy (Romer and Romer (2010)). These authors identified episodes of discretionary changes in tax policy in the US with a careful study on Congressional debates and identified after much careful work several episodes of "exogenous", i.e. not due by the business cycle, changes of tax policy in the post war US. Weo (2010) adopts a similar methodology for 17 countries for a 30 year period. Then, it defines a fiscal adjustment episode a multi-year period in which a government explicitly raised taxes or cut expenditure with the explicit and declared intention of reducing the deficit. Table 13 lists the original episodes. Based upon these episodes, Weo (2010) reported essentially three results: 1) tax based fiscal adjustments were more recessionary than spending based ones; 2) on average spending based fiscal adjustment were (mildly) recessionary; 3) the fiscal package mattered. Subsequently Devries et al. (2011) provided a different classification of episodes, which is also reported in Table 13. In what follows we use the episodes of Devries et al. (2011) rather than Weo (2010) since the former are the corrected "final"list of episodes.

4.2 The composition of the adjustments

Table 14 shows that the key result regarding the composition of fiscal adjustments holds using the Devries et al. (2011) dates as well. The successful and expansionary fiscal adjustments are those which were primarily on the current spending side. Alesina, Favero, and Giavazzi (2012) also using these episodes show how different the effect of spending based and tax based adjustments were. The former were associated with virtually no recessions, on average, while the latter were accompanied by a prolonged downturn.

Table 15 to Table 21 reproduce the same analysis which we had performed above on our definition of episodes using the IMF classification. The basic result is that exactly the same picture emerges regarding the effect of accompanying policies which lead to expansionary versus contractionary episodes. In particular, Table 15 shows that there is not a clear pattern about the initial conditions which differentiate the four types of fiscal adjustments. Table 16 shows that as discussed above, expansionary fiscal adjustments are more likely to occur in less regulated economies. Table 17 shows that expansionary fiscal adjustments are more likely to occur when they are accompanied by liberalizations. Table 18 shows that there is no difference in measures of monetary conditions regarding expansionary versus contractionary episodes while "easier"monetary conditions seem to have helped adjustments to be successful by lowering interest rates. Table 19 shows positive effects on confidence of expansionary adjustments: once again causality is an issue here. Is confidence driving the expansions or the other way around? A much more sophisticated analysis, beyond the scope of this paper, would be necessary to answer this question. Table 20 confirms the important role of investment increases during successful fiscal adjustment, again the same result we obtained above with our definition of adjustment. Table 21 confirms the role of unit labor costs which fell much more on average for expansionary fiscal adjustments rather than contractionary ones.

The bottom line then is that the basic results of the paper namely that: 1) spending based adjustment are less much less contractionary or even expansionary than tax based ones and 2) differences in supply side policies like liberalization and wage moderation are key element of the policy mix, are robust to alternative definitions of episodes. They hold both for our definitions based upon deficit reduction outcomes and the Deviers et al. definition based upon announced plans.

5 Econometric Evidence

5.1 Methodology

We now turn to empirical estimates of the effect of fiscal policy and its main components on real GDP. Our baseline specification is identical to that estimated by IMF (2010)

$$\Delta Y_{it} = \sum_{j=1}^{2} \alpha_j \Delta Y_{it-j} + \sum_{j=0}^{2} \beta_j \Delta CAPB_{it-j}^{FA} + \lambda_i + \mu_t + \nu_{it}$$

Y_{it} is the logarithm of real GDP, $\Delta CAPB^{FA}$ is equal to the change in the cyclically adjusted primary balance (or the IMF series measuring the size of fiscal consolidations in percent of GDP) in periods of fiscal adjustments and zero otherwise, λ_i is a vector of country fixed effects and μ_t a vector of year fixed effects.

We estimate equation (1) over the entire sample period by OLS and we cumulate the estimated responses for $\Delta CAPB$ at t, t+1, t+2 to measure the effect of a 1 percentage point change in the fiscal variable on the level of real GDP. We compute the standard errors of the impulse responses via the delta method.

For robustness check, we also augment equation (1) with two additional terms,

$$\Delta Y_{it} = \sum_{j=1}^{2} \alpha_j \Delta Y_{it-j} + + \sum_{j=0}^{2} \beta_j \Delta CAPB_{it-j}^{FA} + + \sum_{j=0}^{2} \beta_j \Delta CAPB_{it-j}^{NFA} + \lambda_i + \mu_t + \nu_{it}$$

where: ΔCPB^{NFA} is equal to the change in the cyclically adjusted primary balance in "normal" times (i.e. when no fiscal adjustment is taking place) and zero in periods of fiscal consolidations.

Equation (1) assumes that changes in the cyclically adjusted primary balance in periods of fiscal consolidations are exogenous and uncorrelated with changes in fiscal policy in all other periods. Including the additional terms allows us to verify the robustness of these assumptions. In fact, if the assumption holds, the estimated coefficients of ΔCPB^{FA} should not change when we include the additional term.

To investigate the role of the composition of a fiscal consolidation, we split the change in ΔCPB into the change in the cyclically adjusted primary spending and the change in the cyclically adjusted taxes. In this respect, we differ from the IMF specification. Devries et al. (2011) measure the effect of a different composition of a fiscal adjustment by introducing a dummy variable equal to one for the episodes in which the improvement in the fiscal balance is due to public spending cuts for more than 50% and zero otherwise. Given that the IMF provides time series for changes in spending and tax shocks, by using the continuos changes in spending and taxes one uses all the information and does not risk that the results are driven by a particular threshold chosen to identify spending based versus taxed based adjustments.

Finally, we estimate the various specifications also controlling for other policy changes (i.e. structural reforms in product and labour markets and monetary policy) to check that our main results on the composition are sound and we investigate the effect of the policy changes on GDP components.

5.2 The effect of fiscal shocks on GDP

Table 22 shows the cumulated effect on real GDP of (i) a 1% improvement in the primary balance (col.1 and 4), (ii) a 1% decrease in primary spending (col.2 and 5), or (iii) a 1% increase in taxes (col.3 and 6). The specifications are estimated following the baseline model (1). In columns 1-3, fiscal consolidations are defined according to Definition 1 above, while in columns 4-6, we consider the episodes identified by Devries et al. (2011).

Estimates based on our series suggest that fiscal consolidations do not have a statistical significant effect on GDP at any time horizon (column 1), and that the result is due to the offsetting effects of spending cuts and tax increases. While a decrease in primary spending has an expansionary and statistically significant effect on GDP with a peak effect of 0.46 percent within three years (t-statistic = 2.57), an increase in taxes has a contractionary but not statistically significant effect on GDP with a peak effect of -0.34 percent within three years. This result is in line with the statistical evidence discussed so far.

The estimates based on the IMF series suggest a different picture at a first reading: fiscal consolidations have a statistical significant contractionary effect on GDP with a peak effect of -0.63 percent within two years (t-statistic = 3.89) (see column 4). However, the negative effect on GDP is driven by taxation in the IMF sample. Column 4 shows that cuts to primary spending are not statistically significant at any time horizon. Instead, an increase in taxes has a contractionary and statistically significant effect on GDP with a peak effect of -1.60 percent within three years (t-statistic = -3.69). The effect of a 1 percentage point increase in taxes is almost three times as large than the average effect of the primary deficit and much larger than the effect we find using our definition of fiscal adjustments.

Estimates for the augmented model are in Table 23. The key message does not change, although the magnitude of the coefficients varies, suggesting that the assumption that changes in the fiscal stance in years of fiscal consolidations are uncorrelated with changes in "normal times" is not supported by the data. Consistently with results in Table 22, real GDP declines in response of a 1% positive shock to taxes in periods of fiscal consolidation, regardless of the criteria used to select these episodes. Primary spending shocks do not have a statistically significant effect on GDP if episodes are selected using the IMF methodology, but real GDP increases in response to spending cuts in our sample of fiscal consolidations.

Finally, note that the IMF data do not provide a distinction between primary current spending and spending on capital goods. The descriptive statistics discussed above shows that current primary spending is the critical item of the budget that distinguishes expansionary and successful fiscal adjustments from contractionary and unsuccessful ones. We run again the baseline and augmented specifications for our sample of fiscal adjustments and separate primary spending between changes in primary current spending and spending on capital goods. Results are in Table 24. We find that shocks to the former have a statistical significant effect on GDP but not the latter. Moreover, the effect on GDP of a decrease in current primary spending is even larger than the effect of a decrease in total primary spending. A reduction of 1 percentage point of GDP in current primary spending has a peak effect of 0.73 percent (t-statistic = 3.07) within three years, compared with a 0.46 percent effect due to a reduction in total primary spending by the same magnitude.

5.3 Monetary policy

We now investigate whether the results on the effect of spending cuts and tax increases hold when we control for changes in monetary or exchange rate policies. First, we study the effect of spending and tax changes on the monetary policy variables. Second,we add among the right hand side of equations (1) and (2) the short-term nominal interest rates or the change in the nominal effective exchange rate. Results are in Tables 25-26.

When we identify episodes of fiscal adjustments using Definition 1, we find that the short-term interest rate increases in response to tax increases, but falls when spending is cut. However, these effects are not statistically significant. Instead, when we consider the IMF episodes, we find evidence that monetary policy reacts differently to the spending and tax changes as the short-term interest rate increases in response to tax hikes and falls in response to spending cuts and coefficients are statistically significant. This suggests that monetary policy might endogenously respond to the type of the adjustments and central banks might decide to accommodate only more credible and potentially successful adjustments, (i.e. the spending based ones but not tax based ones).

In all specifications, however, our results discussed in the section above on the effect that a different composition of the fiscal adjustment has on GDP growth hold when we include monetary variables among the regressors. The coefficient of the primary spending remains positive (i.e.: a decrease in spending leads to higher growth) and statistically significant and the one on taxes negative and insignificant when episodes are selected using Definition 1. When episodes are selected using the IMF data, spending cuts do not have a statistical significant effect on GDP but a positive shock to taxes leads to a fall in output. The coefficient on the monetary policy variable has the expected sign and a shock to the short term interest rate has a statistically significant effect on GDP after two and three years in all specifications. Hence, while a reduction in the short-term interest rate does have a positive effect on economic activity, the expansionary effect due to monetary policy does not eliminate the one from the compositional effect of a fiscal adjustment. Devries et al. (2011) claim that spending based adjustments are less contractionary only because monetary policy is more accommodative. They never test the model including the interest rate among the regressors but they reach this conclusion by only comparing the response to fiscal policy shocks in the baseline specification and the response of the interest rate to different types of adjustments. Results similar to our but based also on country by country evidence by Alesina, Favero and Giavazzi (2012) confirm the irrelevance of monetary policy as an explanation for the different effects of tax based and expenditure based adjustments on output.

Turning to the exchange rate, we do not find any statistically significant effect of fiscal shocks on the nominal effective exchange rate and results discussed so far are not affected when we include the exchange rate variable among the regressors of equation (1) or (2). Results on these specifications are not shown but are available upon request.

5.4 Labor markets and competitiveness

Finally, we investigate the effect of spending and tax shocks when we control for the effect of goods and labour market liberalizations and changes in unit labor costs. We included one by one the same indices we discussed in Table 7 among the regressors of equation (1) and (2). As for the case on monetary policy, deregulation policies do not alter our conclusions on the effect of spending cuts and tax increases on GDP either when we select episodes of fiscal adjustments using our methodology nor when we use the IMF sample (results are not shown but available upon request). However, when we look at the effect of the regulatory indicators on GDP, coefficients are in general not statistically significant within a 3-year horizon.

Finally, improvements in cost competitiveness have statistical and economic significant effect on GDP. A reduction in the growth rate of unit labour costs by 1% increases GDP with a peak effect of 0.27 percent within three years (t-statistic = 5.98) when episodes are identified with Definition 1 and of 0.31 percent within three years (t-statistic = 5.63) when episodes are identified according to the IMF criteria (see Table 27). Interestingly, regardless of the way in which episodes are identified, we find that unit labour costs decrease in response to cuts in primary spending and that the effect is statistically significant. This is consistent with the evidence in Perotti (2012) and can help explaining the positive response of exports to spending based fiscal adjustments. Finally, once again, the qualitative effect of spending and tax shocks does not change when we control for competitiveness indicators in the regressions estimated in Tables 22-23.

5.5 Components of GDP

Devries et al. (2011) show that in spending based fiscal adjustments, exports increase and that the decrease in domestic demand is larger than the total effect on GDP. They attribute the positive response of exports to a different behavior of the exchange rate. Also, they do not estimate the effect on private consumption and investment but on total domestic demand, including public spending and inventories. We investigated the effect of a reduction in primary spending (increases in taxes) on private consumption, business investment and export separately. Our results, available upon request, are very much in line with those in Tables 22 and 23. When episodes are selected using definition 1, spending cuts (tax increases) have a positive (negative) on private consumption, business and private investment and exports. When episodes are selected using the IMF definition, reductions in public spending have a negative and significant effect only on private consumption after one year. The effect on private consumption is not statistically significant two and three years after the adjustment. Instead, spending cuts have a positive and statistically significant effect both on export (after one and three years) and on business investment (three years after the consolidation). Tax increases are always recessionary.

6 Conclusions

In the last two years there has been a very lively debate about what are the consequences of different types of fiscal adjustments. In this paper we have taken a detailed look at recent controversies, performed a host of sensitivity tests, changing definitions and exploring alternative approaches. We also have brought into the picture other variables like goods and labor market liberalizations, which sometimes accompany fiscal adjustments.

Our results can be summarized as follows: expenditure based adjustments are those which are more likely to lead to a permanent reduction in the debt over GDP ratio. In addition, they are associated with smaller recessions than tax based ones or no recessions at all. The component of private demand which seem to react more positively to an expenditure based adjustment is private investment. Cuts in current spending have smaller or no effect on output than cuts in public investments. The small downturns caused by expenditure based adjustments can be eliminated making the adjustment expansionary even on impact, if the policy package include pro growth polices like labor and goods market liberalization. Monetary policy has the standard effect on output, but it does not seem to play a role in differentiating the effects of tax based versus expenditure based adjustments.

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Table 1

Definition of the variables

• Debt = government gross debt as a share of GDP
• ΔTotal deficit = change in cyclically adjusted total deficit as a share of GDP = primary deficit + (interest expenses on government debt/GDP).
• ΔPrimary deficit = change cyclically adjusted primary deficit as a share of GDP = Primary expenses - Total revenue
• ΔPrimary expenses = change cyclically adjusted primary expenditure as a share of GDP = Change cycl. Adj. Transfers/GDP + (Change (Government wage expenditures + Government non wage expenditures + Subsidies + Government investment)/GDP)
• ΔCurr. G = Change cycl. Adj. Transfers/GDP + (Change (Government wage expenditures + Government non wage expenditures + Subsidies)/GDP)
• ΔTransfers = Change cyclically adjusted transfers as a share of GDP
• ΔGovernment wage expenditures = Change government wage bill expenditures
• ΔGovernment non wage expenditures = Change government non wage bill expenditures
• Subsidies = Change subsidies to firms
• ΔGovernment investment = Change gross government consumption on fixed capital
• Total revenue = Tax = Change cyclically adjusted total revenue as a share of GDP = Change cyclically adjusted (Income taxes + Business taxes + Indirect taxes + Social security contributions
+ Other taxes)/GDP
• G7 GDP Growth = average growth rate of real GDP (with GDP weights) of the seven major industrial countries
• GDP Growth = growth rate of real capita GDP
- Employment Protection: indicator of the stringency for Employment Protection Legislation for all contract. Source: Indicators for Employment Protection, OECD.
- Product market regulation: country average value of the sectorial indicator.

Source: Indicators of Product Market Regulation (PMR) , OECD

- Barriers to entry: Entry barriers cover legal limitations on the number of companies in potentially competitive markets and rules on vertical integration of network industries. The barriers to entry indicator takes a value of 0 when entry is free (i.e., a situation with three or more competitors and with complete ownership separation of natural monopoly and competitive segments of the industry) and a value of 6 when entry is severely restricted (i.e., situations with legal monopoly and full vertical integration in network industries or restrictive licensing in other industries).

Source: Indicators of Product Market Regulation (PMR), OECD

- Public ownership: Public ownership measures the share of equity owned by central or municipal governments in firms of a given sector. The two polar cases are no public ownership (0 value of the indicator) and full public ownership (a value of 6 for the indicator).

Source: Indicators of Product Market Regulation (PMR) , OECD

- Confidence indicator: Indicator produced by the European Commission targeted to reflect overall perceptions and expectations at the individual sector level Source: DG ECFIN
- Economic Sentiment Indicator (ESI): a composite indicator made up of five sectoral confidence indicators with different weights: Industrial confidence indicator, Services confidence indicator, Consumer confidence indicator, Construction confidence indicator, Retail trade confidence indicator. Source: DG ECFIN
- All fiscal and macro economic variables are from the OECD Economic Outlook n. 89.
- The variables are cyclically adjusted following the methodology by Blanchard (1993) and Alesina and Perotti (1995)

Table 2a: Episodes of fiscal adjustment selected using Definition 1 and Definition 2

Episodes of fiscal adjustments			
Successfull		**Unsuccessfull**	
Belgium	1993-2001	Austria	1996-1997
Canada	1993-1997	Belgium	1973-1974
Denmark	1983-1986	Belgium	1984-1990
Denmark	2004-2005	Canada	1986-1989
Finland	1996-1998	Finland	1988-1989
Ireland	1986-1989	Finland	1993-1994
Ireland	1996-1998	France	1994-2001
Italy	1995-1997	Germany	1996-2000
Japan	1979-1987	Germany	2003-2007
Netherlands	1971-1973	Ireland	1983-1984
Netherlands	1996-2000	Italy	1976-1977
Netherlands	2004-2005	Italy	1982-1983
New Zealand	1991-1994	Italy	1988-1993
Norway	1978-1980	Italy	2006-2007
Norway	1993-1996	Netherlands	1982-1983
Portugal	1994-1995	Netherlands	1985-1988
Spain	1986-1987	Norway	1982-1983
Spain	1994-1997	Norway	1988-1990
Sweden	1983-1984	Norway	1999-2000
Sweden	1986-1987	Norway	2004-2005
Sweden	1993-1998	Portugal	2002-2003
Sweden	2004-2005	Portugal	2006-2007
Switzerland	2003-2008	Spain	1983-1984
United Kingdom	1984-1988	Sweden	1975-1976
United Kingdom	1994-2000		

Table 2b: Episodes of fiscal adjustment selected using Definition 1 and Definition 3

Expansionary (Def. 3)		**Contractionary (Def. 3)**	
Austria	1996-1997	Canada	1986-1989
Belgium	1973-1974	Germany	1996-2000
Belgium	1984-1990	Ireland	1976-1977
Belgium	1993-2001	Ireland	1983-1984
Canada	1993-1997	Italy	1982-1983
Denmark	1976-1978	Italy	1988-1993
Denmark	1983-1986	Japan	1979-1987
Denmark	2004-2005	Netherlands	1971-1973
Finland	1988-1989	Netherlands	1982-1983
Finland	1993-1994	Norway	1978-1980
Finland	1996-1998	Norway	1982-1983
France	1994-2001	Norway	1988-1990
Germany	2003-2007	Norway	1999-2000
Ireland	1986-1989	Portugal	1982-1984
Ireland	1996-1998	Portugal	2002-2003
Italy	1976-1977	Sweden	1975-1976
Italy	1995-1997	Sweden	1986-1987
Italy	2006-2007		
Netherlands	1985-1988		
Netherlands	1996-2000		
Netherlands	2004-2005		
New Zealand	1991-1994		
Norway	1993-1996		
Norway	2004-2005		
Portugal	1994-1995		
Portugal	2006-2007		
Spain	1983-1984		
Spain	1986-1987		
Spain	1994-1997		
Sweden	1983-1984		
Sweden	1993-1998		
Sweden	2004-2005		
Switzerland	2003-2008		
United Kingdom	1984-1988		
United Kingdom	1994-2000		

Table 2c: Episodes of fiscal adjustment selected using Definition 1 and Definition 4

Expansionary (Def. 4)		**Contractionary (Def. 4)**	
Belgium	1973-1974	Austria	1996-1997
Belgium	1984-1990	Belgium	1993-2001
Canada	1993-1997	Canada	1986-1989
Denmark	1976-1978	Denmark	1983-1986
Denmark	2004-2005	Germany	1996-2000
Finland	1988-1989	Germany	2003-2007
Finland	1993-1994	Ireland	1976-1977
Finland	1996-1998	Ireland	1983-1984
France	1994-2001	Italy	1976-1977
Ireland	1986-1989	Italy	1982-1983
Ireland	1996-1998	Italy	1988-1993
Italy	1995-1997	Netherlands	1971-1973
Italy	2006-2007	Netherlands	1982-1983
Japan	1979-1987	Norway	1982-1983
Netherlands	1985-1988	Norway	1988-1990
Netherlands	1996-2000	Norway	1993-1996
Netherlands	2004-2005	Norway	1999-2000
New Zealand	1991-1994	Portugal	1982-1984
Norway	1978-1980	Portugal	2002-2003
Norway	2004-2005	Spain	1983-1984
Portugal	1994-1995	Sweden	1975-1976
Portugal	2006-2007	Sweden	1983-1984
Spain	1986-1987	Sweden	2004-2005
Spain	1994-1997	United Kingdom	1984-1988
Sweden	1986-1987		
Sweden	1993-1998		
Switzerland	2003-2008		
United Kingdom	1994-2000		

Table 3 :Successful vs. unsuccessfull fiscal stabilizations

	Successful	Unsuccessful	St. err. of difference
Change in the debt/GDP	-0.19	1.49	0.65**
Debt/GDP (T+2) - Debt/GDP (T)	-7.4	6.89	1.18***
GDP growth	3.47	2.3	0.27***
G7 GDP growth	2.89	2.89	0.17
GDP growth in deviation from G7 growth	0.58	-0.59	0.25***
Avg. growth (T0-Tn) - avg growth (T0-2-T0-1)	1.43	0.32	0.49**
Average duration	3.03	2.55	0.28*
Number of episodes	25	24	

Note: Changes are in percentage points of GDP unless indicated. Average duration is in terms of years. See also Table 1 for the exact definitions of the variables. * 1% significance level. ** 5% significance level. ***10% significance level.

Table 4a: Expansionary vs. contractionary fiscal stabilizations
Definition 3*

	Expansionary	Contractionary	St. err. of difference
Change in the debt/GDP	0.34	1.1	0.73
Debt/GDP (T+2) - Debt/GDP (T)	-1.88	2.94	2.5*
GDP growth	3.15	2.49	0.31**
G7 GDP growth	2.95	2.84	0.18
GDP growth in deviation from G7 growth	0.2	-0.35	0.30*
Avg. growth (T0-Tn) - avg growth (T0-2-T0-1)	1.88	-1.25	0.35***
Average duration	2.85	2.63	0.3
Number of episodes	35	17	

Note: Changes are in percentage points of GDP unless indicated. Average duration is in terms of years. See also Table 1 for the exact definitions of the variables. * 1% significance level. ** 5% significance level. ***10% significance level.

* A period of fiscal adjustment is expansionary if real GDP growth during the adjustment period is higher than the average growth the country experienced in the two years before.

Table 4b: Expansionary vs. contractionary fiscal stabilizations
Definition 4[†]

	Expansionary	Contractionary	St. err. of difference
Change in the debt/GDP	0.54	0.57	0.66
Debt/GDP (T+2) - Debt/GDP (T)	-2.51	2.19	2.30**
GDP growth	3.31	2.46	0.28***
G7 GDP growth	2.86	2.99	0.16
GDP growth in deviation from G7 growth	0.45	-0.53	0.27***
Avg. growth in dev. G7 (T0-Tn) - avg growth in dev. G7 (T0-2-T0-1)	1.42	-1.39	0.32***
Average duration	2.94	2.57	0.27
Number of episodes	28	24	

Note: Changes are in percentage points of GDP unless indicated. Average duration is in terms of years. See also Table 1 for the exact definitions of the variables. * 1% significance level. ** 5% significance level. ***10% significance level.

[†] An expansionary fiscal adjustment is one in which the average growth in difference for the G7 average growth during the adjustment was higher than the average growth in the two year before the adjustment relative to the G7 average growth.

Table 5a: The composition of fiscal adjustments
Definition 3‡

	Success	Unsuccess	St. err. of difference	Expansionary	Contractionary	St. err. of difference
Δ Total deficit	-6.27	-3.91	0.80***	-5.43	-4.16	0.86
Δ Primary deficit	-5.82	-4.59	0.83	-5.34	-4.8	0.86
Δ Primary expenditures	-4.18	-2.53	0.91*	-3.98	-2.05	0.92**
Δ Current primary spending	-2.48	-1.31	0.73	-2.62	-0.38	0.68***
Δ Gov. consumption	-1.35	-0.61	0.37**	-1.32	-0.25	0.36***
Δ Government wage expenditures	-1.1	-0.59	0.27*	-1.12	-0.28	0.26***
Δ Government non wage expenditures	-0.24	-0.05	0.2	-0.24	0.03	0.2
Δ Transfers	-0.74	-0.55	0.4	-0.97	0.04	0.39**
Δ Subsidies	-0.39	-0.15	0.14*	-0.33	-0.17	0.14
Δ Government investment	-1.7	-1.21	0.5	-1.36	-1.67	0.5
Δ Total revenue	1.64	2.06	0.6	1.36	2.75	0.58**
Composition - spending	71.81	44.96	14.4*	71.14	33.98	14.18**
Composition - current spending	45.36	20.75	14.8*	48.7	1.29	14.00***
Composition - capital spending	26.45	24.2	5.9	22.43	32.69	5.79*
Composition - taxes	28.19	55.04	14.4*	28.86	66.02	14.18**
Public employment growth	1.64	3.08	1.62	1.51	6.37	1.84**

Note: The table reports the cumulative change in variables of interest over the episode of fiscal adjustment. Changes are in percentage points of GDP unless indicated. Composition – spending, Composition – current spending, Composition – capital spending and Composition –taxes are changes in the respective variables in percentage points of the change of Primary Deficit. Public employment growth is in percentage points. See also Table 1 for the exact definitions of the variables. * 1% significance level. ** 5% significance level. ***10% significance level.

‡ A period of fiscal adjustment is expansionary if real GDP growth during the adjustment period is higher than the average growth the country experienced in the two years before.

Table 5b: The composition of fiscal adjustments
Definition 4[§]

	Expansionary	Contractionary	St. err. of difference
Δ Total deficit	-5.62	-4.31	0.81
Δ Primary deficit	-5.49	-4.78	0.8
Δ Primary expenditures	-3.89	-2.72	0.88
Δ Current primary spending	-2.39	-1.29	0.69
Δ Gov. Consumption	-1.26	-0.63	0.36*
Δ Government wage expenditures	-1.18	-0.46	0.25***
Δ Government non wage expenditures	-0.13	-0.17	0.19
Δ Transfers	-0.77	-0.49	0.39
Δ Subsidies	-0.37	-0.17	0.13
Δ Government investment	-1.49	-1.42	0.47
Δ Total revenue	1.6	2.07	0.57
Composition – spending	66.56	50.16	14.04
Composition - current spending	42.33	22.56	14.3
Composition - capital spending	24.24	27.59	5.6
Composition – taxes	33.44	49.84	14.04
Public employment growth	1.84	4.8	1.83

Note: The table reports the cumulative change in variables of interest over the episode of fiscal adjustment. Changes are in percentage points of GDP unless indicated. Composition – spending, Composition – current spending, Composition – capital spending and Composition –taxes are changes in the respective variables in percentage points of the change of Primary Deficit. Public employment growth is in percentage points. See also Table 1 for the exact definitions of the variables. * 1% significance level. ** 5% significance level. ***10% significance level.

[§] An expansionary fiscal adjustment is one in which the average growth in difference for the G7 average growth during the adjustment was higher than the average growth in the two year before the adjustment relative to the G7 average growth.

Table 6: Initial conditions

	Success	Unsuccess	St. err. of difference	Expansionary	Contractionary	St. err. of difference
Growth	2.4	1.5	0.65	1.5	2.8	0.67**
Growth G7	0.1	-0.7	0.6	-0.6	0.5	0.64*
Inflation	4.2	6.4	1.29*	4.2	9.5	1.42***
Unemployment rate	8.2	6.9	1.3	8.6	5.1	1.21***
Total deficit/GDP	-5.5	-4.7	1.4	-5.6	-4.6	1.42
Primary deficit/GDP	-2.0	-2.4	1.0	-2.5	-2.1	1.03
Debt/GDP	69.9	63.2	7.5	69.1	60.3	8.07

Note: The table reports the variables of interest the year before the beginning of the episode of fiscal adjustment. Variables are in percentage points of GDP unless indicated. Inflation and Unemployment rate are in percentage points. See also Table 1 for the exact definitions of the variables. * 1% significance level. ** 5% significance level. ***10% significance level.

Table 7a: Fiscal adjustment and regulation of goods markets: levels

	Success	Unsuccess	St. err. of difference	Expansionary	Contractionary	St. err. of difference
Initial level						
Product market regulation	4.0	4.4	0.40	4.0	5.2	0.39***
Product market regulation excluding public ownership	3.9	4.3	0.46	3.8	5.2	0.45***
Barriers to entry	3.9	4.4	0.48	3.8	5.3	0.47***
Public ownership	4.3	4.6	0.32	4.4	4.9	0.3
Employment protection	2.3	2.6	0.37	2.3	2.9	0.44
Employment protection regular contracts	2.3	2.6	0.33	2.4	2.5	0.4
Employment protection temporary contracts	2.3	2.6	0.54	2.2	3.3	0.63*
Union density	48.6	42.6	5.98	45.7	47.9	6.15

Note: The table reports the variables of interest the year before the beginning of the episode of fiscal adjustment. Variables are in levels. See also Table 1 for the exact definitions of the variables. * 1% significance level. ** 5% significance level. ***10% significance level.

Table 7b: Fiscal adjustments and regulation of goods markets: changes

	Success	Unsuccess	St. err. of difference	Expansionary	Contractionary	St. err. of difference
Cumulative change						
Product market regulation	-16.69	-7.98	4.8*	-14.44	-4.92	5.13*
Product market regulation excluding public ownership	-20.56	-10.2	6.14*	-18.48	-4.7	6.47**
Barriers to entry	-23.62	-15.6	8.04	-21.44	-11.6	8.49
Public ownership	-13.93	-5.6	5.15*	-10.36	-6.98	5.42
Employment protection	-6.36	-1.8	3.79	-4.51	-4.15	4.69
Employment protection regular contracts	-1.14	1.25	2.59	-0.16	0	3.12
Employment protection temporary contracts	-10.55	-4.8	6.18	-8.35	-7.3	7.6
Union density	-7.43	-3.19	2.69	-5.96	-2.95	2.86

Note: The table reports the cumulative change in variables of interest over the episode of fiscal adjustment. Changes are in percentage points. See also Table 1 for the exact definitions of the variables. * 1% significance level. ** 5% significance level. ***10% significance level.

Table 8: Fiscal adjustments and monetary conditions

	Success	Unsuccess	St. err. of difference	Expansionary	Contractionary	St. err. of difference
Cumulative change						
Inflation	-1.07	-1.19	0.82	-0.72	-1.56	0.96
Nom. short-term interest rate	-2.53	-0.49	0.94**	-1.62	-0.65	1.17
Nom. long-term interest rate	-2.42	-0.38	0.67***	-1.55	-0.07	0.87*
"Real" short-term interest rate	-1.97	-0.76	1.23	-1.61	-0.65	1.35
"Real" long-term interest rate	-2.08	-0.37	1.01*	-1.42	0.41	1.16
Loans - % growth rate	39.8	28.5	9.24	34.4	34.9	11.7
Deposits - % growth rate	32.7	28.9	7.99	31.95	27.8	9.9

Note: The table reports the cumulative change in variables of interest over the episode of fiscal adjustment. Changes are in percentage points. See also Table 1 for the exact definitions of the variables. Data for loans and deposits are available for a sub-sample of episodes.* 1% significance level. ** 5% significance level. ***10% significance level.

Table 9: Fiscal adjustments and confidence

	Success	Unsuccess	St. err. of difference	Expansionary	Contractionary	St. err. of difference
Consumer confidence	-2.69	-12.48	2.50***	-5.48	-15.69	3.82***
Economic sentiment index	103.64	100.44	1.57**	102.51	99.69	2.33
Consumer confidence - cum % change	670	-11.2	707	483	-7.85	989
Economic sentiment index - cum % change	13.8	5.05	6.3	13.4	-12.91	7.32***

Note: The table reports the levels and the cumulative change in variables of interest over the episode of fiscal adjustment. Data are available for a sub-sample of episodes (i.e. European countries starting in 1985). Changes are in percentage points when indicated. See also Table 1 for the exact definitions of the variables. * 1% significance level. ** 5% significance level. ***10% significance level.

Table 10: Macro variables during fiscal adjustments

	Success	Unsuccess	St. err. of difference	Expansionary	Contractionary	St. err. of difference
Cumulative change						
GDP dev. from G7 - % growth rate	2.36	-1.82	1.16***	0.73	-1.1	1.33
GDP - % growth rate	14.02	7.08	1.94***	11.61	7.91	2.18*
Private consumption - % growth rate	12.35	6.2	2.06***	10.11	7.22	2.27
Investment private sect. - % growth rate	25.06	13.17	6.42*	26.17	6.77	6.00***
Investment business sect. - % growth rate	29.72	14.22	7.53**	29.74	9.25	7.31***
Total investment (incl. housing)- % growth rate	19.75	6.98	4.47***	18.49	1.57	4.49***
Exports - % growth rate	30.67	19.76	4.69**	27.62	19.69	4.89
Imports - % growth rate	-4.66	-38.91	32.6	-21.04	-43.06	34.03
Unemployment rate- ppt change	-0.84	0.51	0.65**	-0.61	1.09	0.66**

Note: The table reports the cumulative change in variables of interest over the episode of fiscal adjustment. Changes are in percentage points. See also Table 1 for the exact definitions of the variables. * 1% significance level. ** 5% significance level. ***10% significance level.

Table 11: Fiscal adjustments and competitiveness

	Success	Unsuccess	St. err. of difference	Expansionary	Contractionary	St. err. of difference
Cumulative change						
Unit labour costs - % growth rate	10.06	13.07	3.12	9.41	18.78	3.23***
Relative unit labor costs in manuf. - % growth rate	-1	0.35	3.64	-2.64	3.8	3.58*
Relative consumer price index- % growth rate	-1.2	-0.21	2.55	-1.85	1.58	2.54
Export performance - % growth rate	4.25	5.3	2.93	2.85	6.14	3.09
Labor productivity - % growth rate	9.33	5.22	1.43***	7.55	6.3	1.62

Note: The table reports the cumulative change in variables of interest over the episode of fiscal adjustment. Changes are in percentage points. See also Table 1 for the exact definitions of the variables. * 1% significance level. ** 5% significance level. ***10% significance level.

Table 12: Fiscal adjustments and exchange rates

	Success	Unsuccess	St. err. of difference	Expansionary	Contractionary	St. err. of difference
Nom. Eff. Exch Rate (%) at t-1	1.41	-1.08	1.76	-0.05	0.41	1.82
Nom. Eff. Exch Rate (%) during the 1st year of the adjustment	-1.91	-1.55	1.56	-1.92	-2	1.63
Cum Eff. Exch Rate (%)	3.52	1.04	3.98	0.96	1.43	4.51

Note: The table reports the variables of interest the year before the beginning of the episode (t-1) of fiscal adjustment, the first year of the fiscal adjustment and the cumulative change in variables of interest over the episode of fiscal adjustment. Changes are in percentage points. * 1% significance level. ** 5% significance level. ***10% significance level.

Table 13a: Episodes of fiscal adjustments Weo (Oct. 2010. ch.3)

Episodes of fiscal adjustments Weo (Oct. 2010. ch.3)										
Australia	1980	1985	1986	1987	1994	1995	1996	1997	1998	1999
Belgium	1982	1983	1984	1987	1990	1992	1993	1994	1995	1996
	1997	1998								
Canada	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Denmark	1983	1984	1985	1986	1995					
Finland	1984	1988	1992	1993	1994	1996	1997	1998	1999	2000
	2006	2007								
France	1984	1986	1987	1988	1989	1991	1995	1996	1997	1998
	2000	2006	2007							
Germany	1982	1983	1984	1985	1986	1987	1988	1989	1992	1993
	1994	1995	1996	1997	1998	1999	2000	2003	2004	2005
	2006	2007								
Ireland	1982	1983	1984	1985	1986	1987	1988	2009		
Italy	1992	1993	1994	1995	1996	1997	1998	2004	2005	2006
	2007									
Japan	1981	1982	1983	1986	1997	2003	2004	2005	2006	2007
Portugal	1983	2000	2002	2003	2005	2006	2007			
Spain	1983	1984	1985	1986	1987	1988	1989	1992	1993	1994
	1995	1996	1997	1998						
Sweden	1983	1984	1986	1992	1993	1994	1995	1996	1997	1998
	2007									
United Kingdom	1981	1982	1994	1995	1996	1997	1998	1999		
United States	1980	1981	1985	1986	1988	1990	1991	1993	1994	2000

Table 13b: Episodes of fiscal adjustments Devries et al. (IMF WP 11/128)

Episodes of fiscal adjustments Devries et al. (IMF WP 11/128)										
Australia	1985	1986	1987	1988	1994	1995	1996	1997	1998	1999
Austria	1980	1981	1984	1996	1997	2001	2002			
Belgium	1982	1983	1984	1985	1987	1990	1992	1993	1994	1996
	1997									
Canada	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
	1994	1995	1996	1997						
Denmark	1983	1984	1985	1986	1995					
Finland	1992	1993	1994	1995	1996	1997				
France	1979	1987	1989	1991	1992	1995	1996	1997	1999	2000
Germany	1982	1983	1984	1991	1992	1993	1994	1995	1997	1998
	1999	2000	2003	2004	2006	2007				
Ireland	1982	1983	1984	1985	1986	1987	1988	2009		
Italy	1991	1992	1993	1994	1995	1996	1997	1998	2004	2005
	2006	2007								
Japan	1979	1980	1981	1982	1983	1997	1998	2003	2004	2005
	2006	2007								
Netherlands	1981	1982	1983	1984	1985	1986	1987	1988	1991	1992
	1993	2004	2005							
Portugal	1983	2000	2002	2003	2005	2006	2007			
Spain	1983	1984	1989	1990	1992	1993	1994	1995	1996	1997
Sweden	1984	1993	1994	1995	1996	1997	1998			
United Kingdom	1979	1980	1981	1982	1994	1995	1996	1997	1998	1999
United States	1978	1980	1981	1985	1986	1988	1990	1991	1992	1993
	1994	1995	1996	1997	1998					

Table 14 a: The composition of fiscal adjustments using Devries et al. (2011) data Definition 3[**]

	Success	Unsuccess	St. err. of difference	Expansionary	Contractionary	St. err. of difference
Δ Total deficit	-3.54	-1.64	.88**	-3.16	-1.51	.97*
Δ Primary deficit	-3.82	-2.01	1.02*	-3.51	-1.84	1.07
Δ Primary expenditures	-2.69	-0.68	.93*0*	-2.31	-0.7	.95*
Δ Current primary spending	-1.6	-0.21	.6*	-1.4	-0.13	.63**
Δ Gov. consumption	-1.05	-0.05	.32***	-0.84	-0.14	.34**
Δ Government wage expenditures	-0.95	-0.44	.32*	-0.9	-0.37	.32*
Δ Government non wage expenditures	-0.11	0.39	.20**	0.06	0.23	.21
Δ Transfers	-0.2	-0.10	.44	-0.23	0.08	.45
Δ Subsidies	-0.35	-0.06	.14**	-0.34	-0.06	.13**
Δ Government investment	-1.1	-0.46	.49	-0.91	-0.57	.47
Δ Total revenue	1.13	1.33	.56	1.2	1.15	.55
Public employment growth	0.6	1.25	1.64	-0.65	3.56	1.91**
Size-IMF	4.76	2.67	1.21*	3.27	3.87	0.50
Spending-IMF	2.93	1.67	0.92	2.15	2.31	0.90
Tax revenue-IMF	1.83	1.00	0.49*	1.11	1.56	0.48
Δ Pr. Expendit./ Δ Pr. deficit	70.4	44.8		65.8	38.1	
Spending-IMF/ Size-IMF	61.5	62		65.7	59.6	

Note: The table reports the cumulative change in variables of interest over the episode of fiscal adjustment. Changes are in percentage points of GDP unless indicated. Composition – spending, Composition – current spending, Composition – capital spending and Composition –taxes are in percentage points of the change of Primary Deficit. Public employment growth is in percentage points. See also Table 1 for the exact definitions of the variables. * 1% significance level. ** 5% significance level. ***10% significance level.

[**] A period of fiscal adjustment is expansionary if real GDP growth during the adjustment period is higher than the average growth the country experienced in the two years before.

Table 14 b: The composition of fiscal adjustments using Devries et al. (2011) data Definition 4[††]

	Expansionary	Contractionary	St. err. of difference
Δ Total deficit	-3.00	-1.59	.98
Δ Primary deficit	-3.45	-1.83	1.07
Δ Primary expenditures	-1.80	-1.11	.98
Δ Current primary spending	-0.93	-0.52	.66
Δ Gov. consumption	-0.64	-0.30	.35
Δ Government wage expenditures	-0.75	-0.47	.32
Δ Government non wage expenditures	0.11	0.19	.21
Δ Transfers	0.03	-0.16	.45
Δ Subsidies	-0.33	-0.05	.13 **
Δ Government investment	-0.87	-0.59	.47
Δ Total revenue	1.64	0.72	.53 *
Public employment growth	-0.51	3.91	1.89 **
Size-IMF	3.16	4.01	1.19
Spending-IMF	2.08	2.39	0.89
Tax revenue-IMF	1.08	1.61	0.48
Δ Pr. Expendit./ Δ Pr. deficit	52.0	60.0	
Spending-IMF/ Size-IMF	65.8	59.6	

Note: The table reports the cumulative change in variables of interest over the episode of fiscal adjustment. Changes are in percentage points of GDP unless indicated. Composition – spending, Composition – current spending, Composition – capital spending and Composition –taxes are in percentage points of the change of Primary Deficit. Public employment growth is in percentage points. See also Table 1 for the exact definitions of the variables. * 1% significance level. ** 5% significance level. ***10% significance level.

[††] An expansionary fiscal adjustment is one in which the average growth in difference for the G7 average growth during the adjustment was higher than the average growth in the two year before the adjustment relative to the G7 average growth.

Table 15: Initial conditions using Devries et al. (2011) data

	Success	Unsuccess	St. err. of difference	Expansionary	Contractionary	St. err. of difference
Growth	2.28	2.44	0.69	1.79	2.8	0.70
Growth G7	-0.09	-0.25	0.54	-0.62	0.28	0.52*
Inflation	4.92	3.49	1.22	2.84	6.11	1.39**
Unemployment rate	7.66	6.58	0.87	8.19	6.07	0.77***
Total deficit/GDP	-5.41	-5.18	0.99	-5.07	-5.60	0.94
Primary deficit/GDP	-1.78	-1.99	0.89	-2.45	-1.59	0.86
Debt/GDP	68.33	69.48	9.7	66.00	70.50	9.56

Note: The table reports the variables of interest the year before the beginning of the episode of fiscal adjustment. Variables are in percentage points of GDP unless indicated. Inflation and Unemployment rate are in percentage points. See also Table 1 for the exact definitions of the variables. * 1% significance level. ** 5% significance level. ***10% significance level.

Table 16: Fiscal adjustment and regulation of goods markets using Devries et al. (2011) data: levels

	Success	Unsuccess	St. err. of difference	Expansionary	Contractionary	St. err. of difference
Initial level						
Product market regulation	4.14	3.9	.43	3.68	4.46	.41*
Product market regulation excluding public ownership	4.12	3.96	.45	3.65	4.53	.43**
Barriers to entry	4.19	3.85	.47	3.60	4.56	.44**
Public ownership	4.17	3.74	.44	3.70	4.2	.43
Employment protection	2.3	2.42	.39	2.18	2.54	.39
Employment protection regular contracts	2.11	2.41	.39	2.18	2.27	.40
Employment protection temporary contracts	2.68	2.43	.58	2.17	2.8	.59
Union density	41.74	31.70	5.9	37.23	36.49	5.9

Note: The table reports the variables of interest the year before the beginning of the episode of fiscal adjustment. Variables are in levels. See also Table 1 for the exact definitions of the variables. * 1% significance level. ** 5% significance level. ***10% significance level.

Table 17: Fiscal adjustments and regulation of goods markets using Devries et al. (2011) data: changes

	Success	Unsuccess	St. err. of difference	Expansionary	Contractionary	St. err. of difference
Cumulative change						
Product market regulation	-21.29	-6.74	5.13**	-17.64	-8.48	5.28*
Product market regulation excluding public ownership	-27.95	-8.72	7.04**	-24.43	-9.62	7.06**
Barriers to entry	-33.04	-14.23	8.99**	-32.04	-11.56	8.80**
Public ownership	-11.69	-4.20	4.44*	-9.75	-4.76	4.43
Employment protection	-9.58	-1.81	5.30	-4.81	-7.28	5.80
Employment protection regular contracts	0.4	1.13	4.61	2.5	-2.04	4.77
Employment protection temporary contracts	-15.6	-4.73	7.35	-10.59	-9.86	8.07
Union density	-5.99	-5.16	2.88	-6.58	-4.64	2.80

Note: The table reports the cumulative change in variables of interest over the episode of fiscal adjustment. Changes are in percentage points. See also Table 1 for the exact definitions of the variables. * 1% significance level. ** 5% significance level. ***10% significance level.

Table 18: Fiscal adjustments and monetary conditions using Devries et al. (2011) data

	Success	Unsuccess	St. err. of difference	Expansionary	Contractionary	St. err. of difference
Cumulative change						
Inflation	-2.03	-0.35	1.02	-0.22	-1.82	1.1
Nom. short-term interest rate	-2.77	0.35	1.04***	-0.86	-0.86	1.1
Nom. long-term interest rate	-2.57	-0.06	.70***	-1.04	-1.14	.79
"Real" short-term interest rate	-1.61	1.17	.84***	-0.26	0.17	.96
"Real" long-term interest rate	-0.73	0.76	.9*	-0.45	0.46	.84
Loans - % growth rate	17.77	18.0	7.98	11.32	19.63	7.67
Deposits - % growth rate	17.02	21.76	7.56	14.7	20.84	7.55

Note: The table reports the cumulative change in variables of interest over the episode of fiscal adjustment. Changes are in percentage points. See also Table 1 for the exact definitions of the variables. * 1% significance level. ** 5% significance level. ***10% significance level.

Table 19: Fiscal adjustments and confidence using Devries et al. (2011) data

	Success	Unsuccess	St. err. of difference	Expansionary	Contractionary	St. err. of difference
Consumer confidence	-9.33	-12.55	2.69	-7.72	- 12.61	2.82*
Economic sentiment index	98.66	99.92	1.80	101.39	96.51	1.80***
Consumer confidence - cum % change	-50.75	-12.85	85.8	59.54	-82.41	62.18**
Economic sentiment index - cum % change	7.63	3.96	5.10	9.32	2.43	5.09

Note: The table reports the levels and the cumulative change in variables of interest over the episode of fiscal adjustment. Changes are in percentage points when indicated. See also Table 1 for the exact definitions of the variables. * 1% significance level. ** 5% significance level. ***10% significance level.

Table 20: Macro variables during fiscal adjustments using Devries et al. (2011) data

	Success	Unsuccess	St. err. of difference	Expansionary	Contractionary	St. err. of difference
Cumulative change						
GDP dev. from G7 - % growth rate	-0.36	-1.99	1.19	-0.52	-1.90	1.14
GDP - % growth rate	11.80	5.09	2.44***	9.84	6.04	2.57
Private consumption - % growth rate	9.91	3.98	2.47**	7.91	5.04	2.55
Investment private sect. - % growth rate	14.76	6.61	5.17	17.16	2.65	5.26***
Investment business sect. - % growth rate	19.55	10.51	6.93	23.37	5.48	6.69**
Total investment (incl. housing)- % growth rate	11.81	3.33	4.26**	12.46	0.94	4.26**
Exports - % growth rate	35.33	16.71	6.78***	28.96	20.42	6.90
Imports - % growth rate	-37.21	14.12	26.92*	-3.68	-18.39	26.17
Unemployment rate- ppt change	0.79	0.48	.81	-0.41	1.48	.71**

Note: The table reports the cumulative change in variables of interest over the episode of fiscal adjustment. Changes are in percentage points. See also Table 1 for the exact definitions of the variables. * 1% significance level. ** 5% significance level. ***10% significance level.

Table 21: Fiscal adjustments and competitiveness using Devries et al. (2011) data

	Success	Unsuccess	St. err. of difference	Expansionary	Contractionary	St. err. of difference
Cumulative change						
Unit labour costs - % growth rate	11.86	7.89	4.18	5.72	13.99	3.83**
Relative unit labor costs in manuf. - % growth rate	-3.06	-1.88	4.9	-6.57	-1.31	4.65
Relative consumer price index- % growth rate	-3.06	-1.44	3.45	-5.44	-0.68	3.24
Export performance - % growth rate	6.48	2.18	3.35	2.70	6.80	3.24
Labor productivity - % growth rate	8.89	3.72	1.69***	6.69	4.66	1.83

Note: The table reports the cumulative change in variables of interest over the episode of fiscal adjustment. Changes are in percentage points. See also Table 1 for the exact definitions of the variables. *1% significance level. **5% significance level. ***10% significance level.

Table 22: Effects of Fiscal Shocks on Real GDP, baseline specification

	Fiscal Adjustments - Definition 1			Fiscal Adjustments – IMF (2011)		
Dependent variable: Real GDP growth	ΔCAPB<0	ΔG<0	ΔT>0	ΔCAPB<0	ΔG<0	ΔT>0
T	0.07	0.15*	-0.12	-0.33**	-0.096	-0.64**
	(0.86)	(1.71)	(-1.00)	(-3.15)	(-0.56)	(-3.49)
T+1	0.19*	0.37**	-0.24	-0.63**	-0.177	-1.35**
	(1.64)	(2.74)	(-1.19)	(-3.89)	(-0.69)	(-4.11)
T+2	0.23	0.46**	-0.34	-0.51**	0.069	-1.6**
	(1.48)	(2.57)	(-1.28)	(-2.73)	(0.24)	(-3.69)
	682	682	682	482	482	482

Note: the Table shows the cumulative estimated response of a shock of 1 percentage point to a fiscal variable at t, t+1, t+2 on the level of real GDP. Estimated regressions include country and time fixed effects. Standard errors are computed via the delta method. T-statistics in parenthesis. **5% significance level. *10% significance level See also the text of the paper for a more extensive explanation and the appendix for variables' definitions and sources.

Table 23: Effects of Fiscal Shocks on Real GDP, augmented specification

	Fiscal Adjustments - Definition 1			Fiscal Adjustments – IMF (2011)		
Dependent variable: Real GDP growth	ΔCAPB<0	ΔG<0	ΔT>0	ΔCAPB<0	ΔG<0	ΔT>0
T	0.06	0.15*	-0.17	-0.36**	-0.08	-0.72**
	(0.79)	(1.74)	(-1.43)	(-3.51)	(-0.49)	(-4.08)
T+1	0.18	0.32**	-0.33*	-0.68**	-0.19	-1.51**
	(1.49)	(2.44)	(-1.70)	(-4.25)	(-0.77)	(-4.82)
T+2	0.19	0.38**	-0.41	-0.55**	0.01	-1.81**
	(1.28)	(2.23)	(-1.60)	(-2.96)	`(0.06)	(-4.35)
	682	682	682	482	482	482

Note: the Table shows the cumulative estimated response of a shock of 1 percentage point to a fiscal variable at t, t+1, t+2 on the level of real GDP. Estimated regressions include country and time fixed effects. Standard errors are computed via the delta method. T-statistics in parenthesis. **5% significance level. *10% significance level See also the text of the paper for a more extensive explanation and the appendix for variables' definitions and sources.

Table 24: Effects of Primary Spending Components on Real GDP

	Fiscal Adjustments - Definition 1 baseline specifications		Fiscal Adjustments - Definition 1 Augmented specifications	
Dependent variable: Real GDP growth	Δ Primary current spending<0	Δ Government investment<0	Δ Primary current spending<0	Δ Government investment<0
T	0.29**	-0.06	0.3**	-0.09
	(2.38)	(-0.42)	(2.55)	(-0.68)
T+1	0.63**	-0.08	0.53**	-0.17
	(3.52)	(-0.32)	(3.09)	(-0.67)
T+2	0.73**	-0.07	0.62**	-0.19
	(3.07)	(-0.22)	(2.74)	(-0.55)
	682	682	682	682

Note: the Table shows the cumulative estimated response of a shock of 1 percentage point to a fiscal variable at t, t+1, t+2 on the level of real GDP. Estimated regressions include country and time fixed effects. Standard errors are computed via the delta method. T-statistics in parenthesis. **5% significance level. *10% significance level See also the text of the paper for a more extensive explanation and the appendix for variables' definitions and sources.

Table 25: Effects of Fiscal Shocks on Short-Term Interest Rates

	Baseline specification				Augmented specification			
Dependent variable: Short-term interest rates	Fiscal Adjustments - Definition 1		Fiscal Adjustments – IMF (2011)		Fiscal Adjustments - Definition 1		Fiscal Adjustments – IMF (2011)	
	ΔG<0	ΔT>0	ΔG<0	ΔT>0	ΔG<0	ΔT>0	ΔG<0	ΔT>0
T	-0.1	0.15	-0.18	0.53**	-0.11	0.15	-0.26	0.55**
	(-1.23)	(1.31)	(-1.11)	(2.71)	(-1.43)	(1.25)	(-1.58)	(2.88)
T+1	-0.11	0.29	-0.51*	0.8*	-0.11	0.31	-0.58**	0.88**
	(-0.72)	(1.22)	(-1.74)	(1.88)	(-0.74)	(1.30)	(-2.0)	(2.14)
T+2	-0.13	0.37	-0.86**	0.81	-0.14	0.39	-0.9**	0.95
	(-0.60)	(1.04)	(-2.29)	(1.27)	(-0.63)	(1.13)	(-2.44)	(1.53)

Note: the Table shows the cumulative estimated response of a shock of 1 percentage point to a fiscal variable at t, t+1, t+2 on short-term interest rates. Estimated regressions include country and time fixed effects. Standard errors are computed via the delta method. T-statistics in parenthesis. **5% significance level. *10% significance level See also the text of the paper for a more extensive explanation and the appendix for variables' definitions and sources.

Table 26: Effects of Fiscal Shocks on Real GDP, controlling for monetary policy

	Baseline specification				Augmented specification			
Dependent variable: Real GDP growth	Fiscal Adjustments - Definition 1		Fiscal Adjustments – IMF (2011)		Fiscal Adjustments - Definition 1		Fiscal Adjustments – IMF (2011)	
	ΔG<0	ΔT>0	ΔG<0	ΔT>0	ΔG<0	ΔT>0	ΔG<0	ΔT>0
T	0.14*	-0.04	-0.06	-0.47**	0.15*	-0.05	-0.04	-0.55**
	(1.69)	(-0.30)	(-0.34)	(-2.41)	(1.79)	(-0.44)	(-0.25)	(-2.93)
T+1	0.27**	-0.07	-0.21	-0.92**	0.24*	-0.17	-0.23	-1.1**
	(2.00)	(-0.31)	(-0.85)	(-2.51)	(1.86)	(-0.84)	(-0.93)	(-3.16)
T+2	0.4**	-0.16	-0.09	-1.1**	0.37**	-0.29	-0.11	-1.34**
	(2.22)	(-0.53)	(-0.30)	(-2.18)	(2.13)	(-1.08)	(-0.40)	(-2.82)

Note: the Table shows the cumulative estimated response of a shock of 1 percentage point to a fiscal variable at t, t+1, t+2 on the level of real GDP. Estimated regressions include country and time fixed effects. Standard errors are computed via the delta method. T-statistics in parenthesis. **5% significance level. *10% significance level See also the text of the paper for a more extensive explanation and the appendix for variables' definitions and sources.

Table 27: Effects of Fiscal Shocks on Unit Labour Costs

	Baseline specification				Augmented specification			
Dependent variable % Δ ULC	Fiscal Adjustments - Definition 1		Fiscal Adjustments – IMF (2011)		Fiscal Adjustments - Definition 1		Fiscal Adjustments – IMF (2011)	
	ΔG<0	ΔT>0	ΔG<0	ΔT>0	ΔG<0	ΔT>0	ΔG<0	ΔT>0
T	-0.27**	0.39**	-0.64**	0.33	-0.33**	0.4**	-0.64**	0.35
	(-2.02)	(2.04)	(-2.59)	(1.20)	(-2.50)	(2.22)	(-2.76)	(1.37)
T+1	-0.43**	0.57*	-1.07**	0.57	-0.48**	0.56*	-0.99**	0.59
	(-1.92)	(1.68)	(-2.79)	(1.12)	(-2.23)	(1.77)	(-2.74)	(1.23)
T+2	-0.37	0.75	-1.47**	0.52	-0.47	0.68	-1.28**	0.45
	(-1.22)	(1.63)	(-3.35)	(0.76)	(-1.61)	(1.55)	(-3.10)	(0.70)

Note: the Table shows the cumulative estimated response of a shock of 1 percentage point to a fiscal variable at t, t+1, t+2 on Unit Labour Costs. Estimated regressions include country and time fixed effects. Standard errors are computed via the delta method. T-statistics in parenthesis. **5% significance level. *10% significance level See also the text of the paper for a more extensive explanation and the appendix for variables' definitions and sources.

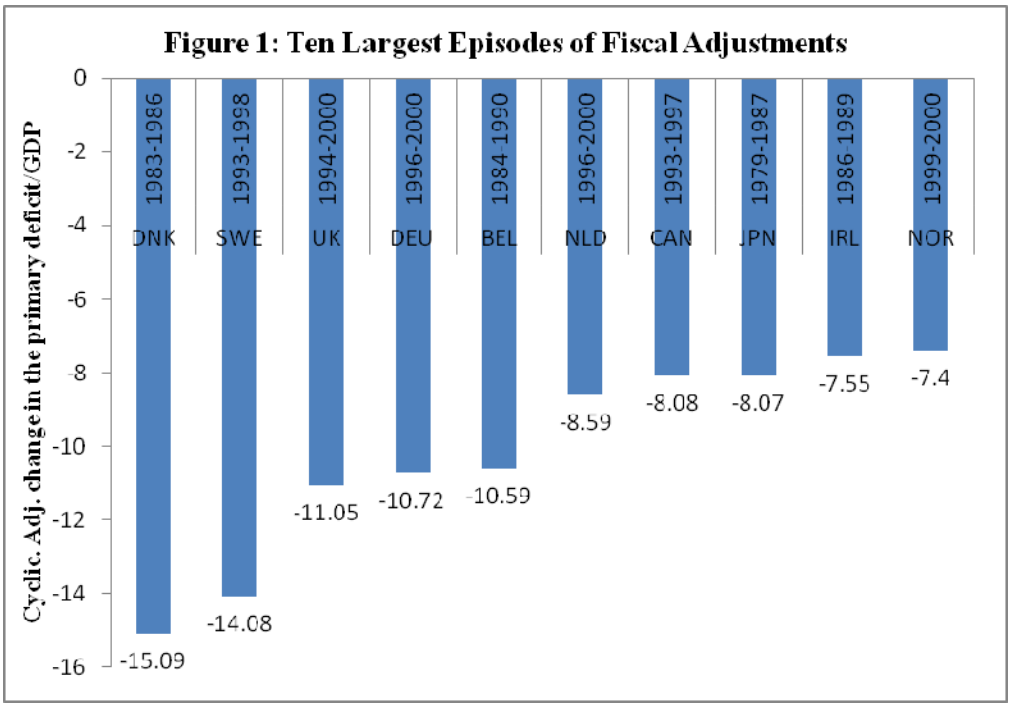
Figure 1: Ten Largest Episodes of Fiscal Adjustments
Cyclic. Adj. change in the primary deficit/GDP
0
-2
-4
-6
-8
-10
-12
-14
-16
1983-1986
1993-1998
1994-2000
1996-2000
1984-1990
1996-2000
1993-1997
1979-1987
1986-1989
1999-2000
DNK
SWE
UK
DEU
BEL
NLD
CAN
JPN
IRL
NOR
-15.09
-14.08
-11.05
-10.72
-10.59
-8.59
-8.08
-8.07
-7.55
-7.4

Figure 2: Exchange rate and government debt

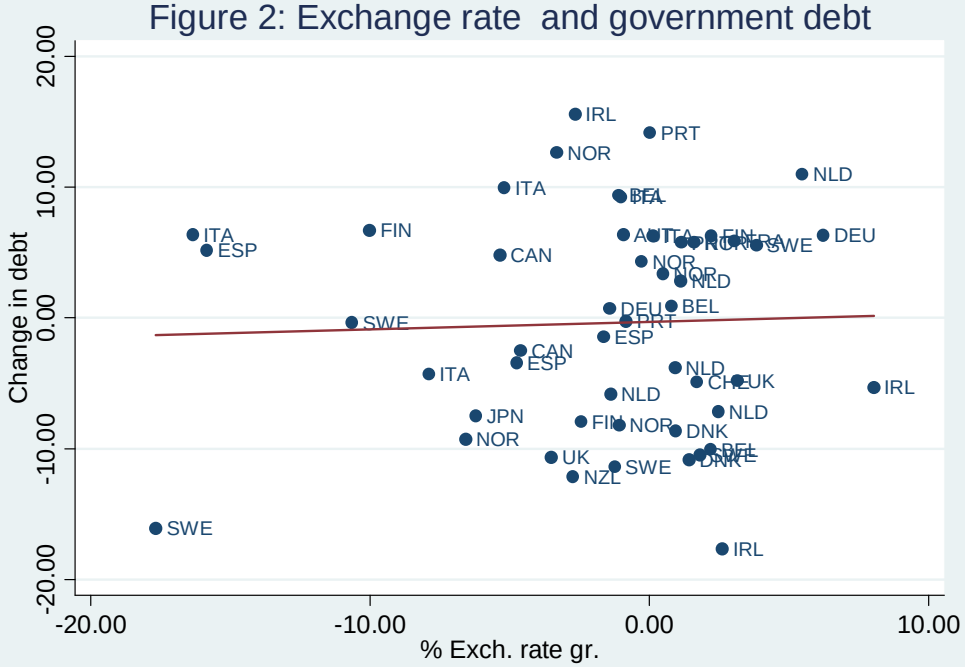

Figure 3: Cum. Exchange rate change and government debt