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

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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 in the cases of general government final consumption expenditure, social transfers and taxes. Keynesian effects prevail when fiscal consolidations are not matched by monetary easing. Panel probit estimations suggest that longer and expenditure-based consolidations contribute positively for its success, whilst the opposite is the case for tax-based ones.

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

* 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 into 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. Based on this reasoning, an increase in taxation should lead to a decrease in private consumption.

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

The theoretical underpinnings stemmed from the German Council of Economic experts in their reports of 1981 and 1982, 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 today (resulting in a budget deficit), may lead to an increase in taxation in the future, in order to comply with the government budget constraint, therefore reducing agents' permanent income. If such expectations are accepted by individuals, then this could lead to a decrease in private consumption today. The reverse reasoning is the case for fiscal consolidation, whereby 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 have a smoothing effect on consumption and do not have liquidity constraints. This motivates a thorough assessment of monetary developments when expansionary fiscal consolidations are being studied. Moreover, according to the Keynesian view, under the IS-LM framework, a fiscal consolidation may lead to an increase in private consumption, if it is accompanied by a strong enough monetary expansion that offsets the detrimental effects of fiscal policy developments on disposable income and private consumption.

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[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).

Arguably, while neglecting the monetary policy stance, one could find themselves 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”.

The importance of this issue within the Economic and Monetary Union (EMU) context is fairly 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’ sphere of influence.

This paper contributes to 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 notably expanding Afonso’s (2006, 2010) and Afonso & Jalles’s (2014) core specification, in order to take into account 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 organised as follows. Section two presents the review of the main related literature. Section three presents an identification of the fiscal and monetary episodes and their respective relationship. In section four, we conduct an empirical analysis of expansionary fiscal consolidations for the EMU, resorting to panel estimations, taking into account the developments of monetary policy, followed by a discussion of the results. We also assess, relying on a probit estimation, 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. Section five concludes with some final remarks and points out some possible subjects for future research on this topic.

2. Literature

Hellwig & Neumann (1987) were pioneers with regard to the postulation 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 growth of output 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 the mid and late 1980's, respectively. For Denmark, they report that the thriving consumption experienced in 1983-1986 cannot be explained by the decline in interest rates alone, and that such an occurrence is related to fiscal consolidation through the increase in revenue from income taxation and the decrease in public investment. Regarding the Irish case, the fast growth of consumption during the second stabilization was due to the government's focus on decreasing spending, instead of increasing taxation, and also due to the liberalisation of the credit markets. In these cases, as a whole, expansionary fiscal consolidation is linked to an adjustment on the side of public spending, 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, using an analysis of OECD countries from 1960 to 1994. According to the General Council of Economic Experts' expectational view of fiscal policy addressed in Hellwig and Neumann (1987), fiscal adjustments that occur when the debt level is high, or growing rapidly, should be expansionary, whereas others should not. Nevertheless the authors don't find evidence that confirms this view. On the other hand, they found strong evidence of the effect of the composition of the adjustment in the outcome of 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 in times of "fiscal stress", which the author defines as periods of high debt-to-GDP ratio or following periods of exceptionally high debt-accumulation rates. His findings differ for other periods, as in "normal" times, the Keynesian effects of fiscal consolidation on private consumption predominate (either through spending cuts, or tax increases).

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 fiscal impulses are large and persistent. This means that only those impulses can signal a regime change, which thus affects private sector expectations. Also non-Keynesian effects leading to expansionary fiscal consolidation, are stronger in the case of changes in net taxes, rather than changes 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 accumulating 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 debt-to-GDP ratio, the success of fiscal consolidation depends more on the size of the adjustment, rather than its composition. On the other hand, the likelihood of fiscal consolidation being expansionary, increases when it is based on public spending cuts, rather than on increased taxation. Concerning the role of monetary policy, there was evidence that neither successful (leading to decrease in debt-to-GDP ratio), or expansionary (leading to increase in GDP growth) consolidations, need to be met by expansionary monetary policies, nor by 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 to see whether 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 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 changes of the cyclically adjusted primary balance may be problematic. Arguably, such an 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 that concerns expansionary fiscal consolidations.[4]

[4] See, for instance, Afonso & Jalles (2012) and Alesina & Ardagna (2013).

Erceg & Lindé (2012) use a New Keynesian DSGE model to assess the differences of fiscal consolidation effects in an open economy for countries with an independent monetary policy *vis-à-vis* a currency union. If inflation is fairly sensitive to the output gap the output contracts more deeply in countries with an independent monetary policy. On the other hand, for a flatter Phillips Curve, the output contraction tends to be smaller in the independent monetary policy case, reflecting a real exchange rate depreciation even if the monetary policy is constrained by the zero lower bound.

Afonso & Jalles (2012) analyse a panel of OECD countries from 1970 to 2010, to assess whether the composition and duration of fiscal consolidations contribute to their success. Consolidation episodes lead to a decrease in debt ratios, only if they are accompanied by strong economic growth and an 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 to its success.

Alesina & Ardagna (2013) use a 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 for explaining the differences between expenditure-based and tax-based adjustments.

On the other hand, Erceg & Lindé (2013) conducted an assessment based on a two country DSGE model and their findings favour tax-based consolidations within a currency union, since those have smaller adverse effects on output than the expenditure-based ones, at least in the short-term. Expenditure-based consolidations seem counterproductive in the short-term if the monetary policy is near the zero lower bound.

To sum up, most of the research seems to support, or at least not to 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 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 to, or only occur, during periods of high debt-to-GDP ratio or when debt is accumulating quickly.

[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).

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 governments' structural budget balance. It extracts those elements of the primary balance that are due to the business cycle, from the total balance, in order to obtain an indicator that has been corrected for the effects of changes in economic activity, and that thus reflects 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), a fiscal episode occurs 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: a fiscal episode occurs 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 reflect the cases studied by Giavazzi and Pagano (1990), as fiscal contractions in Denmark in 1983-86 and in Ireland in 1988 were identified. Also, there is a clear identification of fiscal expansions in 2009 across the EMU countries, which followed the European Commission policy recommendations after the 2007-08 financial crisis. Furthermore, the different methodologies also identify the consolidation efforts made by those

[7] We used a slightly lower threshold for the Afonso (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.

countries that were subject to financial assistance in 2011-2012, namely Ireland, Greece and Portugal.

Table I - Identification of fiscal episodes according to 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", which was 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 CAPB-based fiscal consolidations may be biased, in the sense that they may capture changes that are not related to policy actions due to their inability to remove sharp fluctuations in economic activity. Unfortunately, the database is still not up-todate so we would have to discard the most recent years (2010-2012) in order to use that approach. Therefore, we will not include it at this point, but we intend 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 whether 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 monetary policy easing or tightening[8], as it accounts not only for money market rates, but also for 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, which is commonly used to assess a country's 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 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 about the interest rates case.

In order to define 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 times the panel standard deviation respectively:

[8] See, for instance, Afonso & Sousa (2011).
[9] Since nominal short-term interest rates are very similar in the EMU countries from 1999 onwards, we cannot include them in our estimations, due to near singular matrix issues and therefore they were excluded from this analysis.

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

ME_t^l denotes a monetary episode in period t, according to criterion l and ΔM_t^l corresponds to the change of indicator l in period t. For real short term interest rate, we have an absolute change, whilst for 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 findings, is that there are considerably more monetary episodes than fiscal ones. The duration of 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, then the duration of expansions more than doubles, and in the case of contractions, it also increases significantly.

Moreover, while in the case of fiscal episodes, there is significant overlapping across the different criteria, in this case 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 registered 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, monetary expansion in 1983 expansion is shown according to ME^1, but it shows up as a contraction in ME^3.

Table II – Identification of monetary episodes according to 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 an 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, that was taken from the AMECO database.[11] We used 11 countries that belong to the EMU,[12] namely Austria, Belgium, Germany, Finland, France, Greece, Ireland, Italy, The Netherlands, Portugal and Spain and also Denmark, Sweden and The United Kingdom, which are not in the EMU, but are geographically and politically linked to the remaining countries. This means that a maximum of 602 observations are available 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 those that are not, it makes sense to include all the series in levels, as we have already computed significant changes on the original series, to such a degree that what we have, are the logarithms of the real *per capita* values. 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:

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

[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] Our argument follows the explanation presented in Afonso (2006, 2010).

where $i\,(i=1,...,N)$ indicates the different countries and $t\,(t=1,...,T)$ stands for the period. We also used: 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, which 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 criterion 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 want to analyse the impact of variables that change over time. This 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 that 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 do not vary across time. The source of country heterogeneity is provided 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 lagged consumption has been considered an independent variable, therefore increasing consumption in period t-1 reduces 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 a fiscal consolidation ($FC^m = 1$) occurs, across all of the estimations based on (2), with coefficients between 0.193 and 0.237. Such a 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, to compensate for 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 a Ricardian behaviour, in the absence of fiscal consolidations. Similar non-Keynesian reasoning prevails 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, which means 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*** (-3.62)		-0.089*** (-3.61)		-0.076*** (-3.05)	
ω_0	Y_{t-1}		0.084*** (3.06)		0.083*** (3.06)		0.087*** (3.14)	
ω_1	ΔY_t		0.809*** (11.41)		0.812*** (11.51)		0.835*** (12.24)	
δ_0	Y_{t-1}^{av}		-0.026* (-1.80)		-0.025* (-1.74)		-0.033** (-2.19)	
δ_1	ΔY_t^{av}		-0.169** (-2.38)		-0.165** (-2.31)		-0.187*** (-2.62)	
α_1	FCE_{t-1}	$\times FC^m$	0.005 (0.20)		0.010 (0.50)		-0.001 (-0.06)	
α_3	ΔFCE_t	$\times FC^m$	0.193* (1.85)		0.214** (2.05)		0.237** (2.09)	
β_1	TF_{t-1}	$\times FC^m$	0.003 (0.22)		0.002 (0.18)		-0.003 (-0,13)	
β_3	ΔTF_t	$\times FC^m$	-0.005 (-0.06)		0.016 (0.18)		0,063 (0,49)	
γ_1	TAX_{t-1}	$\times FC^m$	0.005 (0.23)		0.001 (0.07)		0,007 (0,33)	
γ_3	ΔTAX_t	$\times FC^m$	0.044 (0.72)		0.033 (0.67)		0,027 (0,45)	
α_2	FCE_{t-1}	$\times(1-FC^m)$	-0.013 (-0.98)		-0.015 (-1.16)		-0,027** (-2,10	
α_4	ΔFCE_t	$\times(1-FC^m)$	0.048 (0.79)		0.041 (0.67)		0,007 (0,12)	
β_2	TF_{t-1}	$\times(1-FC^m)$	0.002 (0.22)		0.002 (0.30)		0,000 (-0,07)	
β_4	ΔTF_t	$\times(1-FC^m)$	0.031 (0.97)		0.033 (1.05)		0,033 (1,07)	
γ_2	TAX_{t-1}	$\times(1-FC^m)$	0.024** (2.15)		0.025** (2.26)		0,029** (2,43)	
γ_4	ΔTAX_t	$\times(1-FC^m)$	0.033 (1.43)		0.029 (1.21)		0,033 (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 a 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 or absence of fiscal consolidations in relation to 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).

Compared with 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 with regards to 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 ($FC^m = 0$), as 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] Note 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 (-0.24)		-0.035** (-2.15)		-0.038** (-2.39)	
α_{40}	ΔFCE_t		0.270** (2.51)		0.010 (0.09)		0.010 (0.09)	
β_{20}	TF_{t-1}		0.014 (1.21)		-0.018 (-1.57)		-0.018 (-1.52)	
β_{40}	ΔTF_t	$\times(1-FC^m)$ $\times MX^l$	-0.043 (-0.91)		-0.028 (-0.58)		-0.029 (-0.59)	
γ_{20}	TAX_{t-1}		-0.007 (-0.47)		0.056*** (3.74)		0.055*** (3.67)	
γ_{40}	ΔTAX_t		-0.027 (-0.52)		-0.002 (-0.04)		-0.004 (-0.08)	
η_{60}	ΔM_t^l		0.025 (0.52)		-0.000 (-0.55)		-0.001 (-0.48)	
α_{11}	FCE_{t-1}		0.011 (0.42)		0.005 (0.22)		0.002 (0.07)	
α_{31}	ΔFCE_t		0.260** (2.36)		0.310*** (3.57)		0.405*** (5.13)	
β_{11}	TF_{t-1}	$\times FC^m$ $\times(1-MX^l)$	-0.007 (-0.40)		0.003 (0.35)		-0.005 (-0.37)	
β_{31}	ΔTF_t		-0.093 (-1.01)		-0.025 (-0.31)		-0.063 (-0.59)	
γ_{11}	TAX_{t-1}		-0.006 (-0.28)		0.002 (0.09)		0.008 (0.40)	
γ_{31}	ΔTAX_t		0.120 (1.58)		-0.017 (-0.36)		-0.051 (-0.85)	
η_{51}	ΔM_t^l		0.044 (0.84)		0.001 (1.31)		0.002 (1.78)	
α_{21}	FCE_{t-1}		-0.021 (-1.42)		-0.015 (-0.98)		-0.017 (-1.17)	
α_{41}	ΔFCE_t		0.006 (0.10)		0.038 (0.55)		0.029 (0.42)	
β_{21}	TF_{t-1}	$\times(1-FC^m)$	0.003 (0.45)		0.005 (0.61)		0.005 (0.70)	
β_{41}	ΔTF_t	$\times(1-MX^l)$	0.040 (1.09)		0.057 (1.64)		0.054 (1.60)	
γ_{21}	TAX_{t-1}		0.017 (1.36)		0.018* (1.74)		0.016 (1.58)	
γ_{41}	ΔTAX_t		0.029 (1.19)		0.046* (1.83)		0.044* (1.82)	
η_{61}	ΔM_t^l		0.036 (1.23)		-0.001 (-0.93)		-0.000 (-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 fiscal consolidations are matched by 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 when 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 previous cases, such effects seem to disappear when fiscal consolidations take place, 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).

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 indeed signal a future tax decrease and a permanent income rise, which is perceived by households, but does not materialize in current private consumption increase, due to limitations in access to credit markets. Such is summarised 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 capture the monetary stance, is unlikely, as we are controlling for these.

4.3. Measuring the success of fiscal consolidations

In this section we will investigate what the factors are 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 whether 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):

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

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 XIX 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, it can be seen that the success rates range from 51% to 61%, according to FC^1 and FC^3, respectively. Although FC^2 registers the highest number of successful consolidations, the success rate is slightly lower than in FC^3 (57% vs 61%), and is thus penalised by the higher number of consolidation events (56 vs 46). Nevertheless, success rates are similar to the ones found in Afonso & Jalles (2012).

In the case of SU^2, it can be seen that there are significant differences across the criteria used to identify fiscal consolidations, namely between FC^1 and the remainder. This is actually the only criterion that has a success rate which is similar to the one found in the SU^1 case, whilst 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 in Table I, the fiscal consolidations based on FC^1 have a much higher duration than those of 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 in more successful years of fiscal consolidation. The same does not occur in SU^1, as this allows for successful and non-successful years within the same adjustment period.[19]

On the other hand, since the success rates based on SU^1 are generally higher than those 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 ratio. This points to the possibility that, although there are improvements in the CAPB during fiscal consolidation periods, this does not necessarily result in a fiscal surplus, at least during the two years following on from the end of the adjustment. This ultimately impacts on 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 fiscal contractions. By disentangling these, we can assess the possible differences regarding the criteria used to define fiscal consolidations as being 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 XX and XXI 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

[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.

consolidations range 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, there are stronger adjustments for the expenditure-based consolidations. These findings differ from Afonso & Jalles (2012), who report no significant difference between the size of the consolidation whether it is made 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 expenditure and revenue based consolidations lie roughly between 0.96 and 1.94 p.p., 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 over that period. On the revenue-based side, there are significant differences between FC^1 and the remainder. Whilst in the case of 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 impact on the success of the fiscal adjustments:

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

[20] This is the only reported finding that doesn't hold across the 3 different thresholds, only being true 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:-

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

$$Z_i = \delta_1 + \delta_2 D_i + \delta_3 \Delta b_i + \delta_4 EXP_i + \delta_5 MX_i \quad (8)$$

D_i is the duration of 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 is whether there is a possible influence by monetary expansions in determining the success of fiscal consolidations.

For instance, Devries *et al.* (2011) suggest that expenditure-based consolidations were 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 argue for the possible role of 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 XXII and XXIII 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 they are 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

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

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

significant role: longer and stronger consolidations appear to contribute positively for the success of the fiscal consolidations. These results are consistent for all of the reported thresholds in FC^2 and FC^3. In the FC^1 case, we only find statistically significant results for the size of the consolidations.[23] With regard to the role of monetary policy, we find no statistically significant results.[24]

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 XXIV and XXV in the Appendix. The results are similar to the ones found in the SU^1 case and are related to the role of duration and expenditure-based adjustments in the success of fiscal consolidations. Moreover, we have found some evidence that the revenue-based consolidations have a negative impact on the

[23] See tables XXII and XXIII 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, as it predicts perfectly the success of the fiscal consolidations.

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 and is not 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 (-1.41)	-1.690 (-1.42)	-1.884 (-1.41)	-0.850 (-0.90)	-0.519 (-0.52)	-0.519 (-0.52)
duration	0.821** (2.56)	0.832*** (2.61)	0.860** (2.42)	0.720*** (3.06)	0.923*** (3.41)	0.923*** (3.41)
Δcapb	-0.262** (-2.03)	-0.263** (-2.04)	-0.221* (-1.87)	-0.233* (-1.70)	-0.404*** (-2.65)	-0.404*** (-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 (-0.69)	-0.389 (-0.70)	-0.238 (-0.40)	-0.175 (-0.33)	-0.410 (-1.67)	-0.410 (-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 monetary policy, if we look at the FC^2 case in table XXIV 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 monetary expansion based on real short term interest rate (MX^1), on account of the same problem that was reported earlier for SU^1, we were unable to extract a clear conclusion here. Furthermore, the fact that MX^1 predicts perfectly the success of the fiscal consolidations, could actually lead to conclusions opposed to the ones found for either MX^2, or MX^3. So we would rather say that the impact of monetary easing on the success of the fiscal consolidations is not clear.

To sum up, the most robust findings for the success of fiscal consolidation were obtained for the impact of duration and expenditure-based consolidations. Both contribute positively to the success of 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 fiscal consolidations.

The size of the consolidation gives us mixed evidence: it seems to contribute positively to 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 monetary policy is also unclear.

5. Conclusions

This paper aims to provide new insights about expansionary fiscal consolidations in the EMU, by incorporating monetary developments on specifications previously used in empirical research. The Fixed Effects panel estimations conducted for 14 European Union countries show no evidence of non-Keynesian effects during fiscal consolidations, when 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 to take into account 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 in 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 evidenced earlier, disappear. The size of the increase in private consumption due to fiscal consolidation depends on the absence of liquidity-constrained households, which may prevent Ricardian behaviour, thus undermining the permanent income hypothesis of consumption smoothing. Monetary expansion provides the necessary liquidity increase during fiscal consolidations to allow individuals to smooth their consumption.

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

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

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

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

The overall role of monetary policy in the success of fiscal consolidations is unclear. On one hand, we have some (albeit scarce) evidence that monetary expansions based on real currency devaluations, contribute negatively to the success of fiscal consolidations. On the other hand, we cannot perform probit estimations for monetary expansions based on real interest rates, as these predict nearly perfectly 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 factors that could influence the occurrence of expansionary episodes, through a binary choice model and also the use 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 licences (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: Author's 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: Author's computations. *Notes:* LLC – Levin, Lin and Choo test; IPS – Im, Pesaran and Chin test.

Table XIII - Descriptive statistics for the series used in 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: Author's 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^1, 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 (-0.37)		-0.003 (-0.16)		-0.006 (-0.28)	
α_{40}	ΔFCE_t		0.193* (1.83)		-0.062 (-1.03)		0.167* (1.68)	
β_{20}	TF_{t-1}		0.011 (1.05)		-0.018* (-1.89)		0.008 (0.82)	
β_{40}	ΔTF_t	$\times(1-FC^m)$ $\times MX^l$	-0.034 (-0.80)		-0.046 (-0.93)		-0.029 (-0.82)	
γ_{20}	TAX_{t-1}		-0.007 (-0.41)		0.035** (2.54)		-0.007 (-0.44)	
γ_{40}	ΔTAX_t		-0.038 (-0.67)		0.030 (0.75)		-0.048 (-0.85)	
η_{60}	ΔM_t^l		0.035 (0.83)		0.090** (2.26)		0.048 (1.18)	
α_{11}	FCE_{t-1}		0.001 (0.04)		-0.001 (-0.03)		0.000 (0.02)	
α_{31}	ΔFCE_t		0.254** (2.14)		0.375*** (5.07)		0.318** (2.58)	
β_{11}	TF_{t-1}		0.004 (0.22)		-0.008 (-0.51)		-0.003 (-0.14)	
β_{31}	ΔTF_t	$\times FC^m$ $\times(1-MX^l)$	-0.041 (-0.41)		-0.106 (-1.01)		-0.051 (-0.48)	
γ_{11}	TAX_{t-1}		-0.009 (-0.41)		0.024 (1.16)		-0.004 (-0.20)	
γ_{31}	ΔTAX_t		0.066 (1.16)		0.053 (1.16)		0.090 (1.40)	
η_{51}	ΔM_t^l		0.065 (1.08)		-0.010 (-0.12)		0.022 (0.21)	
α_{21}	FCE_{t-1}		-0.024* (-1.67)		-0.016 (-1.12)		-0.024* (-1.72)	
α_{41}	ΔFCE_t		0.003 (0.05)		0.079 (1.10)		0.003 (0.05)	
β_{21}	TF_{t-1}		0.002 (0.26)		0.008 (1.14)		0.002 (0.31)	
β_{41}	ΔTF_t	$\times(1-FC^m)$ $\times(1-MX^l)$	0.042 (1.14)		0.049 (1.50)		0.039 (1.06)	
γ_{21}	TAX_{t-1}		0.017 (1.29)		0.026** (2.31)		0.016 (1.23)	
γ_{41}	ΔTAX_t		0.024 (0.94)		0.054** (2.28)		0.024 (0.97)	
η_{61}	ΔM_t^l		0.035 (1.21)		0.043 (1.78)		0.038 (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 – 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 XX – 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: Author's computations.

Table XXI – 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: Author's computations.

Table XXII – 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 XXIII – 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 XXIV – 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 XXV – 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).

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