MONETARY DEVELOPMENTS AND EXPANSIONARY FISCAL CONSOLIDATIONS: EVIDENCE FROM THE EMU*

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August 2014

Abstract

This paper provides new insights about the existence of expansionary fiscal consolidations in the Economic and Monetary Union, using annual panel data for 14 European Union countries over the period 1970-2012. Different measures for assessing fiscal consolidations based on the changes in the cyclically adjusted primary balance were calculated. A similar *ad-hoc* approach was used to compute monetary expansions in order to include them in the assessment of non-Keynesian effects for different budgetary components. Panel Fixed Effects estimations for private consumption show that, in some cases, when fiscal consolidations are coupled with monetary expansions, the traditional Keynesian signals are reversed for general government final consumption expenditure, social transfers and taxes. Keynesian effects prevail when fiscal consolidations are not matched by a monetary easing. Panel probit estimations suggest that longer and expenditure based consolidations contribute positively for its success, while the opposite holds for the tax based ones.

Keywords: fiscal consolidation, monetary expansion non-Keynesian effects, panel data, probit
JEL: C23, E21, E5, E62, H5, H62

* We thanks participants at the UECE 3rd Conference on Economic and Financial Adjustments for useful comments and suggestions. The opinions expressed herein are those of the authors and do not necessarily reflect those of the ECB or the Eurosystem.

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1. Introduction

Keynesian theory gives us some insights about the expected effect of government budgetary components' changes on income. It postulates that an increase in government spending should stimulate the economy, via the multiplier mechanism, thus increasing disposable income and private consumption. Under this reasoning, an increase in taxation should lead to a decrease in private consumption.

Nevertheless, since the early 90's with the case studies of Denmark and Ireland[1], some literature has been discussing the possible non-Keynesian effects of fiscal policy, namely during fiscal consolidation periods.

The theoretical underpinnings stemmed from the German Council of Economic experts in their 1981 and 1982 reports and are referred to as the "expectational view of fiscal policy".[2] Arguably, the standard Keynesian relationship between private consumption and government budgetary components may be reversed under certain circumstances. A deterioration of the fiscal position (resulting in a budget deficit) today may lead to an increase in taxation in the future in order to fulfil the government budget constraint, therefore reducing the agents' permanent income. If such expectations are accommodated by the individuals, this could lead to a decrease in private consumption today. The reverse reasoning holds for a fiscal consolidation, meaning that an improvement in the fiscal position may lead to an increase in private consumption today. Some empirical research presents evidence that supports this view.[3]

The expectational view of fiscal policy relies on the assumption of Ricardian households, which smooth consumption and don't have liquidity constraints. This motivates a thorough assessment of the monetary developments while studying expansionary fiscal consolidations. Moreover, according to the Keynesian view, under the IS-LM framework, a fiscal consolidation may lead to an increase in private consumption if accompanied by a strong enough monetary expansion that offsets the detrimental effects of fiscal policy developments on disposable income and private consumption.

Arguably, while neglecting the monetary policy stance, one could find himself in a situation described by Ardagna (2004): "In this case, the coefficients of fiscal policy variables can be biased, capturing the effect of monetary rather than fiscal policy".

[1] See Giavazzi & Pagano (1990).
[2] See Hellwig & Newmann (1987).
[3] See for instance, Giavazzi & Pagano (1990), Perroti (1999), Ardagna (2004), Afonso (2006, 2010) and Alesina & Ardagna (2013).

The importance of this issue within the Economic and Monetary Union (EMU) context is rather obvious, since the expectational view of fiscal policy was to some extent reflected in the fiscal convergence criteria of the Maastricht Treaty. Additionally, the monetary policy stance is outside the national governments' influence.

This paper contributes to the existing literature by providing some new insights about the importance of the monetary stance for the relationship between fiscal developments and private consumption during fiscal consolidation periods. It does so by expanding notably Afonso's (2006, 2010) and Afonso & Jalles's (2014) core specification in order to accommodate the monetary policy developments. We conduct an assessment of the fiscal episodes using the same criteria. However, and in addition, we also identify monetary episodes for 14 European Union countries from 1970 to 2012 and study their relationship with fiscal developments.

The paper is organized as follows.

Section two presents the main theoretical underpinnings that motivated the study of expansionary fiscal consolidations, followed by some literature review on this topic. Section three presents an identification of the fiscal and monetary episodes and their respective relationship. In section four we conduct the empirical analysis of expansionary fiscal consolidations for the EMU resorting to panel estimations, accommodating the developments of monetary policy, followed by a discussion of the results.

We also assess the factors that may impinge on the success of the fiscal consolidations, namely expenditure based versus revenue based consolidations, using the fiscal and monetary episodes identified in the earlier sections. We do so by relying on a probit estimation based on Afonso & Jalles (2012) and a success definition proposed by Alesina & Ardagna (2013).

Lastly, section five concludes with some final remarks and point out some possible subjects for future research on this topic.

2. Literature survey

Hellwig & Neumann (1987) were pioneers regarding the assessment of the expansionary fiscal consolidation hypothesis. They argue that fiscal consolidation in Germany in the 1980's under Chancellor Kohl had such a positive impact on private sector confidence that demand actually increased. Supposedly, fiscal consolidation by the Federal Government and monetary tightness by the Bundesbank led to continued output growth and low inflation. Also lower deficits stimulated private investment in the long run due to reduced cost of

financing. Nevertheless, unemployment remained high, which authors attribute to labour market rigidity.

Giavazzi & Pagano (1990) test this hypothesis for Denmark and Ireland for mid and late 1980's, respectively. For Denmark they report that the thriving in consumption experienced in 1983-1986 cannot be explained by the decline in interest rates alone and that such is related to fiscal consolidation through the increase in revenue from income taxation and decrease in public investment. Regarding the Irish case, the fast consumption growth in the second stabilization was due to the government focus on decreasing spending, instead of increasing taxation and also due to the liberalization of the credit markets. As a whole, in these cases the expansionary fiscal consolidation is linked to an adjustment on the public spending side, rather than on revenues, although in Denmark the adjustment was through investment spending and in Ireland it was through current spending.

Alesina & Ardagna (1998) investigate the expansionary fiscal consolidation possibility recurring to an analysis of OECD countries from 1960 to 1994. According to the general Council of Economic Experts' expectational view of the fiscal policy addressed in Hellwig and Neumann (1987), fiscal adjustments occurring when the debt level is high or growing rapidly should be expansionary, whereas others should not. Nevertheless the authors don't find evidence that confirm this view. On the other hand, they found strong evidence of the effect of the composition of the adjustment in the outcome of the fiscal consolidation: all of the non-expansionary adjustments were tax based and all of the expansionary ones were based on expenditure cuts. Expenditure adjustments that were accompanied by wage moderation and by nominal exchange rate devaluation turned out to be expansionary.

Perroti (1999) addresses the same issue for nineteen OECD countries from 1965 to 1994 and, according to his findings, substantial deficit cuts can lead to booms in private consumption. The likelihood of an expansionary fiscal consolidation increases on times of "fiscal stress", which the author defined as periods of high debt-to-GDP ratio or following periods of exceptionally high debt accumulation rates. His findings differ for other periods since in "normal" times the Keynesian effects of a fiscal consolidation (either through spending cuts or tax increases) on private consumption dominate.

Giavazzi *et al.* (2000) address the issue of expansionary fiscal consolidation in OECD countries from 1973 to 1996 and in developing countries from 1960 to 1995. In OECD countries evidence of non-Keynesian response by the private sector is more likely to be found when the fiscal impulses are large and persistent. This means that only those can signal a regime change, thus affecting private sector expectations. Also non-Keynesian effects leading

to an expansionary fiscal consolidation are stronger for changes in net taxes rather than in public expenditure. In developing countries, non-Keynesian effects occur not only during periods of fiscal contractions but also during fiscal expansions and when countries are piling up debt rapidly, regardless of its level.

Using panel data from OECD countries from 1970 to 2002, Ardagna (2004) investigates the effect of fiscal consolidations on debt-to-GDP ratio and GDP growth. Regarding the debt-to-GDP ratio, the success of the fiscal consolidation depends more on the size of the adjustment rather than its composition. On the other hand, the likelihood of a fiscal consolidation being expansionary increases when it is based on public spending cuts rather than on increased taxation. Concerning the role of the monetary policy, there was evidence that either successful (leading to decrease in debt-to-GDP ratio) or expansionary (leading to increase in GDP growth) consolidations don't need to be met by expansionary monetary policies nor exchange rate devaluations.

Giudice *et al.* (2004) address the matter of non-Keynesian effects in fourteen European Union countries in an ex-post and ex-ante analysis. Ex-post analysis consisted on studying the period from 1970 to 2002 and see if fiscal consolidation episodes were followed by an increase in GDP growth. Results show that this occurred in about half the cases. The ex-ante analysis carried out was based on simulations by the European Commission QUEST model and suggested that short-term non-Keynesian effects can occur if consolidation is mainly on the spending side. The latter is also true in the ex-post case, which is in line with most of empirical studies.

Afonso (2006, 2010) conducted a panel analysis for 15 EU countries from 1970 to 2005 having found some evidence of non-Keynesian effects in private consumption for some government spending items, namely final consumption and social transfers. Results show that a decrease in government consumption leads to an increase in private consumption in the long run and the magnitude of this effect is higher when a fiscal consolidation episode occurs.

Devries *et al.* (2011) construct a database for fiscal consolidation measures taken by 17 OECD countries from 1978 to 2009, based on the premise that computing fiscal consolidations from the changes of the cyclically adjusted primary balance may be problematic. Arguably, such approach may be biased in the sense that it may capture changes that are not related to policy actions due to its inability to remove sharp fluctuations in economic activity. Therefore they identify fiscal consolidations through an historical

approach based on policy documents. This database has been widely used in subsequent literature concerning expansionary fiscal consolidations.[4]

Afonso & Jalles (2012) analyse a panel of OECD countries from 1970 to 2010 to assess if the composition and duration of fiscal consolidations matter for their success. Consolidation episodes lead to a decrease in the debt ratios only if accompanied by strong economic growth and increased output gap. Increased duration contributes to the success of the fiscal consolidation episode. Fiscal consolidation success depends on the composition of the adjustment: consolidations based mainly on tax increases contribute negatively for its success.

Alesina & Ardagna (2013) use Devries *et al.* (2011) policy action based approach to identify the fiscal episodes for 21 OECD countries from 1970 to 2010. They conclude that expenditure based adjustments are more likely to be successful and expansionary. Monetary policy is not significant to explain the differences between expenditure based and tax based adjustments.

To sum up, most of the research seems to support or at least not reject the idea of expansionary fiscal episodes.[5] Also, some findings[6] suggest that expansionary and successful fiscal episodes are more likely when there is a consolidation on the spending side.

Moreover, some of the literature, such as Perroti (1999) and Giavazzi *et al.* (2000) propose that non-Keynesian effects are more likely or only occur during periods of high debt-to-GDP ratio or when debt is piling up quickly.

3. Identification of fiscal and monetary episodes in the EMU

3.1. Fiscal Episodes

Most of the empirical literature relies on the change in the cyclically adjusted primary balance (CAPB) as a percentage of GDP as measure of the governments' structural budget balance. It extracts the elements of the primary balance that are due to the business cycle from the total balance in order to have an indicator that has been corrected from the effects of changes in economic activity, thus reflecting the discretionary part of the fiscal policy. Table XI in the appendix shows some descriptive statistics of this indicator.

One can assess the existence of fiscal episodes – either contractions or expansions – by studying the behaviour of this indicator over time. In Giavazzi & Pagano (1996) there is a

[4] See for instance Afonso & Jalles (2012) and Alesina & Ardagna (2013).
[5] As seen in Giavazzi & Pagano (1990), Alesina & Ardagna (1998), Perroti (1999), Giavazzi *et al.* (2000), van Aarle & Garretsen (2003), Ardagna (2004), Giudice *et al.* (2004) and Afonso (2006, 2010).
[6] Giavazzi & Pagano (1990), Alesina & Ardagna (1998), Afonso (2006, 2010) and Alesina & Ardagana (2013).

fiscal episode when the cumulative change in the cyclically adjusted primary balance is at least 5, 4, or 3 percentage points of GDP in 4, 3 or 2 years respectively or 3 percentage points in one year. Alesina & Ardagna (1998) identify the periods of occurrence of fiscal episodes by looking for the periods when the change in the cyclically adjusted primary balance was greater than 2 percentage points in one year or at least 1.5 percentage points of GDP on average in the last two years. Afonso's (2006, 2010) assessment of fiscal episodes relies on a different method: there is a fiscal episode when the change in the cyclically adjusted primary balance is greater than 1.5 times the panel standard deviation of this indicator or when the average absolute change in the last two years is greater than the standard deviation of the full panel. Table I shows the fiscal expansions and contractions according to the different criteria.[7]

The measures used by Giavazzi & Pagano (1996), Alesina & Ardagna (1998) and Afonso (2006, 2010), were labelled respectively as FE^1, FE^2 and FE^3. Overall there is a considerable overlapping of episodes according to the different criteria: there is a coincidence of 82 and 63 percent between fiscal episodes 1 and 2 and 1 and 3, respectively and 82 percent between criteria 2 and 3 (see Table I). The highest number of episodes is given by the criteria used by Alesina & Ardagna (1998), although the methodology followed by Giavazzi & Pagano (1996) leads to higher duration in both expansions and contractions.

All the criteria capture the cases studied by Giavazzi and Pagano (1990), as there is an identification of fiscal contractions in Denmark in 1983-86 and in Ireland in 1988. Also, there is a clear identification of fiscal expansions in 2009 across the EMU countries, following the European Commission policy recommendations after the 2007-08 financial crisis. Furthermore, the different methodologies also identify the consolidation efforts made by the countries under financial assistance in 2011-2012, namely Ireland, Greece and Portugal.

[7] We used a slightly lower threshold for the Afonso's (2006, 2010) methodology, due to the increase in the standard deviation of the panel sample from 1.57 to 2.00. We used 1, instead of 1.5 times the standard deviation.

Table I - Identification of the fiscal episodes according to the different criteria (1970-2012)

	FE^1		FE^2		FE^3	
Country	**Expansions**	**Contractions**	**Expansions**	**Contractions**	**Expansions**	**Contractions**
Austria	04	97	04	84, 97, 01, 05	04	84, 97, 01, 05
Belgium	81, 05, 09	82-87	81, 05, 09	82-85, 06	81, 05, 09	82, 84-85, 06
Denmark	75-76, 90-91	83-87	75, 82,90	83-86	75, 82, 90	83-86
Finland	79-80, 83, 91-93, 10	76-77, 97-98, 00-01	78,87, 91, 09	76-77, 81, 88, 96-97, 00-01	78, 87, 91-92, 10	76, 88, 96, 00
France			09		09	
Germany	75, 91, 95, 01-02	96-99, 12	75, 90-91, 95, 01, 10	96-97, 00, 11-12	75, 90-91, 95, 01-02, 10	96-97, 00, 11
Greece	04, 08-09	92-94, 96, 10-12	89, 95, 08-09	91-92, 94, 10-12	89, 95, 08-09	91-92, 94, 10-12
Ireland	01-02, 07-11	88, 11-12	95, 01, 07-10	88, 11-12	95, 01-02, 07-10	88, 11-12
Italy		83, 92-94, 12	81, 01	82-83, 92-93, 12	81, 01	82-83, 92-93, 12
Netherlands	02, 09-10	91, 93	01, 09	91, 93, 96	01, 09	91, 93, 96
Portugal	78-80, 94, 09-10	83-84, 11-12	78-79, 85, 93, 05, 09	83-84, 86, 88, 92, 11-12	78, 85, 93, 05, 09-10	83, 86, 88, 92, 11-12
Spain	08-11		08-09		08-09	
Sweden	02-03	96-99	02	96-97	02	96-97
United Kingdom	91-93, 01-04, 09	97-00, 11-12	90, 92, 01-02, 09	97-98, 00, 11-12	90, 92-93, 01-03, 09	00, 11
# Years with episodes	53	55	62	57	51	46
Average duration of episodes (years)	1.89	2.39	1.63	1.63	1.34	1.35

Source: author's computations. *Notes:* FE^1 - Measure based on Giavazzi & Pagano (1996); FE^2 - Measure based on Alesina & Ardagna (1998); FE^3 - Measure based on Afonso (2006, 2010).

Recent studies such as Afonso & Jalles (2012) and Alesina & Ardagna (2013) also include a criterion for identifying fiscal consolidations referred to as IMF's "Action Based Approach" computed by Devries *et al.* (2011). It identifies fiscal consolidations based not on the changes in CAPB, but on an historical approach through the analysis of policy documents. Arguably the CAPB based fiscal consolidations may be biased in the sense that they may capture changes that are not related to policy actions due to its inability to remove sharp fluctuations in economic activity. Unfortunately the database is still under update, so we would have to discard the most recent years (2010-2012) in order to accommodate that approach. Therefore we will not include it at this point, but we intent to do so in future research.

3.2.Monetary episodes

One of the main points in this paper is the study of the coupling of fiscal and monetary policy in order to assess if monetary expansions have an impact on the relationship between government budgetary components and private consumption during fiscal consolidation episodes. Therefore, it is crucial to establish a clear identification of the monetary episodes in the EMU countries. We chose three indicators that could be used as a measure of the monetary stance for the different countries, namely the real short term money market interest rate, and the nominal and real effective exchange rates.

The change in the real short term interest rate is a widely used measure of the monetary policy easing or tightening[8] as it accounts not only for the money market rates but also for the price developments. Therefore a negative variation in this indicator signals a real monetary easing, rather than a nominal one.[9]

Both the nominal and the real effective exchange rate assess the currency value in a country *vis-à-vis* a weighted average of other selected countries' currencies, being commonly used to assess the countries' competitiveness. The nominal effective exchange rate has been used by Ardagna (2004) as an indicator of the monetary stance. A negative change in this indicator corresponds to currency depreciation and therefore a monetary expansion. We also included the real effective exchange rate with the purpose of accounting for possible differences in monetary episodes identification due to price developments, which links to the arguments presented on the interest rates case.

In order to define the monetary episodes we relied on a similar strategy as Afonso (2006, 2010) and identified an episode when the absolute change in one year or the average change in two years in the different indicators was greater than 1.5 times or 1 time the panel standard deviation respectively:

$$ME_t^l = \begin{cases} 1, if \left|\Delta M_t^l\right| > 1,5\sigma^l \\ 1, if \left|\dfrac{\Delta M_t^l + \Delta M_{t-1}^l}{2}\right| > \sigma^l \quad l = 1,2,3 \cdot \\ 0, otherwise \end{cases} \tag{1}$$

[8] See for instance Afonso & Sousa (2011).

[9] Since the nominal short-term interest rates are very similar in the EMU countries from 1999 onwards we cannot include them in my estimations due to near singular matrix issues and so they were excluded from this analysis.

ME_t^l denotes a monetary episode in period t according to criteria l; ΔM_t^l corresponds to the change of the indicator l in period t. For the real short term interest rate we have an absolute change while in the nominal and real effective exchange rates we used the percentage change of the respective indexes. σ^l stands for the panel standard deviation of the relevant indicator.

Table II shows the monetary episodes identified according to the different indicators. ME^1, ME^2 and ME^3 correspond to the use of the methodology across the changes in the real short term interest rate, and the percent changes in the real and nominal effective exchange rate, respectively.

One of the main highlights is that there are considerably more monetary episodes than fiscal ones. The duration of the monetary episodes also changes significantly across the different criteria. If we look at the monetary episodes based on the change in the real short term interest rate (ME^1), it is possible to see that the expansions and contractions last 1.5 and 1.8 years on average respectively. If we consider the changes in the nominal effective exchange rates the duration of the expansions more than doubles and in the case of the contractions it also increases significantly.

Moreover, while in the fiscal episodes case there is a significant overlapping across the different criteria, in here it is much lower, with the matching being only 38, 51 and 63 percent between ME^1 and ME^2, ME^1 and ME^3 and ME^2 and ME^3, respectively. The splitting between expansions and contractions is fairly even, with the exception of ME^3, which reports considerably more contractions than expansions. Also, we can see that there are episodes labelled as expansions in ME^1 that show up as contractions in ME^2 and ME^3, which further motivates the inclusion and analysis of all the different criteria.[10]

The descriptive statistics of the indicators used to identify both fiscal and monetary episodes can be consulted in table XI in the Appendix.

[10] For instance in Austria we have a monetary expansion in 1983 expansion according to ME^1, but it shows up as a contraction in ME^3.

Table II – Identification of the monetary episodes according to the different criteria (1970-2012)

	ME^1		ME^2		ME^3	
Country	**Expansions**	**Contractions**	**Expansions**	**Contractions**	**Expansions**	**Contractions**
Austria	72, 83, 94, 09-10	77, 80-81, 89-90	97-98, 00	77, 80, 87, 93, 95, 04		73-80, 83, 86-88, 93, 95
Belgium	72,75, 82-83, 93-94, 10	76-77, 79-81, 90-91	81-83, 97-98, 00	77, 79, 86-87, 95, 03-04	81-83, 97	77-78, 86-87, 91, 95, 03-04
Denmark	73, 81, 94-97, 10	76-78, 90-91, 93, 07, 11	80-82, 00	79, 86-87, 03-04, 09	80-82, 00	73-74, 76, 86-87, 90-91, 93, 95, 03-04
Finland	71-74, 88, 93-95, 98, 12	75-76, 80, 83-84, 89-92	72, 78-79, 92-94, 97, 00, 11	74-76, 80-82, 85, 89-90, 95-96, 03-04	72-73, 78-79, 92-93, 97, 00	81, 89-90, 94-96, 03-04
France	72, 75-76, 94, 97	74, 77, 81, 90	82-84, 97-98, 00-01	86-87, 03-04	77-78, 81-84, 00	73, 75-76, 86-87, 90, 93-96, 03-04
Germany	75, 82-83, 86, 93, 02, 09-10	73, 80-81, 90	81-82, 85, 89, 97-98, 00-01, 11	79, 87, 93-95, 03-04	97, 00	72-80, 83-84, 86-88, 93-96, 03-04
Greece	82, 90, 95-96, 00-03	86, 89, 92-94, 98	83-86, 00-01	82, 88, 90-91, 95-96, 03-04, 08	72-95	03-04
Ireland	75-76, 81, 88-89, 92-94, 98-99, 10-12	74, 77-79, 83-85, 90-91, 07-09	88-89, 93-94, 99-00, 10-12	79-80, 82-83, 86-87, 02-04, 07-08	73-77, 81-82, 84, 99-2000	86, 90-91, 03-04, 08
Italy	73-74, 94, 99, 09	76, 81-85, 92	93-95, 00	83-84, 86-87, 90-91, 96-97, 03-04	73-85, 93-95, 00	87, 96-97, 03-04
Netherlands	71-72, 94-95, 10	73-74, 78-80, 90, 07	81, 84-85, 89, 97, 00	77, 79, 87, 95, 02-04	97	74-78, 83, 86-88, 93-95
Portugal	73-75, 80, 83, 88, 94-95, 98, 10	76-79, 81-82, 85, 87, 90-91, 08	77-80, 83-84	81-82, 89-93, 02-04	76-89, 94	
Spain	84-86, 88, 95, 99	78-81, 83, 87-88, 07-08	82-84, 93-94	85-91, 02-03, 08	76-78, 81-84, 93-94	74, 79, 89-91, 03-04
Sweden	86-87, 93-94	85, 92-93	78, 82-84, 93-94, 98-02, 09	79-80, 85, 89-91, 96, 03-04, 10-12	78-79, 82-84, 93-94, 01-02, 09	76, 96-97, 03-04, 10-12
United Kingdom	74-75, 88, 02, 09-10	73, 76-77, 81-82, 90, 98	83-84, 86-87, 93-94, 08-10	80-81, 88-89, 91, 97-99, 05, 07, 11-12	73-77, 83-84, 87, 93-94, 08-10	79-81, 88, 97-99
# Years with episodes	96	92	95	124	124	122
Average duration of episodes (years)	1.55	1.80	1.98	1.85	3.26	2.22

Source: author's computations. *Notes:* ME^1 - Measure based on the changes in the real short term interest rate; ME^2 - Measure based on changes in the real effective exchange rate; ME^3 - Measure based on the changes in the nominal effective exchange rate.

4. Empirical assessment

4.1. Data description

The data consists on annual frequency time series ranging from 1970 to 2012 for private consumption, GDP, general government final consumption, social transfers, taxes, cyclically adjusted primary balance, general government debt, revenue and expenditure, taken from the AMECO database.[11] We used 11 countries who belong to the EMU,[12] namely Austria, Belgium, Germany, Finland, France, Greece, Ireland, Italy, Netherlands, Portugal and Spain and also Denmark, Sweden and United Kingdom, which are not in the EMU, but are geographically and politically linked to the remaining. This means that we can have a maximum of 602 observations per variable, throughout the entire panel.

Tables XI-XIII in the Appendix show the descriptive statistics and unit root tests for the series used in the estimations.

The unit root tests in table XII in the Appendix show that most series are stationary. For the ones that are not, since we have already computed significant changes on the original series, such that what we have are the logarithms of the real *per capita* values, it makes sense to include all the series in levels. Otherwise we would risk losing some of the intuition behind the variable relationship, thus making the model more difficult to interpret.[13]

4.2. Modelling expansionary fiscal consolidations

The strategy for accessing the potential differences between fiscal expansions and fiscal contractions is based on Afonso (2006, 2010). It consists on estimating the variation of private consumption, using budgetary variables and dummies for assessing fiscal and monetary episodes. The core specification will be

$$\begin{aligned}\Delta C_{it} = {} & c_i + \lambda C_{it-1} + \omega_0 Y_{it-1} + \omega_1 \Delta Y_{it} + \delta_0 Y^{av}_{it-1} + \delta_1 \Delta Y^{av}_{it} + \\ & (\alpha_1 FCE_{it-1} + \alpha_3 \Delta FCE_{it} + \beta_1 TF_{it-1} + \beta_3 \Delta TF_{it} + \gamma_1 TAX_{it-1} + \gamma_3 \Delta TAX_{it}) \times FC^m_{it} + \\ & (\alpha_2 FCE_{it-1} + \alpha_4 \Delta FCE_{it} + \beta_2 TF_{it-1} + \beta_4 \Delta TF_{it} + \gamma_2 TAX_{it-1} + \gamma_4 \Delta TAX_{it}) \times (1 - FC^m_{it}) + \mu_{it}\end{aligned} \qquad (2)$$

[11] For full description of the original series see table X in the Appendix.
[12] Originally we also had Luxembourg, which was dropped due to the lack of information on monetary data.
[13] My argument follows the explanation presented in Afonso (2006, 2010).

where $i (i = 1, ..., N)$ indicates the different countries, $t (t = 1, ..., T)$ stands for the period. We also have: C – private consumption; Y – GDP; Y^{av} – panel's GDP average;[14] FCE – general government final consumption expenditure; TF – social transfers; TAX – taxes. All variables displayed correspond to the natural logarithm of the real *per capita* values.[15] FC^m is a dummy variable that identifies a fiscal consolidation episode, according to the three different criteria mentioned in the previous section $(m = 1, 2, 3)$. Therefore, when FC_{it}^m is equal to one, there is a fiscal consolidation in period *t*, for country *i*, according to the criteria m. c_i is an autonomous term which captures each country's individual characteristics, being the source of cross-country heterogeneity in a Fixed Effects model, which will be our estimation choice. The disturbances μ_{it} are assumed to be independent and identically distributed across countries with zero mean and constant variance.

4.2.1. Core specification outputs

According to Greene (2012), we use the Fixed Effects (FE) estimation whenever we are interested in analysing the impact of variables that change over time. It explores the relationship between predictor and dependent variables within a country. The FE model removes the effect of time-invariant characteristics from the predictor variables so we can assess the independent variables net effect. An important assumption of the model is that time invariant characteristics are country specific and should not be correlated with other individual features. In other words, each country has unique attributes that are not the result of random variation and that do not vary across time. The source of country heterogeneity is given by the intercept c_i in specification (1) with Fixed Effects allowing for correlation between the latter and the repressors.[16]

We perform redundant FE likelihood ratio tests for all estimations, with the null hypothesis being that there is no unobserved heterogeneity and so the model can be estimated by pooled OLS. If we reject this hypothesis then fixed effects is more adequate than pooled

[14] The original specification in Afonso (2006, 2010) used the OECD's GDP instead of the panel average. Nevertheless, since OECD only displays that series starting from 1995 we followed Afonso & Jalles (2011) and used the panel average GDP.

[15] For instance, in order to obtain the variable Y we make the following calculations: $Y = \ln\left(\frac{GDP / DEF}{N}\right)$, where *GDP* stands for the GDP at current prices, *DEF* and *N* correspond to the GDP deflator and total population, respectively.

[16] In the FE estimation the intercept also works as a substitute for non-specified variables, yielding consistent estimates in the presence of correlation between the latter and the repressors, which favours the usage of this model in comparison to pooled OLS.

OLS, since it allows for cross country heterogeneity by permitting each one to have its own intercept value (c_i).[17]

Table III presents the estimation results for specification (2) according to the different criteria for identifying fiscal consolidation episodes. Both consumption and income are statistically significant across the different specifications. The negative sign for consumption in t-1 (λ) has obviously to do with the fact that we have the lagged consumption as an independent variable, therefore increasing consumption in period t-1 decreases its difference between t and t-1. The short-run elasticity of private consumption to income is similar across specifications, ranging between 0.083 and 0.087.

There is a positive statistically significant relationship between the first difference of general government final consumption expenditure (ΔFCE_t) and private consumption (ΔC_t) when we have a fiscal consolidation ($FC^m = 1$), across all of the estimations based on (2), with coefficients between 0.193 and 0.237. Such relationship is in line with the traditional Keynesian effects, indicating that consumers are not behaving in a Ricardian way, since they do not seem to anticipate the need for increased taxation in the future due to an increase in government spending today.

The previous relationship does not hold in the absence of a fiscal consolidation episode. Moreover, there is some evidence of non-Keynesian effects in the absence of fiscal consolidations ($FC^m = 0$) if we look at the final consumption expenditure (FCE_{t-1}) and taxes (TAX_{t-1}) in column 3 and across the three different estimations, respectively. The negative sign in the short-run elasticity of general government final consumption expenditure to private consumption suggests Ricardian behaviour in the absence of fiscal consolidations. Similar non-Keynesian reasoning holds for the relationship between taxes and consumption, meaning that an increase in taxes today leads to increased spending as consumers anticipate that there is no need for increased taxation in the future.

[17] We report the redundant FE likelihood ratio for all estimations. In any case the no cross-country heterogeneity assumption is always rejected, meaning that the FE estimator is more adequate than pooled OLS.

Table III – Fixed Effects estimation results for specification (2)

			FC^1		FC^2		FC^3	
λ	C_{t-1}		-0.090***		-0.089***		-0.076***	
			(-3.62)		(-3.61)		(-3.05)	
ω_0	Y_{t-1}		0.084***		0.083***		0.087***	
			(3.06)		(3.06)		(3.14)	
ω_1	ΔY_t		0.809***		0.812***		0.835***	
			(11.41)		(11.51)		(12.24)	
δ_0	Y_{t-1}^{av}		-0.026*		-0.025*		-0.033**	
			(-1.80)		(-1.74)		(-2.19)	
δ_1	ΔY_t^{av}		-0.169**		-0.165**		-0.187***	
			(-2.38)		(-2.31)		(-2.62)	
α_1	FCE_{t-1}		0.005		0.010		-0.001	
			(0.20)		(0.50)		(-0.06)	
α_3	ΔFCE_t		0.193*		0.214**		0.237**	
			(1.85)		(2.05)		(2.09)	
β_1	TF_{t-1}		0.003		0.002		-0.003	
		$\times FC^m$	(0.22)		(0.18)		(-0,13)	
β_3	ΔTF_t		-0.005		0.016		0,063	
			(-0.06)		(0.18)		(0,49)	
γ_1	TAX_{t-1}		0.005		0.001		0,007	
			(0.23)		(0.07)		(0,33)	
γ_3	ΔTAX_t		0.044		0.033		0,027	
			(0.72)		(0.67)		(0,45)	
α_2	FCE_{t-1}		-0.013		-0.015		-0,027**	
			(-0.98)		(-1.16)		(-2,10	
α_4	ΔFCE_t		0.048		0.041		0,007	
			(0.79)		(0.67)		(0,12)	
β_2	TF_{t-1}	$\times(1-FC^m)$	0.002		0.002		0,000	
			(0.22)		(0.30)		(-0,07)	
β_4	ΔTF_t		0.031		0.033		0,033	
			(0.97)		(1.05)		(1,07)	
γ_2	TAX_{t-1}		0.024**		0.025**		0,029**	
			(2.15)		(2.26)		(2,43)	
γ_4	ΔTAX_t		0.033		0.029		0,033	
			(1.43)		(1.21)		(1,44)	
N			454		454		440	
R^2			0.73		0.732		0,742	
			t-stat.	p-val.	t-stat.	p-val.	t-stat.	p-val.
Redundant FE likelihood ratio			3.09	0.00	3.04	0.00	3.04	0.00
Null hypothesis								
$\alpha_3 - \alpha_4 = 0$			-1.74	0.08	1.54	0.12	1.35	0.18
$\gamma_1 - \gamma_2 = 0$			-0.45	0.65	-0.20	0.84	0.09	0.93

Notes: Used robust heteroskedastic-consistent standard errors. The t-statistics are in parentheses. *, ** and *** denotes statistically significant at a 10, 5 and 1 percent level, respectively. FC^1 - Measure based on Giavazzi & Pagano (1996); FC^2 - Measure based on Alesina & Ardagna (1998); FC^3 - Measure based on Afonso (2006, 2010).

However the Wald coefficient statistical tests suggest that there is no significant difference between the presence and absence of fiscal consolidations concerning the short-run effects of government final consumption expenditure and taxation on private consumption (the null hypothesis: $\alpha_3 - \alpha_4 = 0$ and $\gamma_1 - \gamma_2 = 0$ are not rejected on the third and all specifications, respectively).

Comparing to the literature that used similar methodology, as a whole our results differ from Afonso (2006, 2010) and Afonso & Jalles (2012), since we find no evidence of non-Keynesian effects considering general government final consumption expenditure or taxes in the presence of fiscal consolidations ($FC^m = 1$). However, our findings are similar for periods of no fiscal consolidation ($FC^m = 0$), since there is some evidence of non-Keynesian effects in this case for the mentioned budgetary variables.

4.2.2. Fiscal consolidations and monetary expansions.

The following specification is one of the main contributions of this paper, adding each country's monetary developments to specification (2). It will permit a breakdown of all the possible combinations between fiscal contractions and monetary expansions, thus allowing for the study of the possible differences between them.

$$\begin{aligned}
\Delta C_{it} = {} & c_i + \lambda C_{it-1} + \omega_0 Y_{it-1} + \omega_1 \Delta Y_{it} + \delta_0 Y_{it-1}^{av} + \delta_1 \Delta Y_{it}^{av} + \\
& (\alpha_{10} FCE_{it-1} + \alpha_{30} \Delta FCE_{it} + \beta_{10} TF_{it-1} + \beta_{30} \Delta TF_{it} + \gamma_{10} TAX_{it-1} + \gamma_{30} \Delta TAX_{it} + \eta_{50} \Delta M_{it}^{l}) \times FC_{it}^{m} MX_{it}^{l} + \\
& (\alpha_{20} FCE_{it-1} + \alpha_{40} \Delta FCE_{it} + \beta_{20} TF_{it-1} + \beta_{40} \Delta TF_{it} + \gamma_{20} TAX_{it-1} + \gamma_{40} \Delta TAX_{it} + \eta_{60} \Delta M_{it}^{l}) \times (1 - FC_{it}^{m}) MX_{it}^{l} + \\
& (\alpha_{11} FCE_{it-1} + \alpha_{31} \Delta FCE_{it} + \beta_{11} TF_{it-1} + \beta_{31} \Delta TF_{it} + \gamma_{11} TAX_{it-1} + \gamma_{31} \Delta TAX_{it} + \eta_{51} \Delta M_{it}^{l}) \times FC_{it}^{m} (1 - MX_{it}^{l}) + \\
& (\alpha_{21} FCE_{it-1} + \alpha_{41} \Delta FCE_{it} + \beta_{21} TF_{it-1} + \beta_{41} \Delta TF_{it} + \gamma_{21} TAX_{it-1} + \gamma_{41} \Delta TAX_{it} + \eta_{61} \Delta M_{it}^{l}) \times (1 - FC_{it}^{m})(1 - MX_{it}^{l}) + \mu_{it}
\end{aligned} \tag{3}$$

In addition to the repressors previously explained, MX_{it}^{l} denotes a monetary expansion in period t $(t = 1, ..., T)$ for country i $(i = 1, ..., N)$ according to the criteria l $(l = 1, 2, 3)$. ΔM^{l} corresponds to the relevant indicator used to calculate the monetary episodes on (1). We have found some evidence of non-Keynesian effects during fiscal consolidations in 5 out of the 9 possible estimations.[18] Tables IV and V show some of the most relevant estimation results.

[18] Notice that since we have three different criteria for fiscal and monetary developments, the assessment of their relationship within the current framework yields 9 possible estimation outputs. The other outputs are available in tables XIV-XVII in the Appendix.

Table IV – Fixed Effects estimation for specification (3): 1st output

			FC^1, MX^3	FC^2, MX^1	FC^3, MX^1
λ	C_{t-1}		-0.096***	-0.097***	-0.097***
			(-3.80)	(-4.05)	(-4.10)
ω_0	Y_{t-1}		0.093***	0.099***	0.102***
			(3.25)	(3.64)	(3.82)
ω_1	ΔY_t		0.803***	0.799***	0.789***
			(10.93)	(11.14)	(11.17)
δ_0	Y_{t-1}^{av}		-0.019	-0.029**	-0.0294**
			(-1.22)	(-2.06)	(-2.06)
δ_1	ΔY_t^{av}		-0.181**	-0.155**	-0.145**
			(-2.53)	(-2.22)	(-2.08)
α_{10}	FCE_{t-1}		0.050	0.200	-0.840***
			(1.40)	(1.33)	(-14.24)
α_{30}	ΔFCE_t		-0.213***	-0.369*	-0.039
			(-3.58)	(-1.72)	(-0.30)
β_{10}	TF_{t-1}		0.010	0.026	1.293***
		$\times FC^m$	(0.69)	(0.84)	(21.38)
β_{30}	ΔTF_t	$\times MX^l$	-0.130*	0.034	-11.42***
			(-1.83)	(0.12)	(-19.53)
γ_{10}	TAX_{t-1}		-0.051**	-0.206*	-0.552***
			(-2.06)	(-1.71)	(-9.29)
γ_{30}	ΔTAX_t		-0.132***	0.484***	2.694***
			(-3.07)	(4.55)	(17.32)
η_{50}	ΔM_t^l		0.096**	0.003	-0.215***
			(2.08)	(0.49)	(-20.12)

Table V – Fixed Effects estimation for specification (3): 1st output (cont.)

			FC^1, MX^3		FC^2, MX^1		FC^3, MX^1	
α_{20}	FCE_{t-1}		-0.005		-0.035**		-0.038**	
			(-0.24)		(-2.15)		(-2.39)	
α_{40}	ΔFCE_t		0.270**		0.010		0.010	
			(2.51)		(0.09)		(0.09)	
β_{20}	TF_{t-1}		0.014		-0.018		-0.018	
		$\times(1-FC^m)$	(1.21)		(-1.57)		(-1.52)	
β_{40}	ΔTF_t	$\times MX^l$	-0.043		-0.028		-0.029	
			(-0.91)		(-0.58)		(-0.59)	
γ_{20}	TAX_{t-1}		-0.007		0.056***		0.055***	
			(-0.47)		(3.74)		(3.67)	
γ_{40}	ΔTAX_t		-0.027		-0.002		-0.004	
			(-0.52)		(-0.04)		(-0.08)	
η_{60}	ΔM_t^l		0.025		-0.000		-0.001	
			(0.52)		(-0.55)		(-0.48)	
α_{11}	FCE_{t-1}		0.011		0.005		0.002	
			(0.42)		(0.22)		(0.07)	
α_{31}	ΔFCE_t		0.260**		0.310***		0.405***	
			(2.36)		(3.57)		(5.13)	
β_{11}	TF_{t-1}	$\times FC^m$	-0.007		0.003		-0.005	
			(-0.40)		(0.35)		(-0.37)	
β_{31}	ΔTF_t	$\times(1-MX^l)$	-0.093		-0.025		-0.063	
			(-1.01)		(-0.31)		(-0.59)	
γ_{11}	TAX_{t-1}		-0.006		0.002		0.008	
			(-0.28)		(0.09)		(0.40)	
γ_{31}	ΔTAX_t		0.120		-0.017		-0.051	
			(1.58)		(-0.36)		(-0.85)	
η_{51}	ΔM_t^l		0.044		0.001		0.002	
			(0.84)		(1.31)		(1.78)	
α_{21}	FCE_{t-1}		-0.021		-0.015		-0.017	
			(-1.42)		(-0.98)		(-1.17)	
α_{41}	ΔFCE_t		0.006		0.038		0.029	
			(0.10)		(0.55)		(0.42)	
β_{21}	TF_{t-1}		0.003		0.005		0.005	
		$\times(1-FC^m)$	(0.45)		(0.61)		(0.70)	
β_{41}	ΔTF_t	$\times(1-MX^l)$	0.040		0.057		0.054	
			(1.09)		(1.64)		(1.60)	
γ_{21}	TAX_{t-1}		0.017		0.018*		0.016	
			(1.36)		(1.74)		(1.58)	
γ_{41}	ΔTAX_t		0.029		0.046*		0.044*	
			(1.19)		(1.83)		(1.82)	
η_{61}	ΔM_t^l		0.036		-0.001		-0.000	
			(1.23)		(-0.93)		(-0.88)	
	N		454		454		454	
	R^2		0.759		0.755		0.763	
			t-stat.	p-val.	t-stat.	p-val.	t-stat.	p-val.
	Redundant FE likelihood ratio		3.53	0.00	3.85	0.00	4.08	0.00

Notes: Used robust heteroskedastic-consistent standard errors. The t-statistics are in parentheses. *, ** and *** denotes statistically significant at a 10, 5 and 1 percent level, respectively.

We can see that when the fiscal consolidations are matched by a monetary expansion there is a negative and statistically significant short-term elasticity between the government final consumption expenditure and private consumption ($\alpha_{30} < 0$ in the first and second outputs and $\alpha_{10} < 0$ in the third output). This doesn't hold for fiscal consolidations that are not accompanied by a monetary easing as α_{31} is positive and statistically significant and α_{11} is not statistically significant across the respective outputs. The second and third estimation results also show some evidence of non-Keynesian elasticity on taxes when there are both fiscal contractions and monetary expansions ($\gamma_{30} > 0$). Just like in the previous case, such effects seem to disappear when we have fiscal consolidations without the respective monetary easing as γ_{31} is not statistically significant. The same pattern emerges again for social transfers on the first and third outputs (β_{30} is negative and statistically significant, but β_{31} is not statistically significant). Table XIX in the appendix shows the summary of the robustness test computed for estimations based on specification (3) The Wald coefficient restriction tests, in table XVIII in the Appendix, show that the difference between these coefficients is statistically significant in all cases, except for social transfers in the first output ($\beta_{30} - \beta_{31} = 0$ is not rejected at a 10% level in this case).

A possible explanation relates to liquidity restrictions, which may prevent a Ricardian behaviour, thus undermining the permanent income hypothesis. If households do have liquidity constrains, a fiscal consolidation could signal indeed a future tax decrease and a permanent income rise, which is perceived by the households, but does not materialize in a current private consumption increase due to limitations in access to credit markets. Such is summarized by Alesina & Ardagna (1998) as "the size of the increase in private consumption [following government spending cuts] depends on the absence of liquidity-constrained consumers".

The IS-LM framework argument presented by Ardagna (2004) that the signs of the coefficients may be biased in the sense that they are capturing the monetary stance is unlikely, since we are controlling for these.

4.3.Measuring the success of fiscal consolidations

In this section we will investigate what are the factors that may contribute to the success of fiscal consolidations. We computed dummy variables for successful fiscal adjustments in two different ways based on the literature in order to assess if our findings are

robust across different criteria. The first measure (SU_t^1) is based on Afonso & Jalles (2012) who define a fiscal consolidation as being successful if the change in the cyclically adjusted primary balance (Δb_t) for two consecutive years is greater than the standard deviation (σ) of the full panel sample:

$$SU_t^1 = \begin{cases} 1, if \sum_{i=0}^{1} \Delta b_{t+i} > \sigma \\ 0, otherwise \end{cases}. \quad (4)$$

We have also included a measure computed by Alesina & Ardagna (2013) which is based on the level of debt as a percentage of GDP. A fiscal consolidation is successful if the debt-to-GDP ratio two years after the end of the fiscal adjustment ($Debt_{t+2}$) is lower than the debt-to-GDP ratio in the last year of the adjustment ($Debt_t$):

$$SU_t^2 = \begin{cases} 1, if\ Debt_{t+2} < Debt_t \\ 0, otherwise \end{cases} \quad (5)$$

The identification of the leading policy option for the fiscal consolidation – either expenditure or revenue based – is also assessed through dummy variables. Therefore, a fiscal consolidation on period t is defined as being expenditure based (EXP_t) if the change in the total expenditure of the general government as a percentage of GDP in that period (Δexp_t) accounts for a proportion greater than λ of the change in the cyclically adjusted primary balance (Δb_t)

$$EXP_t = \begin{cases} 1, if \frac{\Delta \exp_t}{\Delta b_t} > \lambda \\ 0, otherwise \end{cases}. \quad (6)$$

Following Afonso & Jalles (2012) we computed the composition of the adjustment for three different thresholds, so that λ assumes the values of 1/2, 2/3 and 3/4. A similar process was conducted for the revenue based consolidations. Table VI shows the number of fiscal consolidation episodes and their respective success rate (successes / total events), based on the

criteria defined in the earlier sections. The identification of the successful episodes follows specifications (4) and (5). Table XX in the Appendix shows the successful fiscal episodes for each country according to the different criteria.

Table VI – Fiscal consolidation events and success rates

		SU^1		SU^2	
	Total events	**Successes**	**Success rate (%)**	**Successes**	**Success rate (%)**
FC^1	49	25	51%	29	59%
FC^2	56	32	57%	19	34%
FC^3	46	28	61%	17	37%

Source: author's computations. *Notes:* SU^1 - Measure of success based on (4); SU^2 - Measure of success based on (5).

If we look at the successful events based on the change in CAPB for two consecutive years, SU^1, we can see that the success rates range from 51% to 61%, according to FC^1 and FC^3, respectively. Although FC^2 reports the highest number of successful consolidations, the success rate is slightly lower than in FC^3 (57% vs 61%), thus being penalized by the higher number of consolidation events (56 vs 46). Nevertheless, the success rates are similar to the ones found on Afonso & Jalles (2012).

In the case of SU^2, we can see that there are significant differences across the criteria used to identify the fiscal consolidations, namely between FC^1 and the remainder. This is actually the only criterion that has a success rate that is similar to the one found in the SU^1 case, while FC^2 and FC^3 are below their peers by more than 20 percentage points.

On the one hand, the main explanation for the difference between the success rates within SU^2 has to do with the duration of the fiscal consolidations coupled with its lower flexibility *vis-à-vis* SU^1. As seen earlier on table I, the fiscal consolidations based on FC^1 have a much higher duration than either FC^2 or FC^3. The only requirement for a fiscal consolidation to be successful according to SU^2 is that the level of debt-to-GDP in two years after the end of the adjustment has to be lower than the one in the last year of the adjustment. Therefore, longer periods of adjustment will necessarily result into more successful years of fiscal consolidation. The same does not occur in SU^1 as it allows for successful and non-successful years within the same adjustment period.[19]

[19] This is a consequence that derives from the fact that Alesina & Ardagna (2013) treat multi-year periods as a single episode and define all those years as either being successful or not altogether, which might have some implications on the results. Perotti (2012) provides a detailed description of this issue.

On the other hand, since the success rates based on SU^1 are generally higher than in SU^2, one can argue that, based on these results, countries have been more successful in improving their fiscal position rather than their levels of debt ratios. This signals that although there are improvements in the CAPB during the fiscal consolidation periods, this doesn't necessarily result in a fiscal surplus at least in the next two years after the end of the adjustment. This ultimately impinges on the countries' debt ratios during that period.

In table VII we present some facts about the expenditure and revenue based consolidations, which were computed for the three different criteria used to identify the fiscal contractions. By disentangling those we can assess the possible differences regarding the criteria used to define fiscal consolidations as successful and also the possible implications for GDP growth. This table shows the results computed for a threshold of λ=2/3, while the results for the other thresholds can be consulted in tables XXI and XXII in the Appendix.

Table VII – Expenditure and revenue based consolidations: λ=2/3

	Total Events	**Average Size of the Consolidation**	$\sum_{i=0}^{1} \Delta b_{t+i}$	$Debt_{t+2} - Debt_t$
Expenditure Based 1	23	2.36	2.87	-2.50
Expenditure Based 2	23	2.83	3.07	-0.74
Expenditure Based 3	18	3.49	3.65	-0.34
Revenue Based 1	13	0.84	1.91	-1.06
Revenue Based 2	15	1.64	1.32	4.49
Revenue Based 3	13	1.93	1.71	4.77

Source: author's computations.

We can see that in our panel there are significantly more expenditure based consolidation events, rather than revenue based ones. The number of expenditure based consolidations ranges between 18, in FC^3 and 23, both in criteria one and two. The revenue based consolidations account for 13 and 15 events, based on both FC^1 and FC^3, and FC^2 respectively.

The average size of the consolidations (based on the change in the CAPB) is also higher in the expenditure based cases across all the different criteria, compared to revenue based ones. The minimum difference is 1.19 percentage points (pp.) in case 2, but it can get as

high as 1.56 pp. in case 3. Overall we have stronger adjustments for the expenditure based consolidations. These findings differ from Afonso & Jalles (2012), which report no significant difference between the size of the consolidation that is done via the expenditure or the revenue side of the budget.

The next column ($\sum_{i=0}^{1}\Delta b_{t+i}$) reports the changes in the cyclically adjusted primary balance for two consecutive years, used in SU^1. The differences between the expenditure and revenue based consolidations lie roughly between 0.96 and 1.94 pp. in cases one and three, respectively.

We can also look at the difference between the debt-to-GDP ratio two years after the end of the adjustment and in the last year of the adjustment, in the following column, which was used to compute SU^2. All of the criteria report that on average the expenditure based consolidations led to a decrease in the debt-to-GDP ratio on that period. On the revenue based side, we have significant differences between FC^1 and the remainder. While in the latter there was a decrease in the debt-to-GDP ratio, in FC^2 and FC^3 it actually increased more than 4 percentage points. Nevertheless, even in the first case we can see that there was a more significant improvement in the debt-to-GDP ratio for the expenditure based consolidation.[20]

Following the results in table VII, we estimated a probit model based on Afonso & Jalles (2012) in order to assess if the reported differences between the expenditure and revenue based consolidations are statistically relevant and impinge on the success of the fiscal adjustments:

$$\Pr_i\left(SU=1|Z_i\right)=E[SU=1|Z_i]=\Phi\left(Z_i\right) \tag{7}$$

where $E[SU=1|Z_i]$ is the conditional expectation of the success of the fiscal consolidation, given Z_i and SU refers to the dummy variables defined in (4) and (5). Z_i is defined as follows:

$$Z_i=\delta_1+\delta_2 D_i+\delta_3\Delta b_i+\delta_4 EXP_i+\delta_5 MX_i \tag{8}$$

[20] This is the only reported finding that doesn't hold across the 3 different thresholds, being true only for λ =2/3 and λ =3/4. For λ =1/2 there is no significant difference between the expenditure and revenue based episodes in FC^1 on this matter.

D_i is the duration of the fiscal consolidation, Δb_i refers to the change in the cyclically adjusted primary balance, which accounts for the size of the consolidation. EXP_i was defined in (6) as a dummy variable that accounts for expenditure based consolidations, according to different thresholds, while the same was done on the revenue side.

We also included MX_i which refers to the dummy variable used to identify the monetary expansions computed earlier, according to (1). The motivation behind this addition has to do with an issue raised in the recent literature, which has to do with the possible influence of the monetary expansions in determining the success of fiscal consolidations.

For instance, Devries *et al.* (2011) suggest that expenditure based consolidations where more successful because they were complemented by monetary expansions, in the form of strong currency devaluations. Alesina *et al.* (2012) mention the importance of accompanying monetary policy in determining the possible heterogeneous effects of expenditure based and revenue based consolidations. Alesina & Ardagna (2013) also account for the possible role of the monetary policy in differentiating the effects of expenditure versus revenue based adjustments.[21]

Table VIII shows the results for the success measure constructed by Afonso & Jalles (2012), based on FC^2.[22] The results for the other criteria used to compute fiscal consolidations can be consulted in tables XXIII and XXVI in the Appendix.

We can see that according to the measure first computed by Afonso & Jalles (2012) the success of the fiscal consolidations seems to be enhanced if based on expenditure cuts. On the other hand, we find no statistically significant results for the revenue based consolidations. Moreover, both the duration and size of the consolidations seem to play a significant role: longer and stronger consolidations appear to contribute positively for the success of the fiscal consolidations. These results hold for all of the reported thresholds in FC^2 and FC^3. In the FC^1 case we find statistically significant results only for the size of the consolidations.[23] Concerning the role of the monetary policy, we find no statistically significant results.[24]

[21] However, in this case they found no significant impact of monetary policy.

[22] Some observations were excluded due to the fact that they occur in the last years of the sample and therefore we cannot assess if they were successful according to either (4) or (5).

[23] See tables XXIII and XXVI in the Appendix for FC^1 and FC^3.

[24] Results for MX^3 are available on request and do not alter the overall findings. We could not compute the estimations for MX^1 since it perfectly predicts the success of the fiscal consolidations.

Table VIII – Success of fiscal consolidations for SU^1 based on FC^2

	Expenditure			Revenue		
Specification	1	2	3	4	5	6
constant	-4.930***	-3.842***	-3.851***	-3.171***	-2.962**	-2.962**
	(-3.17)	(-2.93)	(-2.97)	(-2.79)	(-2.48)	(-2.48)
duration	1.177**	0.974*	0.975*	0.860*	0.828*	0.828*
	(1.99)	(1.93)	(1.94)	(1.87)	(1.72)	(1.72)
Δcapb	1.178***	1.006***	1.009***	0.873***	0.870***	0.870***
	(3.34)	(3.23)	(3.29)	(3.01)	(2.89)	(2.89)
exp12	1.443***					
	(3.14)					
exp23		0.783*				
		(1.70)				
exp34			0.783*			
			(1.70)			
rev12				0.059		
				(0.12)		
rev23					-0.296	
					(-0.62)	
rev34						-0.296
						(-0.62)
mx2	0.031	0.055	0.059	0.343	0.243	0.243
	(0.06)	(0.11)	(0.11)	(0.57)	(0.46)	(0.46)
R^2	0.487	0.414	0.414	0.381	0.386	0.386
N	50	50	50	50	50	50

Notes: Used robust heteroskedastic-consistent standard errors. The t-statistics are in parentheses. *, ** and *** denotes statistically significant at a 10, 5 and 1 percent level, respectively. *12*, *23* and *34* next to *exp* and *rev* refer to the relevant value for λ, according to (6).

Table IX shows the results for the success criterion SU^2, based on FC^1. The results for FC^2 and FC^3 can be consulted in tables XXV and XXVI the Appendix. The results are similar to the ones found in the SU^1 case, concerning the role of the duration and of the expenditure based adjustments in the success of the fiscal consolidations. Moreover, we have found some evidence that the revenue based consolidations have a negative impact on the success of the adjustment. On the other hand, contrary to the findings for SU^1, it seems that the size of the consolidation has a negative impact on the success of the consolidation, thus not being robust across the different criteria.

Table IX - Success of fiscal consolidations for SU^2 based on FC^1

	Expenditure			Revenue		
Specification	1	2	3	4	5	6
constant	-1.672	-1.690	-1.884	-0.850	-0.519	-0.519
	(-1.41)	(-1.42)	(-1.41)	(-0.90)	(-0.52)	(-0.52)
duration	0.821**	0.832***	0.860**	0.720***	0.923***	0.923***
	(2.56)	(2.61)	(2.42)	(3.06)	(3.41)	(3.41)
Δcapb	-0.262**	-0.263**	-0.221*	-0.233*	-0.404***	-0.404***
	(-2.03)	(-2.04)	(-1.87)	(-1.70)	(-2.65)	(-2.65)
exp12	1.600**					
	(2.48)					
exp23		1.601**				
		(2.46)				
exp34			1.938**			
			(2.49)			
rev12				-0.317		
				(-0.55)		
rev23					-1.571**	
					(-1.99)	
rev34						-1.571**
						(-1.99)
mx2	-0.382	-0.389	-0.238	-0.175	-0.410	-0.410
	(-0.69)	(-0.70)	(-0.40)	(-0.33)	(-1.67)	(-1.67)
R^2	0.478	0.477	0.511	0.352	0.440	0.440
N	39	39	39	39	39	39

Notes: Used robust heteroskedastic-consistent standard errors. The t-statistics are in parentheses. *, ** and *** denotes statistically significant at a 10, 5 and 1 percent level, respectively. *12*, *23* and *34* next to *exp* and *rev* refer to the relevant value for λ, according to (6).

Regarding the role of the monetary policy if we look at the FC^2 case in table XXV in the Appendix, there seems to be some evidence that real currency devaluations (MX^2) contribute negatively to the success of the adjustments. However, since we cannot check the robustness of these results with a monetary expansion based on the real short term interest rate (MX^1) because of the same problem reported earlier for SU^1, we would not extract a clear conclusion here. Furthermore, the fact that MX^1 perfectly predicts the success of the fiscal consolidations could actually lead to opposite conclusions to the ones found for either MX^2 or MX^3. So we would rather say that the impact of the monetary easing in the success of the fiscal consolidations is not clear.

To sum up, the most robust findings for the success of the fiscal consolidation were obtained for the impact of the duration and of the expenditure based consolidations. Both contribute positively for the success of the fiscal adjustments, across the different criteria. In addition, there is some evidence that fiscal consolidations based on tax raises have a negative impact on the success of the fiscal consolidations.

The size of the consolidation gives us mixed evidence: it seems to contribute positively for the success of fiscal consolidations based on SU^1, which is consistent with Afonso & Jalles (2012), but the opposite is verified for SU^2. The role of the monetary policy is also unclear.

Table XXVII in the appendix shows the summary of the robustness tests for the estimations computed for specification (8).

5. Conclusions

This paper aimed at providing new insights about expansionary fiscal consolidations in the EMU, by incorporating monetary developments on specifications previously used on empirical research. The Fixed Effects panel estimations conducted for 14 European Union countries show no evidence of non-Keynesian effects during fiscal consolidations, when the monetary policy developments are not considered. Nevertheless, there is some evidence of non-Keynesian effects in the absence of fiscal consolidations.

On the other hand, when the baseline specification is extended in order to accommodate the monetary developments, there is some evidence of non-Keynesian effects during fiscal consolidations. When fiscal consolidation episodes are matched by a monetary expansion, there is a shift on the standard Keynesian impact of government final consumption expenditure and taxation on private consumption.

Overall, when fiscal consolidations are not matched by a monetary expansion, the non-Keynesian effects captured earlier disappear. The size of the increase in private consumption due to a fiscal consolidation depends on the absence of liquidity-constrained households, which may prevent Ricardian behaviour, thus undermining the permanent income hypothesis of consumption smoothing. A monetary expansion provides the necessary liquidity increase during fiscal consolidations that allows individuals to smooth their consumption.

Attending on the success of the fiscal consolidations, countries have been more effective in improving their fiscal position rather than their levels of debt ratios. Improvements in the CAPB during the fiscal consolidation periods do not necessarily result in a fiscal surplus, at least in the next two years after the end of the adjustment, which ultimately impinges on the countries' debt ratios.

Generally, we have stronger adjustments for the expenditure based consolidations as their size is significantly higher *vis à vis* revenue based ones.

The probit estimations show evidence which suggests that longer lasting adjustment periods seem to contribute positively for their success. Even so, the role of the size of the consolidations in this regard is unclear.

Additionally, expenditure based consolidations are more likely to be successful than the ones based on tax raises. These findings are more robust for the expenditure based consolidations.

The overall role of the monetary policy in the success of the fiscal consolidations is unclear. On the one hand, we have some (although scarce) evidence that monetary expansions based on real currency devaluations contribute negatively for the success of fiscal consolidations. On the other hand, we cannot perform probit estimations for monetary expansions based on the real interest rate since those near to perfectly predict the success of fiscal consolidations, which means that in almost every case a monetary expansion based on the real interest rate is associated with a successful fiscal adjustment.

Future research may include the assessment of the factors that may influence the occurrence of expansionary episodes, through a binary choice model and also the usage of the so called policy-action based approach for identifying fiscal episodes.

Appendix

Table X – Data sources

Original Series	AMECO Code
Total population, thousands.	NPTN
Gross domestic product, millions, national currency, current market prices.	UVGD
Price deflator of gross domestic product, national currency, 2005=100.	PVGD
Private final consumption expenditure at 2005 constant prices, millions, national currency.	OCPH
Final consumption expenditure of general government at 2005 constant prices, millions, national currency.	OCTG
Social benefits other than social transfers in kind, general government, millions, national currency, current prices.	UYTGH
Current taxes on income and wealth (direct taxes), general government, millions, national currency, current prices.	UTYG
Total expenditure: general government: ESA 1995 (Including one-off proceeds (treated as negative expenditure) relative to the allocation of mobile phone licenses (UMTS)).	UUTG
Total revenue: general government: ESA 1995.	URTG
General government consolidated gross debt: Excessive deficit procedure (based on ESA 1995) and former definition (linked series); % GDP	UDGGL
Taxes linked to imports and production (indirect taxes), general government, millions, national currency, current prices.	UTVG
Net borrowing (+) or net lending (-) excluding interest of general government adjusted for the cyclical component. Adjustment based on potential GDP excessive deficit procedure (% of GDP at market prices).	UBLGBP
Real short-term interest rates, deflator private consumption.	ISRC
Nominal Effective exchange rate 2005=100: Performance relative to the rest of 24 industrial countries: double export weights: EU-15, TR CH NR US CA JP AU MX and NZ.	XUNNQ
Real effective exchange rate, consumer price index deflated; 2005=100; IMF Statistics Database	

Table XI – Descriptive statistics of the variables used to identify the fiscal and monetary episodes

Variable	Mean	Maximum	Minimum	Std. Dev.	N
Δbt	-0.01	16.41	-15.62	2.01	454
ΔM^1	-0.03	10.61	-15.66	2.43	558
ΔM^2	0.18	26.62	-17.92	4.42	501
ΔM^3	-0.52	16.73	-21.40	4.88	588

Source: authors' computations. *Notes*: Δbt – Change in cyclically adjusted primary balance; ΔM^1 – Absolute change of the real short term interest rate; ΔM^2 – Percent change of the real effective exchange rate; ΔM^3 – Percent change of the nominal effective exchange rate; All indicators were computed based on annual data.

Table XII – Unit root tests for the series used in the fixed effects estimations

	Common Unit Root (LLC)			Individual Unit Root (IPS)		
	t-stat.	p-value	N	t-stat.	p-value	N
C	-7.14	0.00	574	-2.02	0.02	574
ΔC	-3.31	0.00	560	-6.70	0.00	560
Y	-6.01	0.00	574	-1.11	0.13	574
ΔY	-9.83	0.00	560	-9.74	0.00	560
Y^{av}	-6.74	0.00	574	-1.20	0.12	574
ΔY^{av}	-12.41	0.00	560	-9.01	0.00	560
FCE	-9.43	0.00	574	-4.86	0.00	574
ΔFCE	-4.28	0.00	560	-5.01	0.00	560
TF	-7.42	0.00	456	-2.32	0.01	456
ΔTF	-7.89	0.00	442	-7.72	0.00	442
TAX	-5.02	0.00	456	-0.95	0.17	456
ΔTAX	-8.83	0.00	442	-8.37	0.00	442
ΔM^1	-12.47	0.00	530	-15.70	0.00	530
ΔM^2	-9.24	0.00	473	-9.29	0.00	473
ΔM^3	-9.66	0.00	560	-10.73	0.00	560

Source: authors' computations. *Notes:* LLC – Levin, Lin and Choo test; IPS – Im, Pesaran and Chin test.

Table XIII - Descriptive statistics for the series used in the probit estimations

Series	Mean	Median	Maximum	Minimum	Std. Dev.	Observations
Δb_t	-0.01	-0.04	16.41	-15.62	2.00	456
ΔExp	0.22	0.07	17.35	-18.41	2.25	470
ΔRev	0.17	0.24	4.44	-4.24	1.21	470
$Debt$	57.45	55.02	170.31	6.15	29.15	586

Source: authors' computations. *Notes:* Δb_t – Change in the cyclically adjusted primary balance; ΔExp – Change in the general government expenditure; ΔRev – Change in general government revenue; $Debt$ – General government gross debt; All variables are expressed as GDP ratios.

Table XIV – Fixed Effects estimation for specification (3): 2nd output

			FC^1, MX^1	FC^1, MX^2	FC^2, MX^2
λ	C_{t-1}		-0.097***	-0.091***	-0.090***
			(-4.05)	(-3.76)	(-3.74)
ω_0	Y_{t-1}		0.103***	0.079***	0.077***
			(3.77)	(3.00)	(2.95)
ω_1	ΔY_t		0.795***	0.740***	0.745***
			(11.01)	(10.89)	(10.83)
δ_0	Y_{t-1}^{av}		-0.030**	-0.024	-0.024
			(-2.13)	(-1.61)	(-1.60)
δ_1	ΔY_t^{av}		-0.148**	-0.136**	-0.133*
			(-2.14)	(-1.97)	(-1.92)
α_{10}	FCE_{t-1}		0.984***	0.069*	0.107
			(6.73)	(1.69)	(1.91)
α_{30}	ΔFCE_t		-2.288***	-0.161	-0.124
			(-6.53)	(-0.89)	(-0.70)
β_{10}	TF_{t-1}		-0.275***	0.007	0.012
		$\times FC^m$	(-5.74)	(0.50)	(0.822)
β_{30}	ΔTF_t	$\times MX^l$	-3.041***	0.089	-0.022
			(-6.35)	(0.44)	(-0.09)
γ_{10}	TAX_{t-1}		-0.621***	-0.056	-0.091*
			(-6.50)	(-1.46)	(-1.68)
γ_{30}	ΔTAX_t		-1.98***	0.057	0.049
			(-5.94)	(0.41)	(0.33)
η_{50}	ΔM_t^l		0.024***	0.098	0.076
			(5.59)	(0.83)	(0.57)

Notes: Used robust heteroskedastic-consistent standard errors. The t-statistics are in parentheses. *, ** and *** denotes statistically significant at a 10, 5 and 1 percent level, respectively.

Table XV – Fixed Effects estimation for specification (3): 2nd output (cont.)

			FC^1, MX^1		FC^2, MX^2		FC^2, MX^2	
α_{20}	FCE_{t-1}		-0.036**		-0.007		-0.003	
			(-2.19)		(-0.34)		(-0.13)	
α_{40}	ΔFCE_t		0.023		-0.062		-0.060	
			(0.20)		(-1.02)		(-1.03)	
β_{20}	TF_{t-1}		-0.019		-0.022**		-0.022**	
		$\times(1-FC^m)$	(-1.62)		(-2.24)		(-2.36)	
β_{40}	ΔTF_t	$\times MX^l$	-0.041		-0.083*		-0.073	
			(-0.85)		(-1.73)		(-1.58)	
γ_{20}	TAX_{t-1}		0.055***		0.041***		0.039***	
			(3.64)		(2.93)		(2.87)	
γ_{40}	ΔTAX_t		0.013		0.013		0.015	
			(0.28)		(0.33)		(0.41)	
η_{60}	ΔM_t^l		-0.001		0.098		0.107***	
			(-0.92)		(2.41)		(2.64)	
α_{11}	FCE_{t-1}		-0.006		-0.021		-0.006	
			(-0.23)		(-0.72)		(-0.29)	
α_{31}	ΔFCE_t		0.321***		0.363***		0.375***	
			(3.54)		(4.16)		(4.80)	
β_{11}	TF_{t-1}	$\times FC^m$	0.007		0.011		0.005	
			(0.50)		(0.71)		(0.32)	
β_{31}	ΔTF_t	$\times(1-MX^l)$	-0.076		-0.110		-0.100	
			(-0.97)		(-1.24)		(-0.99)	
γ_{11}	TAX_{t-1}		0.006		0.025		0.019	
			(0.26)		(1.11)		(0.98)	
γ_{31}	ΔTAX_t		0.027		0.140**		0.067	
			(0.48)		(2.47)		(1.60)	
η_{51}	ΔM_t^l		0.002		0.028		0.032	
			(1.32)		(0.49)		(0.55)	
α_{21}	FCE_{t-1}		-0.014		-0.015		-0.016	
			(-0.94)		(-1.03)		(-1.14)	
α_{41}	ΔFCE_t		0.039		0.091		0.083	
			(0.58)		(1.29)		(1.14)	
β_{21}	TF_{t-1}		0.005		0.008		0.008	
		$\times(1-FC^m)$	(0.74)		(1.15)		(1.24)	
β_{41}	ΔTF_t	$\times(1-MX^l)$	0.060*		0.046		0.050	
			(1.69)		(1.33)		(1.49)	
γ_{21}	TAX_{t-1}		0.015		0.024**		0.026**	
			(1.44)		(2.20)		(2.36)	
γ_{41}	ΔTAX_t		0.043*		0.056**		0.054**	
			(1.78)		(2.46)		(2.28)	
η_{61}	ΔM_t^l		-0.001		0.037		0.040	
			(-1.01)		(1.39)		(1.49)	
	N		454		454		454	
	R^2		0.758		0.755		0.779	
			t-stat.	p-val.	t-stat.	p-val.	t-stat.	p-val.
	Redundant FE likelihood ratio		4.03	0.00	3.62	0.00	3.46	0.00

Notes: Used robust heteroskedastic-consistent standard errors. The t-statistics are in parentheses. *, ** and *** denotes statistically significant at a 10, 5 and 1 percent level, respectively.

Table XVI – Fixed Effects estimation for specification (3): 3rd output

			FC^2, MX^3	FC^3, MX^2	FC^3, MX^3
λ	C_{t-1}		-0.093***	-0.084***	-0.092***
			(-4.05)	(-3.51)	(-3.63)
ω_0	Y_{t-1}		0.091***	0.075***	0.093***
			(3.15)	(2.84)	(3.26)
ω_1	ΔY_t		0.810***	0.766***	0.804***
			(11.05)	(11.30)	(10.87)
δ_0	Y_{t-1}^{av}		-0.016	-0.026*	-0.017
			(-0.96)	(-1.72)	(-1.06)
δ_1	ΔY_t^{av}		-0.166**	-0.151**	-0.167**
			(-2.29)	(-2.17)	(-2.30)
α_{10}	FCE_{t-1}		0.031	0.278**	0.052
			(0.83)	(2.04)	(1.35)
α_{30}	ΔFCE_t		0.000	-0.576	0.084
			(0.00)	(-1.27)	(0.59)
β_{10}	TF_{t-1}		-0.020	-0.008	-0.033
		$\times FC^m$	(-1.16)	(-0.31)	(-1.57)
β_{30}	ΔTF_t	$\times MX^l$	0.038	-0.873	-0.079
			(0.45)	(-0.98)	(-0.51)
γ_{10}	TAX_{t-1}		-0.015	-0.229*	-0.019
			(-0.56)	(-1.79)	(-0.62)
γ_{30}	ΔTAX_t		-0.010	-0.338	-0.103
			(-0.11)	(-1.11)	(-0.84)
η_{50}	ΔM_t^l		0.172	-0.095	0.220***
			(2.47)	(-0.39)	(2.79)

Notes: Used robust heteroskedastic-consistent standard errors. The t-statistics are in parentheses. *, ** and *** denotes statistically significant at a 10, 5 and 1 percent level, respectively.

Table XVII – Fixed Effects estimation for specification (3): 3rd output (cont.)

			FC^2, MX^3		FC^3, MX^2		FC^3, MX^3	
α_{20}	FCE_{t-1}		-0.008		-0.003		-0.006	
			(-0.37)		(-0.16)		(-0.28)	
α_{40}	ΔFCE_t		0.193*		-0.062		0.167*	
			(1.83)		(-1.03)		(1.68)	
β_{20}	TF_{t-1}		0.011		-0.018*		0.008	
			(1.05)		(-1.89)		(0.82)	
β_{40}	ΔTF_t	$\times(1-FC^m)$ $\times MX^l$	-0.034		-0.046		-0.029	
			(-0.80)		(-0.93)		(-0.82)	
γ_{20}	TAX_{t-1}		-0.007		0.035**		-0.007	
			(-0.41)		(2.54)		(-0.44)	
γ_{40}	ΔTAX_t		-0.038		0.030		-0.048	
			(-0.67)		(0.75)		(-0.85)	
η_{60}	ΔM_t^l		0.035		0.090**		0.048	
			(0.83)		(2.26)		(1.18)	
α_{11}	FCE_{t-1}		0.001		-0.001		0.000	
			(0.04)		(-0.03)		(0.02)	
α_{31}	ΔFCE_t		0.254**		0.375***		0.318**	
			(2.14)		(5.07)		(2.58)	
β_{11}	TF_{t-1}	$\times FC^m$ $\times(1-MX^l)$	0.004		-0.008		-0.003	
			(0.22)		(-0.51)		(-0.14)	
β_{31}	ΔTF_t		-0.041		-0.106		-0.051	
			(-0.41)		(-1.01)		(-0.48)	
γ_{11}	TAX_{t-1}		-0.009		0.024		-0.004	
			(-0.41)		(1.16)		(-0.20)	
γ_{31}	ΔTAX_t		0.066		0.053		0.090	
			(1.16)		(1.16)		(1.40)	
η_{51}	ΔM_t^l		0.065		-0.010		0.022	
			(1.08)		(-0.12)		(0.21)	
α_{21}	FCE_{t-1}		-0.024*		-0.016		-0.024*	
			(-1.67)		(-1.12)		(-1.72)	
α_{41}	ΔFCE_t		0.003		0.079		0.003	
			(0.05)		(1.10)		(0.05)	
β_{21}	TF_{t-1}	$\times(1-FC^m)$ $\times(1-MX^l)$	0.002		0.008		0.002	
			(0.26)		(1.14)		(0.31)	
β_{41}	ΔTF_t		0.042		0.049		0.039	
			(1.14)		(1.50)		(1.06)	
γ_{21}	TAX_{t-1}		0.017		0.026**		0.016	
			(1.29)		(2.31)		(1.23)	
γ_{41}	ΔTAX_t		0.024		0.054**		0.024	
			(0.94)		(2.28)		(0.97)	
η_{61}	ΔM_t^l		0.035		0.043		0.038	
			(1.21)		(1.78)		(1.47)	
	N		454		454		454	
	R^2		0.752		0.780		0.756	
			t-stat.	p-val.	t-stat.	p-val.	t-stat.	p-val.
Redundant FE likelihood ratio			3.26	0.00	3.33	0.00	3.29	0.00

Notes: Used robust heteroskedastic-consistent standard errors. The t-statistics are in parentheses. *, ** and *** denotes statistically significant at a 10, 5 and 1 percent level, respectively.

Table XVIII – Wald coefficient diagnostics for estimations based on specification (3)

	FC^1, MX^3		FC^2, MX^1		FC^3, MX^1	
Null Hypothesis	t-stat.	p-val.	t-stat.	p-val.	t-stat.	p-val.
$\alpha_{10} - \alpha_{11} = 0$	1.03	0.30	1.28	0.20	-14.01	0.00
$\alpha_{30} - \alpha_{31} = 0$	-3.93	0.00	-2.97	0.00	-3.02	0.00
$\beta_{10} - \beta_{11} = 0$	0.86	0.39	0.69	0.49	21.64	0.00
$\beta_{30} - \beta_{31} = 0$	-0.32	0.75	0.20	0.84	-19.08	0.00
$\gamma_{10} - \gamma_{11} = 0$	-1.53	0.13	-1.73	0.08	-9.75	0.00
$\gamma_{30} - \gamma_{31} = 0$	-2.95	0.00	4.38	0.00	16.32	0.00
	FC^1, MX^1		FC^1, MX^2		FC^2, MX^2	
Null Hypothesis	t-stat.	p-val.	t-stat.	p-val.	t-stat.	p-val.
$\alpha_{10} - \alpha_{11} = 0$	6.43	0.00	1.98	0.05	1.96	0.05
$\alpha_{30} - \alpha_{31} = 0$	-7.14	0.00	-2.60	0.01	-2.58	0.01
$\beta_{10} - \beta_{11} = 0$	-5.49	0.00	-0.21	0.83	0.36	0.72
$\beta_{30} - \beta_{31} = 0$	-6.05	0.00	0.91	0.36	0.30	0.76
$\gamma_{10} - \gamma_{11} = 0$	-6.67	0.00	-1.94	0.05	-2.00	0.05
$\gamma_{30} - \gamma_{31} = 0$	-5.93	0.00	-0.55	0.58	-0.12	0.91
	FC^2, MX^3		FC^3, MX^2		FC^3, MX^3	
Null Hypothesis	t-stat.	p-val.	t-stat.	p-val.	t-stat.	p-val.
$\alpha_{10} - \alpha_{11} = 0$	0.81	0.42	2.02	0.04	1.30	0.19
$\alpha_{30} - \alpha_{31} = 0$	-1.45	0.15	-2.06	0.04	-1.31	0.19
$\beta_{10} - \beta_{11} = 0$	-1.08	0.28	0.00	1.00	-1.15	0.25
$\beta_{30} - \beta_{31} = 0$	0.60	0.55	-0.85	0.39	-0.15	0.88
$\gamma_{10} - \gamma_{11} = 0$	-0.21	0.83	-1.99	0.05	-0.40	0.69
$\gamma_{30} - \gamma_{31} = 0$	-0.74	0.46	-1.27	0.20	-1.40	0.16

Notes: Wald coefficient diagnostics for the estimations on tables IV-V, XIV-XV and XVI-XVII respectively.

Table XIX – Robustness tests for estimations based on specification (3)

Sample restriction	Summary results
Sample with "central-European" countries	Some evidence of non-keynesian effects for taxes during fiscal consolidations, which holds both in the presence and absence of monetary expansions. Evidence seems stronger when fiscal consolidations are matched by monetary expansions. Could not compute many estimations due to near singular matrix problems.
Sample with "peripheral" countries	Some evidence of non-keynesian effects for all of the budgetary components, which seems to be stronger when fiscal consolidations are matched by monetary expansions. Could not compute some estimations due to near singular matrix problems.
1970 – 1998	Some evidence of non-keynesian effects for all of the budgetary components, which seems to be stronger when fiscal consolidations are matched by monetary expansions.
1999 – 2012	We could not compute any estimation due to near singular matrix.

Notes: "Central-European" countries include all but Greece, Ireland, Italy, Portugal and Spain, which are labelled as peripheral countries. Estimations are available on request.

Table XX – Successful fiscal consolidations according to the different criteria (1970-2012)

	SU^1			SU^2		
Country	FC^1	FC^2	FC^3	FC^1	FC^2	FC^3
Austria		84, 05	84, 05		01, 05	01, 05
Belgium	82-84	82-84	82, 84	82-87		
Denmark	83-86	83-86	83-86	83-87	83-86	83-86
Finland	97, 00	88, 96-97, 00	88, 96, 00	97-98	88, 96-97	88, 96, 00
France						
Germany	96, 99	96, 11	96, 11	96-99		
Greece	93-94, 10-11	91, 94, 10-11	91, 94, 10-11	96		
Ireland	11	88, 11	88, 11		88	88
Italy	92	82, 92	82, 92	92-94		
Netherlands	91	91	91	93	93, 96	93, 96
Portugal	83, 11	83, 88, 11	83, 88, 11		86, 88	86, 88
Spain						
Sweden	97	96-97	96-97	97-99	96-97	96-97
United Kingdom	97-99, 11	97-98, 11	11	97-00	97-98, 00	00
# Successful years	25	32	28	29	19	17

Source: author's computations. *Notes:* SU^1 - Success measure based on Afonso & Jalles (2012); SU^2 - Success measure based on Alesina & Ardagna (2013); FC^1 - Measure based on Giavazzi & Pagano (1996); FC^2 - Measure based on Alesina & Ardagna (1998); FC^3 - Measure based on Afonso (2006, 2010).

Table XXI – Expenditure and revenue based consolidations: λ =1/2

	Total Events	Average Size of the Consolidation	$\sum_{i=0}^{1} \Delta b_{t+i}$	$Debt_{t+2} - Debt_t$
Expenditure Based 1	24	2.34	2.94	-2.50
Expenditure Based 2	27	2.75	3.07	-0.85
Expenditure Based 3	22	3.25	3.53	-1.08
Revenue Based 1	19	1.28	2.24	-2.62
Revenue Based 2	22	1.94	2.13	2.07
Revenue Based 3	19	2.17	2.39	2.61

Source: authors' computations.

Table XXII – Expenditure and revenue based consolidations: λ =3/4

	Total Events	Average Size of the Consolidation	$\sum_{i=0}^{1} \Delta b_{t+i}$	$Debt_{t+2} - Debt_t$
Expenditure Based 1	21	2.34	2.86	-2.52
Expenditure Based 2	22	2.75	3.07	-0.64
Expenditure Based 3	17	3.42	3.68	-0.16
Revenue Based 1	12	0.71	1.91	-1.06
Revenue Based 2	14	1.58	1.32	4.49
Revenue Based 3	12	1.89	1.71	4.77

Source: authors' computations.

Table XXIII – Success of fiscal consolidations for SU^1 based on FC^1

	Expenditure			**Revenue**		
Specification	1	2	3	4	5	6
constant	-1.229*	-1.182*	-1.091	-1.601**	-1.660**	-1.660**
	(-1.79)	(-1.73)	(-1.61)	(-2.14)	(-2.16)	(-2.16)
duration	0.184	0.186	0.197	0.208	0.218	0.218
	(1.12)	(1.14)	(1.18)	(1.31)	(1.34)	(1.34)
Δcapb	0.516***	0.511***	0.500***	0.548***	0.579***	0.579***
	(3.85)	(3.87)	(3.83)	(3.85)	(3.58)	(3.58)
exp12	-0.080					
	(-0.18)					
exp23		-0.179				
		(-0.40)				
exp34			-0.433			
			(-0.95)			
rev12				0.416		
				(0.91)		
rev23					0.544	
					(1.00)	
rev34						0.544
						(1.00)
mx2	-0.188	-0.175	-0.150	-0.111	-0.111	-0.111
	(-0.38)	(-0.35)	(-0.30)	(-0.22)	(-0.21)	(-0.21)
R^2	0.303	0.305	0.317	0.315	0.320	0.320
N	43	43	43	43	43	43

Notes: Used robust heteroskedastic-consistent standard errors. The t-statistics are in parentheses. *, ** and *** denotes statistically significant at a 10, 5 and 1 percent level, respectively. *12*, *23* and *34* next to *exp* and *rev* refer to the relevant value for λ, according to (6).

Table XXIV – Success of fiscal consolidations for SU^1 based on FC^3

	Expenditure			Revenue		
Specification	1	2	3	4	5	6
constant	-5.197***	-14.678***	-14.678***	-10.752***	-10.622***	-10.622***
	(-2.74)	(-2.61)	(-2.61)	(-2.84)	(-3.11)	(-3.11)
duration		3.375**	3.375**	2.447**	2.481**	2.481**
		(2.02)	(2.02)	(2.19)	(2.35)	(2.35)
Δcapb	2.052***	4.596***	4.596***	3.688***	3.586***	3.586***
	(2.73)	(2.73)	(2.73)	(2.89)	(3.21)	(3.21)
exp12	1.362***					
	(2.70)					
exp23		1.375*				
		(1.74)				
exp34			1.375*			
			(1.74)			
rev12				-0.704		
				(-1.19)		
rev23					-0.852	
					(-1.23)	
rev34						-0.852
						(-1.23)
mx2	-0.180	-0.373	-0.373	-0.024	0.060	0.060
	(-0.28)	(-0.49)	(-0.49)	(-0.03)	(0.09)	(0.09)
R^2	0.522	0.603	0.603	0.566	0.577	0.577
N	42	42	42	42	42	42

Notes: Used robust heteroskedastic-consistent standard errors. The t-statistics are in parentheses. *, ** and *** denotes statistically significant at a 10, 5 and 1 percent level, respectively. *12*, *23* and *34* next to *exp* and *rev* refer to the relevant value for λ, according to (6).

Table XXV – Success of fiscal consolidations for SU^2 based on FC^2

	Expenditure			Revenue		
Specification	1	2	3	4	5	6
constant	-0.293	0.019	-0.011	0.249	0.931	0.931
	(-0.51)	(0.04)	(-0.02)	(0.42)	(1.41)	(1.41)
duration	0.011	0.003	0.003	-0.008	-0.124	-0.124
	(0.06)	(0.02)	(0.02)	(-0.04)	(-0.64)	(-0.64)
Δcapb	-0.040	-0.054	-0.048	-0.067	-0.130	-0.130
	(-0.33)	(-0.46)	(-0.40)	(-0.55)	(-1.03)	(-1.03)
exp12	0.860**					
	(2.12)					
exp23		0.356				
		(0.88)				
exp34			0.397			
			(1.64)			
rev12				-0.115		
				(-0.271)		
rev23					-1.121**	
					(-2.15)	
rev34						-1.121**
						(-2.15)
mx2	-1.215**	-1.093**	-1.078**	-1.011*	-1.308**	-1.308**
	(-2.40)	(-2.20)	(-2.22)	(-1.89)	(-2.44)	(-2.44)
R^2	0.136	0.08	0.08	0.07	0.146	0.146
N	45	45	45	45	45	45

Notes: Used robust heteroskedastic-consistent standard errors. The t-statistics are in parentheses. *, ** and *** denotes statistically significant at a 10, 5 and 1 percent level, respectively. *12*, *23* and *34* next to *exp* and *rev* refer to the relevant value for λ, according to (6).

Table XXVI – Success of fiscal consolidations for SU^2 based on FC^3

	Expenditure			Revenue		
Specification	1	2	3	4	5	6
constant	-0.477	-0.076	-0.004	0.263	0.815	0.815
	(-0.71)	(-0.12)	(-0.01)	(0.38)	(1.18)	(1.18)
duration	0.176	0.147	0.137	0.149	0.050	0.050
	(0.78)	(0.70)	(0.66)	(0.71)	(0.24)	(0.24)
Δcapb	-0.097	-0.116	-0.104	-0.140	-0.202	-0.202
	(-0.62)	(-0.78)	(-0.69)	(-0.87)	(-1.29)	(-1.29)
exp12	1.036**					
	(2.37)					
exp23		0.482				
		(1.10)				
exp34			0.187			
			(0.42)			
rev12				-0.246		
				(-0.53)		
rev23					-0.993*	
					(-1.94)	
rev34						-0.993*
						(-1.94)
mx2	-0.765	-0.679	-0.534	-0.602	-0.786	-0.786
	(-1.30)	(-1.19)	(-0.90)	(-0.98)	(-1.28)	(-1.28)
R^2	0.142	0.057	0.039	0.041	0.109	0.109
N	37	37	37	37	37	37

Notes: Used robust heteroskedastic-consistent standard errors. The t-statistics are in parentheses. *, ** and *** denotes statistically significant at a 10, 5 and 1 percent level, respectively. *12*, *23* and *34* next to *exp* and *rev* refer to the relevant value for λ, according to (6).

Table XXVII – Robustness tests for estimations based on specification (8)

Sample restriction	Summary results
Sample with "central-European" countries	Similar pattern, compared to the unrestricted case.
Sample with "periphery" countries	We could not compute any estimation, except for the SU2 case, due to lack of variability of some variables. Didn't get statistically significant results except for expenditure based adjustments. Those coefficients have the same signal as in the unrestricted case.
1970 – 1998	Similar pattern for the SU1 case. In the SU2 case, the results are similar to the ones found for the unrestricted sample, except for the size of the consolidations, which didn't turn any statistically significant results.
1999 – 2012	We could not compute any estimation due to lack of variability of some variables.

Notes: "Central-European" countries include all but Greece, Ireland, Italy, Portugal and Spain, which are labelled as periphery countries. Estimations are available on request.

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