

Fiscal Consolidation in Hard Times*

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Preliminary. Comments welcome.

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Abstract

A fierce debate rages between economists on the effects of fiscal consolidation. We demonstrate that the narrative approach for evaluating the effects of fiscal consolidation is flawed since the selected dummy variable can be predicted from past economic circumstances. Fiscal consolidations can promote growth. However, the success of fiscal consolidations depends critically on the level of private debt. Using a probit model on a sample of OECD countries, we find that deleveraging of private debt is more painful if achieved by fiscal consolidation alone. Cold showers do not work in a financial crisis, but a more gradual approach requires also accompanying financial and monetary policies.

JEL: E63, H30, H63.

Keywords: consolidation, fiscal policy, non-Keynesian effects, event, debt, probit, debt overhang, IMF.

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1 Introduction

A fierce debate rages between economists on the effects of fiscal consolidation. Some are in favour of a cold-shower strategy that plans fast and decisive cuts in spending, accompanied by structural reform. Such a consolidation strategy has often been expansionary. This Non-Keynesian view invokes both positive supply side and wealth effects on the investment outlook and the labour market, as it is seen as a credible commitment to lower taxes. In addition, restoring fiscal sustainability - especially when debt seems not to be under control - alters the long-term economic outlook positively. Empirical evidence demonstrates that such strategies have worked. By contrast, opponents argue that consolidation is growth depressing, and may even become self-defeating. Their argument is based on standard RBC or New-Keynesian models of fiscal policy. Spending cuts have negative effects on output in the short-term due to negative wealth effects. Debt consolidation should therefore be gradual in order to smooth fiscal pain over time.

Both sides of the debate bring empirical evidence in support. The Non-Keynesian view is mostly based on the work of Alesina and Perotti (1995, 1997) and employs event studies around episodes of large fiscal consolidations, to examine the characteristics of those that are successful in promoting growth and reducing debt. These large fiscal consolidations are usually selected by some criterion, like a 3% change in the cyclically adjusted primary balance, or similar criteria. A large literature has extended this type of analysis, and has examined a large set of determinants of expansionary fiscal consolidations. This has been done mainly with probit models that take as the dependent the consolidation event dummy. By contrast, the advice of gradual consolidation is mostly based on the simulation of large macro-models or on VAR studies. A recent paper by IMF researchers (Devries et al., 2011) adopts the event study approach and makes a more refined selection of fiscal consolidations, by excluding large changes due to growth revisions or statistical measures. A narrative approach following Romer and Romer (2010) to test the effects of these 'action based' periods on economic growth shows that consolidation always has contractionary effects.

We compare the probit model and the narrative IMF method to examine fiscal consolidation in OECD countries. Our critique is similar to Leeper's (1994) on the identification problem in monetary VARs with the narrative approach of Romer and Romer (1994). The consolidation dummy is not exogenous: as the large Non-Keynesian literature argues, consolidations are preceded by fiscal or economic reform that have an impact on its growth effects. The narrative method omits an important feedback from macro-economic circumstances to consolidation. Omission of these characteristics biases the findings by Devries et al. (2011) towards finding negative growth effects of consolidation. Once we include this feedback, either in a simple VAR or in a VAR augmented with a conditional logit model, we show that different ways of defining fiscal consolidation all result in expansionary growth effects. Our results therefore corroborate the findings of Non-Keynesian studies.

Fiscal consolidations have been argued to be more likely to succeed when they are based on expenditure cuts (in particular, on the wage component of public spending) rather than tax increases (Alesina and Perotti 1995, 1997; von Hagen et al. 2002; Alesina and Ardagna 1998). Size and persistence of fiscal effort matters too (Giavazzi and Pagano 1990, 1996; Ardagna 2004; Alesina and Ardagna 1998). However, our logit model has a hard time in predicting fiscal consolidation in more recent years. We find that this is due to two factors. The first is that the probit model does not allow for the feedback of past economic growth: we find that consolidation in slack times implies that growth would pick up over time regardless of the fiscal effort. Like the IMF study, we find that this tends to bias the finding towards a too positive effect of fiscal consolidation. Second, consolidation is argued to bring about positive wealth effects through lower taxation and wealth effects. There are also a set of accompanying policies that improve the chances of growing out of debt. Favourable monetary and exchange rate policies (Lambertini and Tavares 2005; Ahrend et al. 2006) and contemporaneous labour and product market reform increases the chances of economic expansions (Hauptmeier et al., 2006; Tagkalakis, 2009) as they improve competitiveness and hence stimulate exports.¹ However, in order for the wealth effect to kick in, the private sector should hold wealth. However, when there is a private debt overhang, fiscal consolidation has a negative multiplier effect. Policies that aim at deleveraging private debt would be more successful than fiscal consolidation per se. The success of fiscal consolidation rather depends on the speed of deleveraging fiscal policy may achieve. This implies other policies like financial sector regulation, deflationary policies (labour and product market, wages and income policies) or unusual monetary policies (creating a class of safe assets or higher inflation) may

¹Political factors (Tavares, 2004; Alesina et al. (2006) or fiscal governance like fiscal rules and budgetary procedures (Guichard et al., 2007, EC, 2007) are usually found to favour a successful adjustment.

be called for to make fiscal consolidation successful. We present evidence on , adding to the typical analysis of the different macroeconomic, policy, political and other factors, some - financial indicators - confidence indicators - IMF programmes - other financial crisis (Sweden, Finland) while still looking at the other factors that have been argued to be decisive and by considering different definitions of fiscal adjustment

Our main finding is that credit conditions matter for the success of fiscal adjustment. Rapid credit growth in the banking sector prior to a fiscal adjustment substantially reduces the chances of success of a consolidation. size and composition of fiscal adjustment

The paper is structured as follows. We review in section 2 the narrative approach to test the effect of fiscal consolidations, and the probit models that have modeled expansionary fiscal consolidations. In section 3, we examine the identification problems of the narrative approach and demonstrate the bias this induces in the findings. We then focus in section 4 on the theoretical considerations on the expansionary or contractionary effects of fiscal consolidation under private debt deleveraging. We then employ several indicators of financial status to examine under what circumstances fiscal consolidations can be expansionary and successful. We corroborate our findings with alternative methodological approaches. In section 5, we present some robustness checks. Section 6 concludes the paper with some policy recommendations.

2 Narrative studies and probit models for testing fiscal consolidation

2.1 The narrative approach

The narrative approach examines the effect of a dummy variable that is argued to capture an exogenous change in policy on the economy. This approach was first proposed by Romer and Romer (1994) in monetary VARs. After a detailed reading of Federal Reserve documents, they select a few time periods in which the Fed's Board was changing interest rates out of a concern about containing inflation. These dummies D_t are then included in an ADL model, to examine the dynamic impulse response effects on some economic variable. The response of this variable to the identified monetary contractions D_t suggest that monetary policy does have real effects on the economy.

In short, a general formulation of the narrative approach has the ADL equation in the economic variable of interest y_t , with $\theta(L)$ and $\lambda(L)$ scalar polynomials in non-negative powers of the lag operator L and an innovation ε_t ,

$$y_t = \theta(L)y_{t-1} + \lambda(L)D_t + \varepsilon_t \quad (1)$$

and the associated dynamic effects of a shock to D_t can be traced by:

$$\lambda(L)/1-\theta(L)L \quad (2)$$

Romer and Romer (2010) use the same approach to examine the effect of exogenous tax changes in the US. Devries et al. (2011) read IMF and OECD historical reports and check what government were intending to do at the time of the publication of these reports. & They find that fiscal consolidations are contractionary.

Romer and Romer (2010) argue that the narrative approach excludes reverse causation by excluding endogenous responses of policy to the economic outlook. However, a reading of policy documents involves many judgment calls.

2.2 Probit model

The Non-Keynesian view invokes positive effects on both the demand and supply side of the economy. Basically, lower taxes in the future creates a positive wealth effect that spurs consumption and investment (Alesina and Ardagna, 1998). The more credible is this commitment to restore fiscal sustainability, the stronger is this wealth effect. Several elements can bolster credibility. Giavazzi et al. (2000) argue that spending cuts should be large to demonstrate a government's resolve.² Political circumstances also play a role, and several papers have shown that governments that are able to go against their own interest groups, have stable majorities or are able to

²Moreover, spending cuts are hard to roll back.

push through reforms (Tagkalakis, 2009) are more successful in consolidating. Bertola and Drazen (1993) also point to the effect of an emergency on implementing consolidation. When debt becomes too high and cannot be rolled over anymore in the near future, households and firms expect a shift towards a low spending/low tax regime. This shift spurs growth. Moreover, if restoring fiscal sustainability is imminent, the risk premium will fall and it will contribute to reduce real interest rates (raising investment). The size of the wealth effect depends to a large extent on the efficiency of financial markets such that lower interest rates lead to a fall in real rates, and the possibility of consumers to access credit (Perotti, 1997).

On the supply side, the labour market channel may have two different behaviours if we consider perfectly competitive labour markets or not. In the first case, wealth and substitution effects on labour supply can be observed and total effect will depend upon whether the change in fiscal policy is expected to be temporary (the substitution effect dominates and labour supply increases) or permanent (the wealth effect dominates and the labour supply decreases). On unionised labour markets, the effect could be different. Whereas at individual level the effect of an increase in labour taxes may have a low or null impact, the actions by unions consist in lobby for high pre-taxes wages to offset the effect of the labour tax increase, raising relative unit costs (Alesina and Ardagna, 1998). The composition of a fiscal adjustment matters for its success. In particular, wage cuts in the public sector are seen to have positive effects, probably because it facilitates the reallocation on labour markets, but also because it is a more credible strategy for a hard nosed government (Alesina and Perotti 1995, 1997; von Hagen et al. 2002; Alesina and Ardagna 1998).

There are also a set of accompanying policies that improve the chances of growing out of debt. Favourable monetary and exchange rate policies (Lambertini and Tavares 2005; Ahrend et al. 2006) and contemporaneous labour and product market reform increases the chances of economic expansions (Hauptmeier et al., 2006; Tagkalakis, 2009) as they improve competitiveness and hence stimulate exports.³ In summary, the probability that a fiscal consolidation exhibits Non-Keynesian effects depends upon the size and composition of the adjustment (Alesina and Perotti, 1997), political and economic circumstances ('emergency'), and a set of accompanying policies.

The Non-Keynesian propositions are typically tested with a probit model, like 3.⁴

$$D_t = \alpha(L)y_{t-1} + \beta(L)Z_t + \nu_t \quad (3)$$

The probability that a (successful) consolidation episode dummy occurs depends on a set of variables Z_t and also past growth. Which of these variables improves the likelihood to have expansionary fiscal consolidations is an empirical question (Alesina and Ardagna (1998); Giudice (2007)). This empirical literature typically finds that a fiscal consolidation targeting spending is more likely to successfully stabilise debt since it cuts deficits permanently and raises growth. The growth impact comes about in the long term, but even on impact, there may be positive growth effects.

2.3 Identification problems

The responses (2) in the ADL model are not fully dynamic responses (Leeper, 1994). The reason is that in (2) the reaction of D_t to the economy are omitted. We can see this from combining (1) with (3) into a VAR model:

$$\begin{cases} y_t = \theta(L)y_{t-1} + \lambda(L)D_t + \varepsilon_t \\ D_t = \alpha(L)y_{t-1} + \delta(L)D_{t-1} + \nu_t \end{cases} \quad (4)$$

Sufficient conditions for the dynamic effects in (2) to be an impulse response are:

- D_t does not respond to y_t ($\alpha(L) = 0$), then the dummy is weakly exogenous in (1) and the ADL model can be estimated by OLS;
- the dummy has no effect on the economy ($\lambda(L) = 0$).

³Political factors (Tavares, 2004; Alesina et al. (2006) or fiscal governance like fiscal rules and budgetary procedures (Guichard et al., 2007, EC, 2007) are usually found to favour a successful adjustment.

⁴The probit model is certainly not the only empirical model that is being employed. Some authors estimate the effect of fiscal adjustments on private consumption with a saving function (Giavazzi et al., 2000; Afonso, 2006), an investment function (Schiantarelli, 2000) or a consumption function (Alesina et al., 2000).

If the consolidation dummies are well identified, then they should be distinguish the response of policy to the economy from the dynamic reaction of the economy to policy changes. I.e., the narrative approach only works if the endogenous policy responses are separated from exogenous policy changes. However, the Non-Keynesian literature has found that macroeconomic circumstances can indeed predict the consolidation dummy, hence $\alpha(L) \neq 0$. This implies, however, that the dummy in (1) is not exogenous.

In order to check if there is a feedback channel from economic circumstances to the dummy, and how this modifies the findings of the narrative approach, we estimate the following VAR model (4). This can be done in two ways. First, we can estimate a simple bivariate VAR including the dummy and economic growth. Second, we may estimate a conditional logit model and substitute this into (1). Leeper (1994) demonstrates for the monetary VAR that the Romer&Romer dummies are predictable from past series, and hence are not exogenous. Taking into account the endogeneity of the monetary dummies alters the findings. Basically, the effects of policy are dampened.

3 Expansionary or contractionary consolidations

3.1 The consolidation dummies

We construct a consolidation dummy using two common ways in the literature to define a fiscal consolidation are (Alesina and Ardagna, 1998).

Definition 1: the primary cyclically adjusted balance improves by at least 3% of GDP over three consecutive years and in each year the change in the primary cyclically adjusted balance cannot be below -0.5% of GDP. The average real GDP growth in each adjustment year and in the two years

A period of fiscal adjustment is a year in which the cyclically adjusted primary balance improves by at least 2% of GDP, or a period of two consecutive years in which the cyclically adjusted primary balance improves by at least 1.5% of GDP per year, in both years. This definition emphasizes the size of adjustment.

Definition 2: The primary cyclically adjusted budget balance improves by at least three percentage points of GDP over three consecutive years and in each year the change in the primary cyclically adjusted budget balance cannot be below -0.5 percentage points of GDP. This definition puts the emphasis on the persistence of the adjustment rather in the size because the horizon has been extended but not the amount of the improvement.

Table 1 report the cases of fiscal consolidations over the pasts four decades for a sample of OECD countries using both definitions.⁵ This results in 57 and 43 episodes of fiscal consolidation. All the countries achieve at least one fiscal consolidation whereas countries as Greece, Finland or the Netherlands experienced more than six years of fiscal adjustments. Most of the countries had important consolidations during the 80's.

The next step is to define an expansionary fiscal consolidation. There are several ways of characterizing an expansion and the most common are:

1. the average real GDP growth in each adjustment year and in the 2 years after is greater than the average real GDP growth in the two years before.
2. the average trend growth in each adjustment year and in the 2 years after is greater than the average trend growth in the two years before. The use of trend output growth should help to isolate those expansionary episodes where the acceleration in growth is not purely cyclical.

Table 1 reports the cases of expansionary fiscal consolidations in aggregate numbers and by countries according to the different criteria proposed in this section. All the countries in the sample achieved at least one expansionary fiscal consolidation following any of the proposed criteria, whereas Denmark for example, achieved it at least in three occasions. Concerning the number of expansionary episodes, almost half of the consolidation experiences turn out to be expansionary. The number of expansionary episodes is quite similar using the persistence definition

⁵The sample used in this analysis includes fourteen European Union countries for the period between 1970 and 2010. These fourteen countries are: Belgium, France, Germany, Italy, The Netherlands, Denmark, Ireland, United Kingdom, Greece, Portugal, Spain, Austria, Finland and Sweden. The selected countries are the old EU15 minus Luxembourg, because a problem of missing data before 1992. Twelve of these countries are currently in the Economic Monetary Union (EMU) zone so they keep a common monetary policy and have also a common currency, the euro since 1999. All fiscal and macroeconomic variables are from OECD Economic Outlook No 86 database (OECD, 2009b) except public and private debt provided by AMECO database and World Data Bank, respectively. A detailed description of all variables and sources is provided in Appendix A as well as some descriptive statistics.

Table 1: Measures of fiscal consolidation: year of consolidation.

	all	successful	IMF (large consolidation)	Devries et al. (2011)(small consolidation)
Austria	1995	1995		
Belgium	1983	1983	1982, 1983, 1987, 1993	1984, 1990, 1992, 1994-98
Denmark	1982, 1983, 1984, 2003	1982, 1983, 2003	1983, 1984, 1985, 1986	1995
Finland	1995, 1996, 1998	1995, 1996	1992, 1993, 1994, 1996, 1997, 1998	1984, 1988, 1999, 2000, 2006-07
France	2009	-	-	1984, 1986-89, 1991, 1995-98, 2000, 2006-07
Germany	1995	1995	1997	1982-89, 1992-96, 1998-00, 2003-07
Greece	1985, 1989, 1990, 1992, 2009	1989		
Ireland	1981, 1982, 1986, 1987	1987	1982, 1983, 1987, 1988, 2009	1984-86
Italy	1975, 1981, 1990, 1991	-	1992, 1996, 1995, 1997	1994, 1996, 1998, 2004-07
Japan			1997	1981-83, 1986, 2003-07
Netherlands	1971, 1995, 2003, 2009	1995, 2003		
Portugal	1981, 1982, 2009	-	1983, 2002	2000, 2003, 2005-07
Spain	2009	-	-	1983-89, 1992-98
Sweden	1985, 1994, 1995	1994, 1995	1983, 1986, 1995, 1996, 1997	1984, 1986, 1992, 1994, 1998, 2007
UK	1995, 1996, 2009	-	1981, 1997	1982, 1994-96, 1998-99

of consolidation and also exists a considerable coincidence between the concrete years affected by a budgetary constraint episodes whereas using the size definition of consolidation there are about 10% more cases using the trend growth description than the growth one. Almost all countries that carried out fiscal consolidation fiscal consolidations during the eighties achieved a positive reaction of growth in the next years. Concerning the duration of the fiscal adjustment in most cases, the length of the fiscal consolidation is generally short, around one year, but it can last up until three years, as occurs in Denmark from 1982 to 1984. During those years the fiscal effort of Denmark reduced the cyclically adjusted balance from -8.99 per cent of potential GDP until +1.5 per cent of potential GDP in 1986. In general, sizable consolidation episodes also lasted for long periods, as in the Danish case.

The second and third dummies are the 'action based' consolidation periods suggested by Devries et al. (2011). The only difference between the second and third variant is the size of the consolidation. The second variant - used in the World Economic Outlook (2011) - is a subset of large consolidations in Devries et al. (2011). The latter considers all gradual consolidations - even of small size - as a fiscal consolidation.

3.2 The ADL model

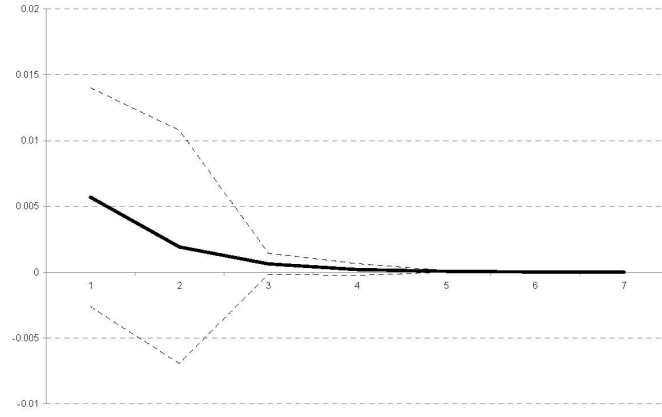
We test first the simple ADL model, and look at the impulse response of (1) for each of the 3 dummies. Using the IMF dummies, we confirm the result in IMF (2011) and Devries et al. (2011) that a fiscal consolidation has negative effects on growth. This reduction in growth is protracted over a period of 4 years. Instead, if we use a dummy typical of the Non-Keynesian literature, then a consolidation results in positive growth for about 3 years, although the result is not really significant.

3.3 Can we predict the IMF 'action based' consolidation dummies?

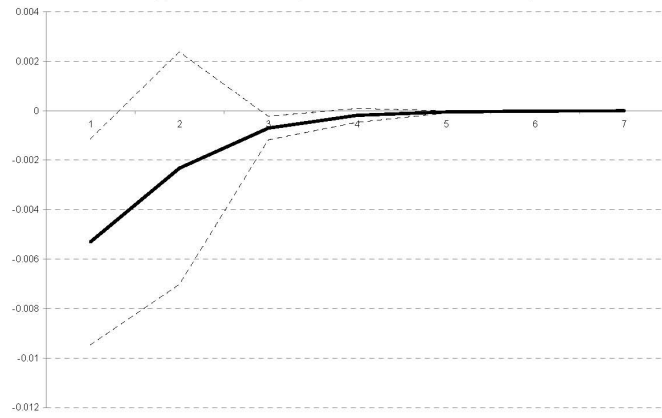
We know from the Non-Keynesian studies that we can predict successful consolidation episodes. Typically, the successful episode can be explained by a set of budgetary, macroeconomic and political circumstances (Alesina and Ardagna, 1998). The same is also true for the action based consolidation dummies. Figure (2) plots our dummy and the IMF dummy together with the predicted values of a probit model using the IMF dummy. The model includes a set of budgetary, macroeconomic and political series, just as in Alesina and Ardagna (1998). We detail the set of variables in section 4.

We observe from Figure (2) that we can fit the action based dummies rather well with both approaches. The model predicts some probability of consolidation throughout the sample, but it captures nearly all important consolidation moments found in the Non-Keynesian literature or in the IMF study. The probit model places probabilities exceeding 0.5 on most of the events. Since the IMF study has more consolidation events, the fit is obviously closer. The biserial point correlation between the fit and the IMF dummy ranges between 0.10 (Belgium) and 0.52 (Portugal). A low correlation is due to a continuously high probability of consolidation in a few countries. The implication is that consolidations can be predicted from current or past economic conditions. Therefore the policy response is not exogenous and the response in the ADL are biased.

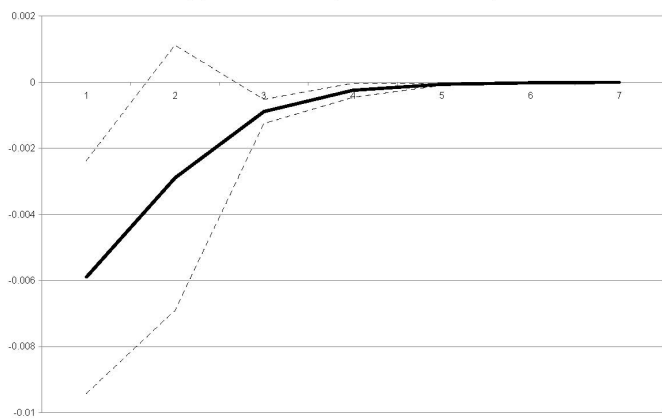
Figure 1: Dynamic response to fiscal consolidation



(a) ADL model: response to consolidation dummy

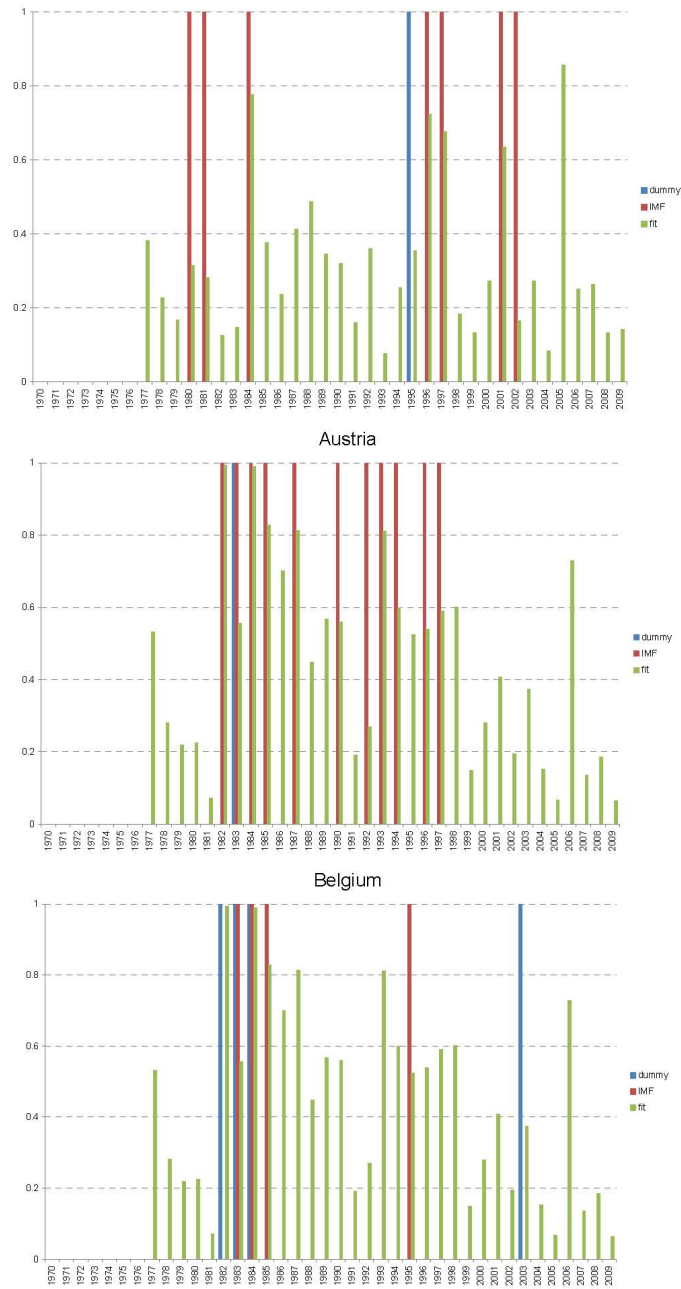


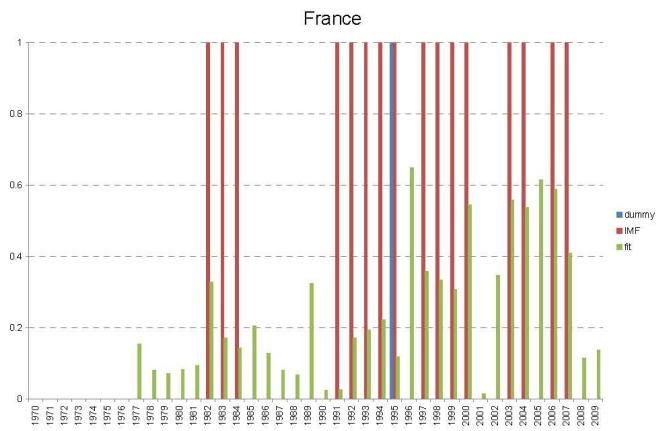
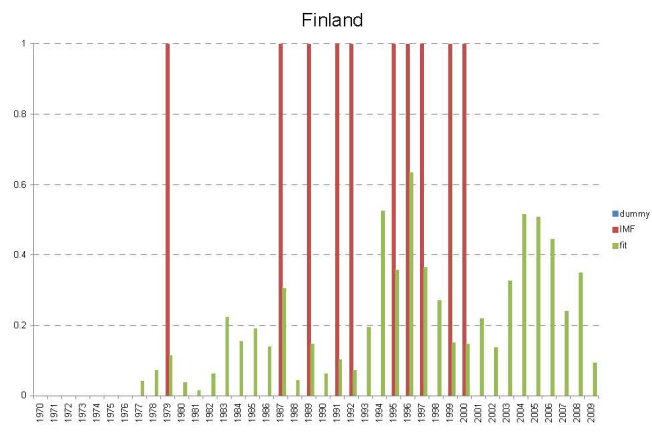
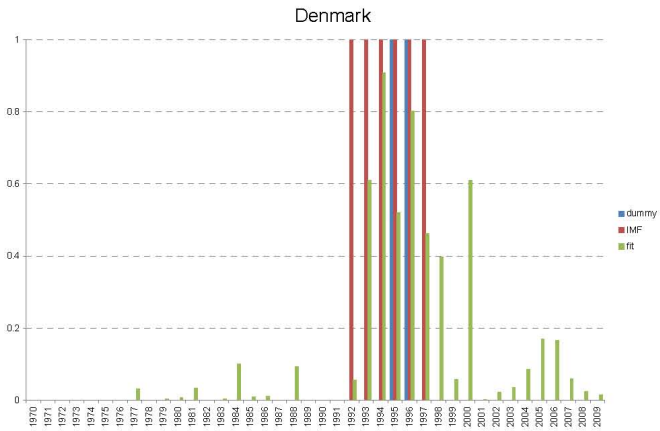
(b) ADL model: response to IMF dummy

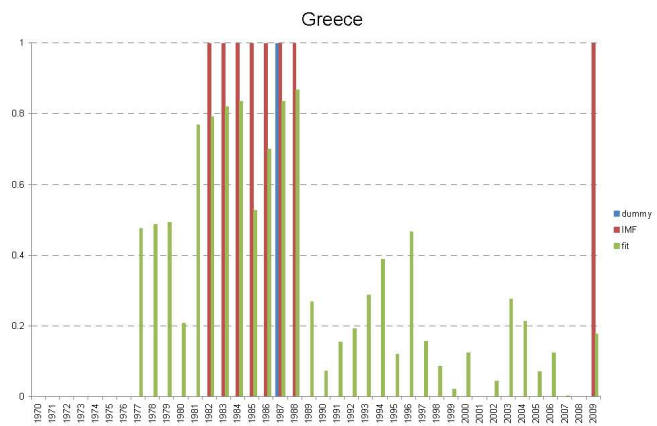
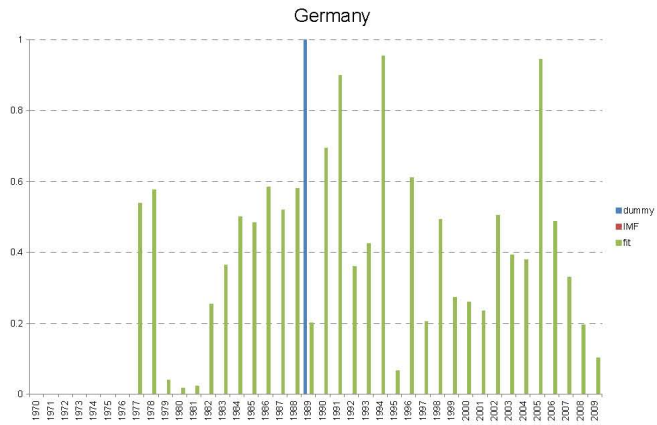


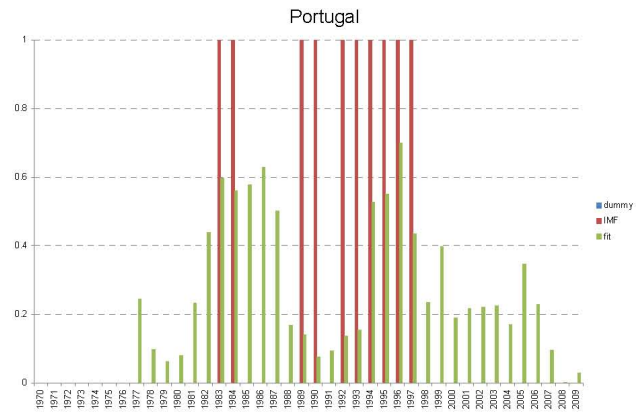
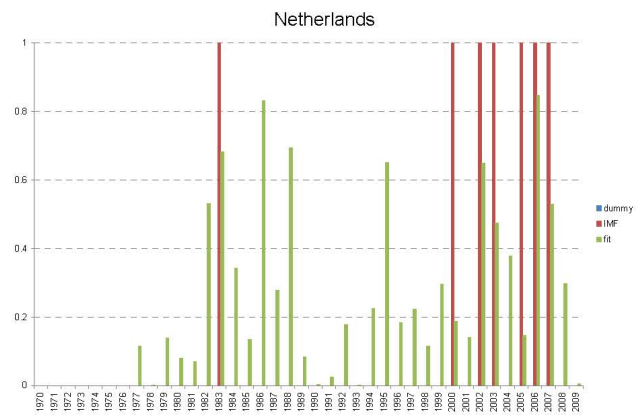
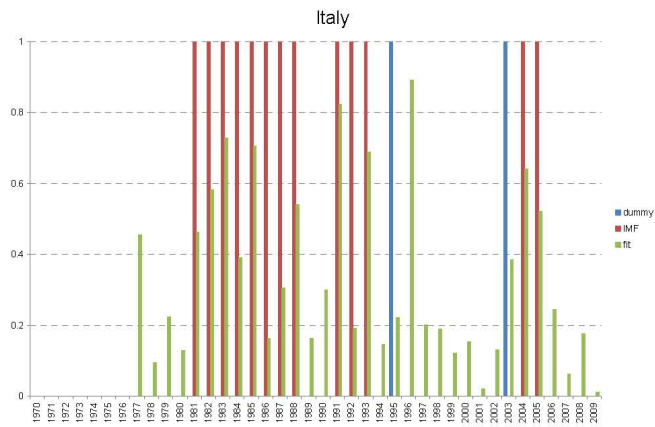
(c) ADL model: response to dummy Devries et al. (2011)

Figure 2: Predicted values from probit equation (3) versus fiscal consolidation dummy

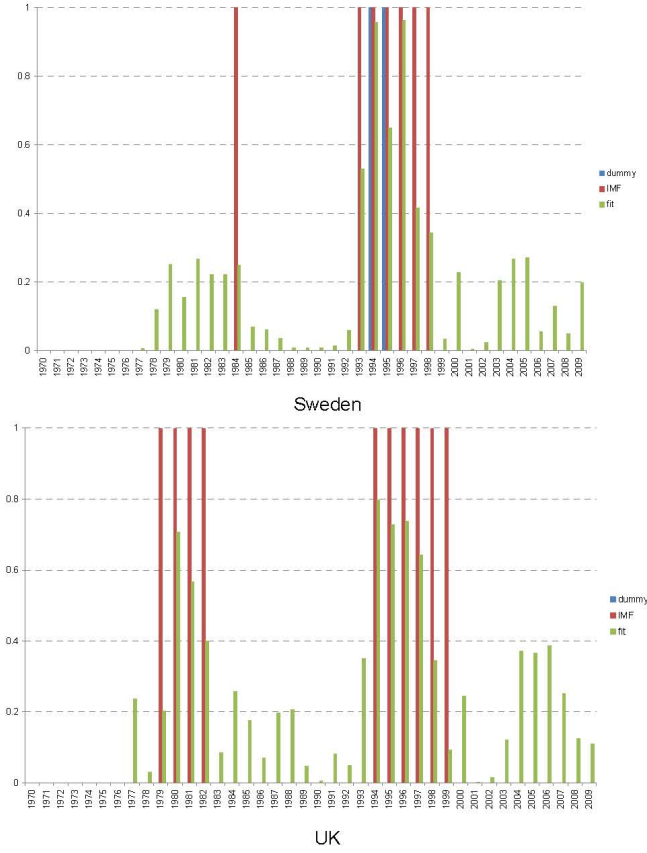








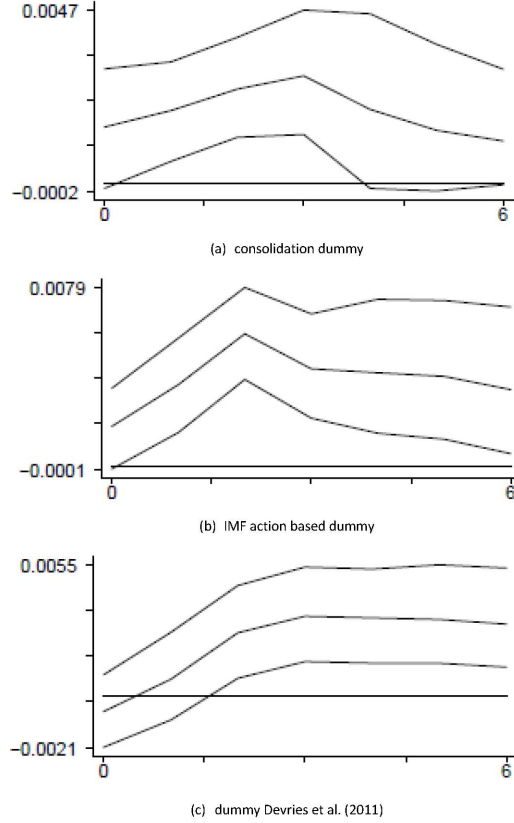
Spain



3.4 The effects on economic growth of fiscal consolidation

We first examine the effect of the three consolidation dummies on economic growth with a simple VAR model. The two-variable VAR on the growth rate of economic activity and the fiscal consolidation dummy includes 4 lags, and in order for fiscal consolidation to influence economic activity within the year, we order the dummy first. The VAR is estimated on the panel of EU countries. Figure (3) plots the response of growth to a unit innovation in the dummy variable, together with 95% probability bands. Modeling the endogeneity of the fiscal policy response dramatically alters the inferences about the effects of consolidation. The results support the

Figure 3: VAR impulse responses to a fiscal consolidation dummy



Non-Keynesian view that consolidations are expansionary. The impulse responses show that fiscal consolidation always has expansionary effects, regardless of the type of dummy that is being used. The estimated effect on GDP is significant, and seems rather permanent, since 6 years after the shock, its effect has hardly dampened out. This implies the dummy is a proxy for omitted variables in the ADL regressions in Figure (1).

We can more correctly examine the endogeneity of policy by estimating the probit equation for D_t and the condition the response of economic growth in the VAR on the realization of the consolidation. The dynamic simulations have to account for the dichotomic nature of the dummy, so we condition on the sample mean of the data as initial conditions. (...)

4 Fiscal consolidation and private debt overhang

The evidence in support of the Non-Keynesian view does not imply all fiscal consolidations are spurring growth. There are particular reasons to be cautious on the success of austerity in a financial crisis. These caveats are already present in the present models. First, the size of the wealth effect depends to a large extent on the possibility of consumers to access credit (Perotti, 1997). I.e., in order for the wealth effect to kick in, the private sector should hold wealth. However, when there is a private debt overhang, fiscal consolidation that lowers real rate aids deleveraging private debt would be more successful than fiscal consolidation per se. The success of fiscal consolidation rather depends on the speed of deleveraging fiscal policy may achieve. This implies other policies like financial sector regulation, deflationary policies (labour and product market, wages and income policies) or unusual monetary policies (creating a class of safe assets or higher inflation) may be called for to make fiscal consolidation successful. Second, the size of the wealth effect also depends on the efficiency of financial markets. Lower interest rates should transmit into a fall in real rates. However, a banking crisis stops the flow of credit to the private sector, and does so indiscriminately. The positive wealth effect does not materialize since the

fraction of liquidity constrained consumers increases.

Empirical evidence on successful fiscal adjustments during financial crises is limited. Few industrialised economies have gone through the kind of crisis we have observed since 2007, hence we must draw on empirical inference from historical episodes or from other countries. These studies are rather bearish on the possibility of a growth rebound by fiscal austerity. The reason is that banking crises carry a high fiscal cost while contemporaneously undermining growth perspectives. Banks must be bailed out and suppose a direct fiscal burden. In addition, subdued growth often makes governments look for “ambitious” countercyclical fiscal policies aimed at mitigating the downturn but it also implies permanently lower tax revenues (Honohan and Klingebiel, 2003; Reinhart and Rogoff, 2009). In the aftermath of several financial crises the real value of government debt (not debt to GDP ratio) rose on average by 86% in a panel of developed and developing economies. At the same time, dysfunctional financial markets trouble economic development and curb long-term growth (Cerra and Saxena, 2008).

Just a few papers have attempted to control for financial market developments around fiscal consolidations. Ardagna (2009) demonstrates the strength of the wealth effect by looking at the evolution of stock market prices after a fiscal consolidation. Evidence is in line with other Non-Keynesian studies as it points to positive reactions of stock markets to credible and lasting spending-based adjustments. Tagkalakis (2011) examines whether asset prices have any effect on the probability of initiating and successfully concluding a fiscal adjustment. His argument is that higher asset prices imply higher tax income. Such revenue windfalls aid fiscal adjustment since may crowd in other taxes. His findings indicate that housing and equity price movements contribute positively to primary balance adjustment, mainly through higher tax income. Tagkalakis (2011) also tackles the question whether asset prices movements induce governments to adjust spending (e.g. a discretionary contraction to an asset boom) High housing prices seem to cause expenditure cuts. There are two problems with this approach. First, if the wealth effect works (as the results in Ardagna (2009) suggest), then high asset prices are the consequence of a successful adjustment and increases tax revenue as a consequence (but the tax response is endogenous). Second, the asset price changes may be driven by real economic growth, or by speculative movements. But although they may drive up tax revenues prior to the adjustment in both cases, bursting asset bubbles are unlikely to lead to rapid recoveries.

4.1 Data and specification

The main interest of this study is to determine which are the factors that lead to an expansionary impact of fiscal consolidation, including also financial conditions.

The consolidation dummies are the three variants described in section 3.1. After that, the GDP growth rate is used to determine when happened a year of growth following these definitions, as explained in section 3.1.

The explanatory variables can be classified in four different groups. The first one is related with the characteristics of the adjustment and the initial conditions. As in other studies, we use the cyclically adjusted primary balance and the level of public debt. The second group is related with policy and economic conditions of each country in the sample. The output gap measures the slack at the time of the adjustment. Other variables measures monetary policies: real short term interest rates and real effective exchange rates. Third, monetary policy may facilitate adjustment but there is also a hard way to improve competitiveness. We consider the difference in relative consumer prices, relative labour costs in the manufacturing sector, the relative price of exported goods and services and finally the product per hour worked.

Following the theories in section 2.2, we expect to find a negative effect of the cyclically adjusted primary balance on the probability to have an expansionary fiscal contraction, meaning that an increase in the budget surplus or a reduction in the budget deficit reduces the likelihood to observe an expansionary consolidation. Respect the initial state of public finances represented by the sovereign debt, is expected to have a positive sign: deterioration in the initial conditions will make easier to found an expansionary effect on output. The same argument could be applied to private debt. Following the non Keynesian arguments, we expected to have a negative sign for the primary expenditures. It means that decreasing the expenditures, the probabilities to observe a successful budget constrain increases. The exchange rate and the interest rate are expected to have positive and negative sign respectively. The first could be related with the positive effect of devaluation and the second with the difficulties to cope with the payment of the debt. The output gap is expected to have a negative sign as well as the competitiveness indexes based on consumer’s prices, labour costs and exports prices because

Table 2: Data definitions.

series		source	definition
cyclically adjusted primary balance	%GDP	OECD	level
gross public debt	%GDP	OECD	level
domestic credit provided by banking sector	%GDP	WB	level
output gap of the total economy	%GDP	OECD	level
cyclically adjusted primary expenditure	%GDP	OECD	level
cyclically adjusted current receipts	%GDP	AMECO	level
wages of government sector	%GDP	AMECO	level
subsidies	%GDP	OECD	level
government fixed capital formation	%GDP	OECD	level
social security benefits paid by government	%GDP	OECD	level
direct taxes on business	%GDP	OECD	level
capital tax and transfers receipts	%GDP	OECD	level
social security contributions	%GDP	OECD	level
taxes on production and imports	%GDP	OECD	level
short term interest rates	%	OECD	level
real effective exchange rates	%	OECD	level
unit labor costs	index, relative to EU 15	OECD	growth rate
price exported goods and services	index, relative to EU 16	OECD	growth rate
consumer price index	index, relative to EU 17	OECD	growth rate
product per hour worked	index, relative to EU 18	OECD	growth rate

the lower are the indexes the higher is the competitiveness and thus, rises the probabilities of successful fiscal consolidations. The competitiveness index based on product per hour worked is expected to have a positive sign, increasing the product per hour increases the likelihood of expansionary fiscal consolidations.

Table (2)

4.2 A probit model

We now assess via probit regressions the significance and the relevance of each one of the variables in order to determine the probability of consolidations to have an expansionary effect on output. This methodology is akin to Alesina and Ardagna (1998) and Giudice (2007), and we test (3) with a panel probit model. Since the dependent variable takes only the values 0 and 1, we use a random effects estimator. This implies we estimate:

$$D_{i,t} = \Theta Z_{i,t} + \nu_{i,t} \quad (5)$$

where $D_{i,t}$ is one of the 3 dummies indicating a successful fiscal consolidation and $Z_{i,t}$ is the vector of variables that affect the probability of success.

4.3 Results

Table (3) summarizes the results of the probit estimations and reports the percentage chance of each variable on encountering a successful consolidation, for the mean value of the independent variables and the associated probability. We confirm a couple of results in the literature when using our dummy variable. Looking at the initial condition variables, the cyclically adjusted primary balance is significant across all the estimations and shows the negative sign predicted by the Non-Keynesian arguments, meaning that the higher is the primary deficit as per cent of potential GDP, the more pressing the need to correct fiscal imbalances. A 1% higher deficit implies a 15% higher chance of starting and concluding successfully a consolidation. Since the effect of the deficit may be highly non-linear and depend on the level of debt (Giavazzi et al. ,2000), we include also the public debt ratio. High debt marginally decreases the probability of success. Our result also shows the importance of the macroeconomic environment: the output gap is significant and it shows the negative expected sign meaning that sluggish growth below potential GDP increases the probability of an expansionary fiscal contraction. I.e., since growth resumes back to trend, it is easier to stabilise the primary balance, and recover growth.

Monetary policy has some marginal effect too on the success of consolidation. Each increase in real rates by 1% reduces the probability by about 5%. Looser monetary policy does not seem to work through the exchange rate channel, however. More generally, boosting competitiveness does not seem to work either: lower unit labour costs do not lead to more success. Finally, we look at the effect of the growth in domestic credit, supplied by the

Table 3: Panel probit model, EU countries, 1980-2009.

	dummy	IMF	Devries et al. (2011)
primary balance (CA)	-0.155*** (0.00332)	-0.197*** (5.43e-07)	-0.184*** (3.45e-07)
debt	-0.00932* (0.0060)	0.0394*** (1.56e-08)	0.0360*** (4.02e-08)
output gap	-0.240*** (0.00151)	-0.211*** (1.32e-05)	-0.182*** (4.80e-05)
spending	-0.110 (0.328)	-0.462*** (8.79e-09)	-0.348*** (1.01e-06)
tax	-0.116 (0.324)	0.183** (0.0197)	0.352*** (1.85e-06)
interest rate	-0.0505* (0.0567)	0.00526 (0.799)	0.00283 (0.890)
REER	-0.00526 (0.139)	0.00601 (0.275)	0.00921 (0.126)
ULC	0.00553 (0.727)	0.0203* (0.0898)	0.00942 (0.401)
credit	-0.00987*** (0.00369)	0.00995*** (0.00158)	0.00395 (0.155)
Observations	532 (14)	417 (11)	494 (13)
ll	-67.16	-184.1	-216.3
McFadden R ²	0.0027	0.12	0.088
correlation	0.0096	0.0517	0.059

banking sector. High growth prior to the adjustment seems to affect negatively the chances of a fiscal adjustment. This effect seems small, since a 1% in the credit to GDP ratio decreases the chances by just 1%. However, since the average credit to GDP ratio stands at 200% of GDP in EU countries, deleveraging at a constant rhythm still implies a strong effect.

These results are not confirmed when using both types of IMF dummies. They confirm the importance of initial fiscal conditions and of economic slack,⁶ and the insignificant contribution of external competitiveness (be it through exchange rates or real competitiveness). Also, the result on credit circumstances is confirmed. In line with the Non-Keynesian literature, higher spending decreases the chances of a successful adjustment, but higher levels of taxation should increase the chances of success.

Since the policy strategy in EMU is to deflate the economy and regain competitiveness through external channels, we evaluate a couple of different measures for measuring external competitiveness. In table 4 we look at the development of some indices of prices and productivity, relative to the average development in the EU15. These are export prices, CPI, and productivity per hour (here measured inversely, i.e. a relatively high productivity means a lower index). Higher export prices and more productive labour should facilitate adjustment; but higher CPI should erode price competition. Price competition does not seem to affect much the chances of consolidation. Instead, productivity gains do raise the chances of consolidation substantially. This is at least the case for large consolidations. Including each of these variables does not alter the main results. Since we control for price and productivity developments, the real effective exchange rate now becomes significant (at least when using our dummy), and it implies that higher exchange rates make consolidation more difficult to achieve. The probit model now also seems to confirm that higher spending or taxes result in less success of an adjustment.

Using our consolidation dummy, spending and taxes matter, but the size of the effect is quite variable. For spending, a 1% reduction increases the chances of success by anything between 1 and 10%. For taxes, a cut may increase chances by anything between 12 and 40%. We explore in more detail how the budget may be adjusted and what are the budget categories that contribute most to success. In table(5) we test the same probit model (5) but decompose total spending and tax revenues into their main components. The results using the typical dummy in this literature shows only significantly positive effects of a cut in subsidies and of a cut in indirect taxes. Spending items like wages have the expected negative sign, and its effect is sizable, but the coefficient is insignificant. On the tax side, cuts in business taxes seem to help adjustment (Schiantarelli et al., 2002) and so do increases in capital taxes, but their effects are limited. The growth rate of (cyclically adjusted) primary expenditures as a percentage of GDP remains significant and its sign is always negative as predicted by Non-Keynesian theories. It means that budget composition matters - but also the overall size of the adjustment - in order to achieve an expansionary fiscal consolidation.

⁶But there is a more significant effect of high public debt.

Table 4: Panel probit model, EU countries, 1980-2009, competitiveness indices.

	dummy	IMF	Devries et al. (2011)	dummy	IMF	Devries et al. (2011)	dummy	IMF	Devries et al. (2011)
primary balance (CA)	-0.225*** (0.00114)	-0.179*** (4.96e-06)	-0.174*** (3.18e-07)	-0.156*** (0.00380)	-0.198*** (6.96e-07)	-0.180*** (9.64e-07)	-0.174*** (0.00138)	-0.214*** (1.86e-07)	-0.183*** (4.46e-07)
debt	0.00623 (0.488)	0.0209*** (0.00258)	0.0168*** (0.00101)	-0.0100* (0.0943)	0.0406*** (1.62e-07)	0.0334*** (2.35e-06)	-0.00736 (0.158)	0.0322*** (6.82e-06)	0.0347*** (1.30e-07)
output gap	-0.235*** (0.00545)	-0.204*** (1.62e-05)	-0.175*** (2.77e-05)	-0.240*** (0.00184)	-0.213*** (1.25e-05)	-0.185*** (4.03e-05)	-0.211*** (0.00152)	-0.177*** (0.000289)	-0.176*** (5.76e-05)
spending	-0.00622 (0.959)	-0.433*** (2.05e-08)	-0.354*** (2.64e-07)	-0.0950 (0.414)	-0.437*** (7.28e-08)	-0.363*** (8.92e-07)	-0.0556 (0.609)	-0.465*** (1.24e-08)	-0.353*** (6.98e-07)
tax	-0.244* (0.0877)	0.235*** (0.00365)	0.389*** (2.10e-07)	-0.118 (0.329)	0.167** (0.0359)	0.348*** (3.08e-06)	-0.144 (0.216)	0.182** (0.0203)	0.356*** (1.51e-06)
interest rate	-0.0286 (0.398)	-0.0280 (0.142)	-0.0366** (0.0361)	-0.0513* (0.0773)	0.00815 (0.716)	-0.00369 (0.865)	-0.0365 (0.139)	0.0148 (0.484)	0.00295 (0.887)
REER	-0.0293*** (0.00375)	-0.0198*** (0.000173)	-0.0168*** (3.94e-05)	-0.00442 (0.260)	0.00334 (0.559)	0.00870 (0.173)	-0.00821** (0.0224)	0.00335 (0.518)	0.00885 (0.165)
export prices	0.0338 (0.433)	0.0225 (0.420)	-0.0128 (0.587)						
relative CPI				0.00238 (0.911)	0.0237* (0.1000)	0.00914 (0.512)			
productivity							-0.0873* (0.0570)	-0.141*** (0.00177)	-0.0101 (0.338)
credit	0.00228 (0.656)	0.00703** (0.0139)	0.00253 (0.280)	-0.00940*** (0.00810)	0.0104*** (0.00249)	0.00321 (0.277)	-0.00893*** (0.00592)	0.00864*** (0.00560)	0.00353 (0.200)
Observations	462 (14)	363 (11)	429 (13)	511 (14)	396 (11)	473 (13)	518 (14)	406 (11)	481 (13)
ll	-51.43	-172.5	-195.4	-65.64	-174.6	-206.3	-62.20	-179.1	-216.1
McFadden R ²	0.028	0.03	0.006	0.0071	0.11	0.077	-9.01E-08	0.0588	0.054
correlation	0.299	0.18	0.22	-0.015	0.0519	0.064	-0.0073	0.1	0.064

Columns (2) and (3) of table 5 report the same estimation for the two IMF dummies. These largely confirm the results in table 3, and in comparison to our dummy, we now detect a significant effect of reductions in government consumption and wages on the success of consolidation.

Similar results are obtained if we add different measures of competitiveness to the model. Table 6 reports the marginal probabilities.

These result have important implications for the fiscal consolidations in 2010-11. High credit growth prior to the crisis has fueled an asset boom that now takes time to unwind. This compromises the possibilities of successfully consolidation. If Reinhart and Rogoff (2009) or Cerra and Saxena (2008) are right, a return to pre-crisis growth rates is also unlikely. Since the output gap is really uncertain in the current context, it is questionable if there is room for picking up growth quickly. Moreover, there is now less scope for other mitigating factors. Interest rates are close to the zero lower bound, and some countries are close to deflation, implying even higher real interest rates. In addition, EU countries are cutting deficits contemporaneously. There may be few gains from increasing competitiveness. Since everyone else is cutting, the effect of a fiscal contraction is further magnified. The only margin to affect the chances of success are the size and composition of the adjustment.

5 Robustness checks

5.1 Case study: Sweden, Finland or Japan

(...)

5.2 Confidence indicators

(...)

5.3 IMF programmes

(...)

5.4 Definition of consolidation

In order to validate the results obtained in the previous section, we estimate also the probit model using other definitions of consolidation . The results, shown in Table 6, are very similar in terms of the sign, the significance

Table 5: Panel probit model, EU countries, 1980-2009, decomposition.

		Devries et al. (2011)		
		dummy	IMF	
primary balance (CA)		-0.213*** (0.00526)	-0.102*** (0.00555)	-0.137*** (5.94e-05)
debt		-0.0131 (0.177)	0.00406 (0.505)	0.00788* (0.0666)
output gap		-0.256** (0.0162)	-0.187*** (0.000122)	-0.141*** (0.00119)
spending	consumption	0.102 (0.853)	-0.459* (0.0872)	-0.0236 (0.921)
	wages	-0.504 (0.509)	-0.662 (0.106)	-0.985*** (0.00591)
	subsidies	-1.593* (0.0735)	-0.285 (0.568)	-0.412 (0.323)
	investment	-0.489 (0.473)	-0.669** (0.0397)	-0.509* (0.0877)
SZ transfers		0.0816 (0.813)	0.205 (0.256)	0.0983 (0.545)
taxes	business tax	-0.0352 (0.907)	0.0570 (0.581)	-0.00477 (0.960)
	capital tax and	0.0227 (0.981)	-0.000214 (0.999)	-0.0588 (0.822)
	SZ payments	-0.395 (0.306)	0.102 (0.676)	0.501** (0.0130)
indirect taxes		-0.948** (0.0126)	0.415** (0.0209)	0.589*** (0.000825)
interest rate		-0.0916* (0.0541)	-0.0626*** (0.00467)	-0.0671*** (0.000549)
REER		-0.00218 (0.772)	-0.00357 (0.473)	-0.00366 (0.300)
ULC		0.0777** (0.0205)	0.0178 (0.280)	0.00680 (0.636)
credit		-0.0106** (0.0341)	0.00142 (0.606)	-0.00300 (0.189)
Observations		416 (14)	324 (11)	402 (13)
ll		-38.70	-159.1	-192.7

Table 6: Panel probit model, EU countries, 1980-2009.

		Devries et al. (2011)			Devries et al. (2011)				
		dummy	IMF		dummy	IMF		imf	dglp
primary balance (CA)		-0.204*** (0.00755)	-0.0959*** (0.00770)	-0.136*** (6.60e-05)	-0.228*** (0.00459)	-0.0990*** (0.00652)	-0.133*** (8.83e-05)	-0.0980*** (0.00641)	-0.136*** (7.27e-05)
debt		-0.0141 (0.174)	0.00405 (0.499)	0.00809* (0.0537)	-0.0149 (0.154)	0.00416 (0.493)	0.00799* (0.0627)	0.000447 (0.934)	0.00707* (0.0897)
output gap		-0.227** (0.0354)	-0.174*** (0.000220)	-0.134*** (0.00174)	-0.250** (0.0184)	-0.180*** (0.000180)	-0.132*** (0.00213)	-0.200*** (4.35e-05)	-0.153*** (0.000499)
spending	consumption	0.108 (0.851)	-0.427 (0.110)	0.0279 (0.907)	0.00936 (0.987)	-0.446* (0.0964)	0.00114 (0.996)	-0.466* (0.0871)	-0.0394 (0.869)
	wages	-0.309 (0.696)	-0.641 (0.116)	-0.967*** (0.00656)	-0.431 (0.598)	-0.641 (0.117)	-0.953*** (0.00747)	-0.592 (0.157)	-0.912** (0.0116)
	subsidies	-1.635* (0.0672)	-0.256 (0.608)	-0.409 (0.331)	-1.859** (0.0499)	-0.271 (0.587)	-0.410 (0.327)	-0.237 (0.635)	-0.483 (0.250)
	investment	-0.539 (0.424)	-0.691** (0.0328)	-0.554* (0.0621)	-0.418 (0.551)	-0.673** (0.0383)	-0.536* (0.0718)	-0.582* (0.0710)	-0.481 (0.106)
SZ transfers		-0.0520 (0.879)	0.146 (0.407)	0.0249 (0.875)	0.153 (0.675)	0.178 (0.322)	0.0515 (0.749)	0.0689 (0.699)	0.0453 (0.774)
taxes	business tax	-0.0269 (0.929)	0.0595 (0.569)	-0.0198 (0.828)	-0.00103 (0.997)	0.0596 (0.566)	-0.00452 (0.962)	0.0739 (0.490)	-0.00353 (0.970)
	capital tax and	-0.131 (0.902)	0.00574 (0.982)	-0.0287 (0.914)	-0.141 (0.891)	-0.00846 (0.974)	-0.0423 (0.872)	-0.00397 (0.988)	-0.0511 (0.846)
	SZ payments	-0.195 (0.819)	0.152 (0.521)	0.512** (0.0109)	-0.321 (0.422)	0.142 (0.553)	0.520*** (0.00940)	0.214 (0.381)	0.551*** (0.00746)
indirect taxes		-0.769** (0.0355)	0.451** (0.0104)	0.611*** (0.000284)	-0.964** (0.0140)	0.433** (0.0151)	0.602*** (0.000417)	0.516*** (0.00405)	0.624*** (0.000274)
interest rate		-0.0955** (0.0476)	-0.0609*** (0.00585)	-0.0625*** (0.00121)	-0.101** (0.0427)	-0.0628*** (0.00459)	-0.0655*** (0.000760)	-0.0294 (0.229)	-0.0553*** (0.00503)
REER		-0.00134 (0.863)	-0.00369 (0.453)	-0.00426 (0.223)	0.000244 (0.976)	-0.00357 (0.470)	-0.00395 (0.264)	-0.00393 (0.389)	-0.00443 (0.199)
export prices		0.0685* (0.0756)	-0.00650 (0.727)	-0.0368** (0.0286)					
relative CPI					0.131** (0.0148)	0.0115 (0.591)	-0.0122 (0.518)		
productivity								-0.110** (0.0195)	-0.0344* (0.0867)
credit		-0.0108** (0.0359)	0.00139 (0.610)	-0.00290 (0.202)	-0.0125** (0.0240)	0.00136 (0.619)	-0.00293 (0.199)	0.00234 (0.375)	-0.00245 (0.282)
Observations		416 (14)	324 (11)	402 (13)	416 (14)	324 (11)	402 (13)	324 (11)	402
ll		-39.93	-159.6	-190.4	-37.97	-159.5	-192.6	-155.8	-190.7

and size of the effect. Private debt shows a negative sign across all estimations and a 1% rise in private debt reduces the likelihood of success between 0.01% and 0.24%. The real interest rate is significant across all models and the effect of a 1 basis point rise is around -0.15%.

6 Conclusion

The main contribution of this paper is to clarify the debate on the positive effects of fiscal consolidation on economic growth. We demonstrate that the narrative approach mistakenly concludes that consolidation is painful, since the selected consolidation episodes are not exogenous events. This result does not imply consolidation always promotes growth. We argue the financial situation determines the success of a consolidation. Using the probit model typical of this type of analysis, we show that cutbacks with a private debt overhang are not successful. Financial market responses are critical to make the positive wealth and supply side effects of consolidation kick in.

Our analysis provides several policy recommendations for public debt reductions today. A drastic and permanent cold-shower consolidation may freeze the economy into a permanent state of high indebtedness and low growth. Gradual consolidations are in general more likely to succeed than cold-shower ones after a financial crisis, especially if other policies aid in deleveraging private debt positions too. Nonetheless, cuts on the expenditure side seem more appropriate than tax increases as they have been proven to be more growth-friendly than tax-based consolidations (Alesina and Perotti, 1995; Giudice et al., 2007). Fiscal consolidations are helpful in the long run but in the current context they are unlikely to be painless.

References

- Afonso A, (2006). "Expansionary fiscal consolidations in Europe - new evidence," Working Paper Series 675, European Central Bank
- Alesina A, Ardagna S (1998) Tales of fiscal adjustment. *Economic Policy* 27:489–545
- Alesina A, Ardagna S, Perotti R, Schiantarelli, F (2002) Fiscal policy, profits, and investment. *American Economic Review* 92:571–589
- Alesina A, Perotti R, Tavares J (1998) the political economy of fiscal adjustments. *Brookings Papers Economic Activity* 1:197–266
- Bertola G, Drazen A (1993) Trigger points and budget cuts: explaining the effects of fiscal austerity. *American Economic Review* 83:1170–1188
- Blanchard, O.J., (1990) Comments on Giavazzi's & M. Paganno's (1990) article, 'Can severe fiscal contractions be expansionary? Tales of two small European countries?', *NBER Macroeconomic Annual*, pp.111-116
- Feldstein, Martin, (1982). "Government deficits and aggregate demand," *Journal of Monetary Economics*
- Giavazzi F, Jappelli T, Pagano M, (2000). "Searching for Non-Linear Effects of Fiscal Policy: Evidence from Industrial and Developing Countries," *NBER Working Papers* 7460
- Giavazzi F, Pagano M (1990) Can severe fiscal contractions be expansionary? Tales of two small European countries. *NBER Macroeconomics Annual* 5:75–111
- Giavazzi F, Pagano M (1996) Non-Keynesian effects of fiscal policy changes: International evidence and the Swedish experience. *Sweden Economic Policy Review*
- Giudice G, Turrini A, In't Veld J (2004), Non-Keynesian fiscal consolidations in the EU? Ex-post evidence and ex-ante analysis, *European Economy - Economic Papers* 195.
- Hogan V, (2004). "Expansionary Fiscal Contractions? Evidence from Panel Data," *Scandinavian Journal of Economics*
- Konstantinou P., Tagkalakis A., 2010. "Boosting confidence: is there a role for fiscal policy?," *Working Papers* 113, Bank of Greece
- McDermott CJ, Westcott RF (1996) An empirical analysis of fiscal adjustment. *IMF Staff Papers* 43:725–753
- OECD (1996) *OECD Economic Outlook*. Paris, OECD
- Perotti R (1999). "Fiscal Policy In Good Times And Bad," *The Quarterly Journal of Economics*, MIT Press
- Perotti R (2005) Estimating the effects of fiscal policy in OECD countries *Proceedings*. Federal Reserve Bank of San Francisco
- Schaltegger A., Weder M, (2010). "Fiscal Adjustment and the Costs of Public Debt Service: Evidence from OECD Countries," *CESifo Working Paper Series*
- Sutherland A (1997) Fiscal crises and aggregate demand: can high public debt reverse the effects of fiscal policy? *Journal Public Economics* 65:147–162
- Tagkalakis A (2010) Fiscal adjustments and asset price changes, *Journal of Macroeconomics*, Elsevier, vol. 33