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

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ABSTRACT

We provide new insights into the existence of expansionary fiscal consolidations in the Economic and Monetary Union, using annual panel data from 14 European Union countries, over the period of 1970–2013. Different measures were calculated for assessing fiscal consolidations, based on the changes in the cyclically adjusted primary balance. A similar *ad hoc* approach was used to compute monetary episodes. Panel 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 consolidations contribute positively to its success, whilst the opposite is the case for revenue-based ones. Copyright © 2015 John Wiley & Sons, Ltd.

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1. INTRODUCTION

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

Nevertheless, since the early 1990s, based on the case studies of Denmark and Ireland,[1] some literature discusses 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 reports of 1981 and 1982, which referred to 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, which would therefore reduce individuals'

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permanent income. If such expectations are taken into account by the agents, 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]

In fact, the expectational view of fiscal policy relies on the assumption of Ricardian households, which smooth consumption and have no liquidity constraints. This motivates a thorough assessment of the monetary developments when 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 it is accompanied by a strong enough monetary expansion, which offsets the detrimental effects of fiscal policy developments on disposable income and private consumption.

Arguably, whilst neglecting the monetary policy stance, one could find oneself 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 rather obvious, because 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 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 notably expanding Afonso's (2010) and Afonso and Jalles's (2014) core specification, in order to accommodate monetary policy developments. We conduct an assessment of fiscal episodes, using the same criteria. However, and in addition, we also identify monetary episodes for 14 European Union countries from 1970 to 2013 and study their relationship with fiscal developments. In fact, we want to assess if the existence of monetary expansions plays a role in the identification of expansionary effects of the fiscal policy, during fiscal consolidation periods. Moreover, we investigate if different types of fiscal consolidations as well as monetary expansions play a role in the success of the adjustments.

The paper is organized as follows. Section 2 reviews the related literature. Section 3 presents an identification of the fiscal and monetary episodes and their respective relationship. In Section 4, we conduct the empirical analysis of expansionary fiscal consolidations, resorting to panel estimations, which accommodate the developments of monetary policy. We also assess the success of the fiscal consolidations in this section. Section 5 concludes the paper.

2. LITERATURE SURVEY

Hellwig and Neumann (1987) were pioneers with regard to the assessment of the expansionary fiscal consolidation hypothesis. They argue that fiscal consolidation in Germany in the 1980s, 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. Furthermore, lower deficits stimulated private investment in the long run, owing to the reduced cost of financing. Nevertheless, unemployment remained high, which authors attribute to labour market rigidity.

Giavazzi and Pagano (1990) test this hypothesis for Denmark and Ireland, for the mid and late 1980s, respectively. In the case of Denmark, they report that the boom in consumption experienced in 1983–1986 cannot be explained by the decline in interest rates alone, and that as such, it 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 consumption growth in the second stabilization was due to the government focus on decreasing spending, rather than increasing taxation, and also due to the liberalization of the credit markets. In these cases, on the whole, expansionary fiscal consolidation is linked to an adjustment on the public spending side, rather than of revenues, although in Denmark, the adjustment occurred through investment spending, and in Ireland, it came about through current spending.

Alesina and Ardagna (1998) investigate the expansionary fiscal consolidation possibility, recurring to an analysis of Organisation for Economic Co-operation and Development (OECD) countries from 1960 to 1994.

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According to the General Council of Economic Experts' expectational view of fiscal policy, fiscal adjustments that occur when the debt level is high, or is growing rapidly, should be expansionary, whereas others should not. Nevertheless, the authors do not find evidence that confirms this view. On the other hand, they found strong evidence of the effect of the composition of the adjustment on 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 which were accompanied by wage moderation and by nominal exchange rate devaluation, all turned out to be expansionary.

Perotti (1999) addresses the same issue for 19 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 defined as periods of high debt-to-gross domestic product (GDP) ratio, or following periods of exceptionally high debt-accumulation rates. His findings differ for other periods, because 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 a 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 these can signal a regime change, which thus affects private sector expectations. Furthermore, non-Keynesian effects that lead to an expansionary fiscal consolidation are stronger for 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 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. With regard to 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. Moving to the role of the monetary policy, there was evidence that neither successful (leading to decrease in debt-to-GDP ratio) nor expansionary (leading to increase in GDP growth) consolidations need to be met by expansionary monetary policies or exchange rate devaluations.

Giudice *et al.* (2004) address the subject of non-Keynesian effects in 14 European Union countries, in an *ex post* and *ex ante* analysis. The *ex post* analysis consisted of 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 of empirical studies.

Afonso (2010) conducted a panel analysis for 15 EU countries from 1970 to 2005 and 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 from 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 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 a historical approach, based on policy documents. This database has been used in subsequent literature concerning expansionary fiscal consolidations.[4]

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

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Alesina and Ardagna (2013) also 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 in explaining the differences between expenditure-based and tax-based adjustments.

The European Commission (2014) conducted an empirical analysis of medium-term expenditure trends after expenditure-based consolidations in a sub-sample of EU Member States. The results show that medium-term expenditure trends are substantially reduced over the 4 years following an expenditure-based consolidation, whereas no such effect is noticeable after the implementation of other types of fiscal consolidations.

Nevertheless, the meta-analysis provided by Gechert (2015) shows that the size of the fiscal multiplier crucially depends on the setting and method chosen. An extensive literature overview shows that the reported multipliers largely depend on model classes, with the real business cycle reporting significantly lower multipliers. Moreover, the multiplier effect of public spending is usually in the interval (0, 1), whilst negative multipliers may be associated with public employment, lowering private labour supply and with distortional effects of taxation.

Therefore, some findings[5] suggest that expansionary and successful fiscal episodes are more likely when there is consolidation on the spending side. Moreover, some studies such as Perotti (1999) and Giavazzi *et al.* (2000) argue that non-Keynesian effects are more likely to or only occur during periods of high debt-to-GDP ratio or when debt is piling up quickly. The size and sign of the fiscal multipliers may vary across different setups, but the multiplier effect of public spending is typically positive (Gechert, 2015).

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 a measure of a 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 create an indicator that has been corrected for the effects of changes in economic activity, which thus reflects the discretionary part of the fiscal policy.

In practice, one can assess the existence of fiscal episodes – either contractions or expansions – by studying the behaviour of this indicator over time. In Giavazzi and 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 1 year. Alesina and Ardagna (1998) identify the periods of occurrence of fiscal episodes, by looking for the periods where the change in the cyclically adjusted primary balance was greater than 2 percentage points in 1 year or at least 1.5 percentage points of GDP on average over the last 2 years. Afonso's (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 over the last 2 years is greater than the standard deviation of the full panel. Table 1 shows the fiscal expansions and contractions, according to the different criteria.

The measures used by Giavazzi and Pagano (1996), Alesina and Ardagna (1998) and Afonso (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: a coincidence of 71% and 87% occurs between fiscal episodes 1 and 2, and 1 and 3, respectively, and 87% between criteria 2 and 3 (Table 1).

All the criteria capture the cases studied by Giavazzi and Pagano (1990), as fiscal contractions is identified in Denmark in 1983–1986 and in Ireland in 1988. Also, a clear identification of fiscal expansions was identified in 2009 across the EMU countries, following the European Commission policy recommendations after the 2007–2008 financial crisis. Furthermore, the different methodologies also identify the consolidation efforts made by those countries receiving financial assistance during 2011–2013, namely, Ireland, Greece and Portugal.

In practice, a non-fiscal consolidation episode can either be a case where we have an improvement in the CAPB, which is not enough to be considered as a fiscal episode, according to the measures we defined, or it can also be a

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Table 1. Identification of the fiscal episodes according to the different criteria (1970–2013)

	FE^1		FE^2		FE^3	
Country	Expansions	Contractions	Expansions	Contractions	Expansions	Contractions
Austria	04	97	04	84, 97, 01, 05	04	84, 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	83–87,13	75, 82, 90	83–86, 13	75, 82, 90	83–86, 13
Finland	79–80, 83, 91–93, 10	76–77, 97–98, 00–01	78–79, 83, 87, 91–92, 09–10	76–77, 81, 88, 96–97, 00–01	78, 87, 91–92, 09	76, 88, 96, 00
France			09		09	
Germany	75, 91, 95, 01–02	96–99, 12	75, 90–91, 95, 01–02, 10	96–97, 00, 11–12	75, 90–91, 95, 01–02, 10	96–97, 00, 11
Greece	04, 08–09	91–94, 96, 10–13	89, 95, 08–09, 13	91–92, 94, 10–12	89, 95, 08–09, 13	91–92, 94, 10–12
Ireland	01–02, 07–10	88, 11–13	95, 01–02, 07–10	88, 11–13	95, 01–02, 07–10	88, 11–13
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	01–02, 09–10	91, 93, 96	01, 09	91, 93, 96
Portugal	78–80, 94, 09–10	83–84, 11–13	78–79, 85, 93–94, 05, 09–10	83–84, 86, 88, 92, 11–13	78, 85, 93, 05, 09–10	83, 86, 88, 92, 11–13
Spain	08–11	13	08–09	13	08–09	13
Sweden	02–03	96–99	02	96–97	02	96–97
UK	91–93, 01–04, 09	97–00, 11–13	90–93, 01–03, 09	97–98, 00, 11–12	90, 92–93, 01–03, 09	00, 11
No. of years with episodes	52	62	63	61	51	50
Average duration of episodes (years)	1.86	2.48	1.62	1.65	1.31	1.43

Source: The author's computations.
Notes: FE^1, measure based on Giavazzi and Pagano (1996); FE^2, measure based on Alesina and Ardagna (1998); FE^3, measure based on Afonso (2010).

case where we have a fiscal expansion. The same applies to the monetary episodes, which will be presented in the next section.

Recent studies, such as those of Afonso and Jalles (2012) and Alesina and Ardagna (2013), also include a criterion for identifying fiscal consolidations, which is referred to as the International Monetary Fund's 'Action Based Approach', which is computed according to Devries *et al.* (2011). This identifies fiscal consolidations, based 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 unrelated to policy actions, due to its inability to remove sharp fluctuations in economic activity. Unfortunately, the database is still being updated, and therefore, we would have to discard the most recent years (2010–2013) in order to accommodate that approach. Therefore, we will not include this at this point, but we do, however, intend to do so in future research.

3.2. Monetary episodes

One of the main contributions of this paper is the study of the coupling of fiscal and monetary policy, as a means of assessing 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 monetary episodes in the EMU countries. We chose three indicators that could be used as a

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measure of the monetary stance for the different countries, namely, the real short-term money market interest rate, the nominal effective exchange rate and the real effective exchange rate.

The change in the real short-term interest rate is a widely used measure of monetary policy easing or tightening,[6] 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.

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 countries' competitiveness. The nominal effective exchange rate was used by Ardagna (2004) as an indicator of the monetary stance. A negative change in this indicator corresponds to currency depreciation and, therefore, to 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 the monetary episodes, we relied on a similar strategy to that of Afonso (2010) and identified an episode when the absolute change in 1 year or the average change in 2 years in the different indicators was greater than 1.5 times or 1.0 time the panel standard deviation, respectively,

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

where 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, 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 2 shows the monetary episodes, identified according to the different indicators. ME^1, ME^2 and ME^3 correspond respectively 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.

One of the main highlights is the fact 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 1.6 and 1.7 years on average, respectively,. If we consider the changes in the nominal effective exchange rates, then the duration of the expansions more than doubles, and in the case of the contractions, it also increases significantly.

Moreover, whilst in the fiscal episodes case, a significant overlapping occurs across the different criteria, in this case it is much lower, with the matching being only 4%, 14% and 42% between ME^1 and ME^2, ME^1 and ME^3 ,and ME^2 and ME^3, respectively.

Furthermore, we can see that some episodes are labelled as expansions in ME^1, which show up as contractions in ME^2 and ME^3, which further motivates the inclusion and analysis of all the different criteria.

4. EMPIRICAL ASSESSMENT

4.1. Data description

The data consist on annual frequency time series ranging from 1970 to 2013 for private consumption, GDP, general government final consumption, social transfers, taxes, CAPB, general government debt, revenue and expenditure, taken from the AMECO database.[7] We used 11 countries that belong to the EMU,[8] namely, Austria, Belgium, Germany, Finland, France, Greece, Ireland, Italy, Netherlands, Portugal and Spain and also Denmark, Sweden and the UK, which are not in the EMU but are geographically and politically linked to the remaining. This

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Table 2. Identification of the monetary episodes according to the different criteria (1970–2013)

	ME^1		ME^2		ME^3	
Country	Expansions	Contractions	Expansions	Contractions	Expansions	Contractions
Austria	72, 83, 94, 09–10	77, 80–81, 89	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, 79–80, 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, 10–11	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,	81–82, 85, 89, 97–98, 00–01, 11–12	79, 87, 93–95, 03–04	97, 00	72–80, 83–84, 86–88, 91, 93–96, 03–04
Greece	82, 90, 95–96, 00–03	86, 89, 92–94,	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, 99–00	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, 79–80, 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, 02–03	76–89, 94	
Spain	84–86, 88, 95, 99	78–81, 83, 87–88, 07–08	82–84, 93–94	85–91, 03–04, 08	76–78, 81–84, 93–94	74, 79, 88–91, 03–04
Sweden	86–87, 93–94	85, 92–93	78, 82–84, 93–94, 98–02, 06, 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
UK	74–75, 88, 02, 09–10	73, 76–77, 79, 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, 86–87, 93–94, 08–10	79–81, 88, 97–99
No. of years with episodes	96	93	98	125	125	122
Average duration of episodes (years)	1.55	1.72	2.00	1.87	3.29	2.18

Source: The 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.

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means that we can have a maximum of 616 observations per variable, throughout the entire panel. Data are expressed in real *per capita* values.

We have carried out a set of unit root tests, which are available on the working paper version, and show that most series are stationary. For those that are not, as we have already computed significant changes on the original series, it makes sense to include all the series in levels. Otherwise, we would risk losing some of the intuition behind the variable relationship, which would thus make the model more difficult to interpret. Because the variables are already transformed as logarithmic growth rates, not using such levels would obscure the existence of a possible level relation.

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 of estimating the variation of private consumption, using budgetary variables and dummies for assessing fiscal and monetary episodes. The core specification will be

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

where $i (i = 1, \ldots, N)$ indicates the different countries and $t (t = 1, \ldots, T)$ stands for the period. We also have C as the private consumption, Y the GDP, Y^{av} the panel's GDP average,[9] *FCE* the general government final consumption expenditure, *TF* the social transfers and *TAX* as the taxes. All variables displayed correspond to the natural logarithm of the real *per capita* values.[10] 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^m_{it} is equal to 1, there is a fiscal consolidation in period t, for country i, according to the criteria m., which is an autonomous term that captures each country's individual characteristics, being the source of cross-country heterogeneity in a fixed effects (FE) model, which will be our estimation choice. The disturbances μ_{it} are assumed to be independent and are identically distributed across countries with zero mean and constant variance.

4.2.1. Core specification outputs

We use the 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, in order 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 that do not vary across time. The source of country heterogeneity is given by the intercept c_i, in specification (2) with FE, allowing for correlation between the latter and the repressors.[11]

We perform redundant FE likelihood ratio tests for all estimations, with the null hypothesis being that there is no unobserved heterogeneity, and thus, the model can be estimated by pooled ordinary least squares. If we reject this hypothesis, then FE is more adequate than pooled ordinary least squares, as it allows for cross-country heterogeneity, by permitting each one to have its own intercept value (c_i).[12]

Table 3 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 the lagged consumption is an independent variable, which therefore increases consumption in period $t-1$ and decreases its difference between t and $t-1$. The short-run elasticity of private consumption to income is similar across specifications, ranging between 0.079 and 0.081.

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 there is fiscal consolidation ($FC^m = 1$), across all of the estimations based on (2), with coefficients between 0.203 and 0.256. Such a relationship is in line

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Table 3. Fixed effects estimation results for specification (2)

			FC^1		FC^2		FC^3	
λ	C_{t-1}		−0.083*** (−3.41)		−0.080*** (−3.36)		−0.079*** (−3.33)	
ω_0	T_{t-1}		0.081*** (3.02)		0.080*** (2.98)		0.079*** (2.97)	
ω_1	ΔY_t		0.816*** (11.79)		0.819*** (11.92)		0.818*** (12.04)	
δ_0	Y^{av}_{t-1}		−0.027* (−1.88)		−0.026* (−1.79)		−0.026* (−1.82)	
δ_1	ΔY^{av}_t		−0.162** (−2.35)		−0.152** (−2.19)		−0.152*** (−2.20)	
α_1	FCE_{t-1}	$\times FC^m$	0.007 (0.37)		0.012 (0.69)		0.011 (0.63)	
α_3	ΔFCE_t		0.203** (2.03)		0.210** (2.12)		0.256** (2.47)	
β_1	TF_{t-1}		0.002 (0.13)		−0.000 (−0.02)		−0.001 (−0.06)	
β_3	ΔTF_t		0.013 (0.19)		0.010 (0.12)		0.038 (0.35)	
γ_1	TAX_{t-1}		−0.001 (−0.03)		−0.003 (−0.17)		−0.001 (−0.06)	
γ_3	ΔTAX_t		0.041 (0.73)		0.028 (0.62)		0.022 (0.44)	
α_2	FCE_{t-1}	$\times(1-FC^m)$	−0.015 (−1.14)		−0.016 (−1.27)		−0.017 (−1.32)	
α_4	ΔFCE_t		0.052 (0.85)		0.051 (0.85)		0.044 (0.75)	
β_2	TF_{t-1}		0.001 (0.21)		0.002 (0.25)		0.002 (0.23)	
β_4	ΔTF_t		0.032 (1.00)		0.038 (1.23)		0.037 (1.24)	
γ_2	TAX_{t-1}		0.022** (2.02)		0.022** (2.05)		0.023** (2.10)	
γ_4	ΔTAX_t		0.030 (1.33)		0.025 (1.06)		0.025 (1.06)	
	N		468		468		468	
	R^2		0.739		0.741		0.743	
			t-stat.	*p*-val.	*t*-stat.	*p*-val.	*t*-stat.	*p*-val.
Redundant FE likelihood ratio			3.10	0.00	2.97	0.00	2.95	0.00
Null hypothesis								
$\alpha_3 - \alpha_4 = 0$			1.24	0.22	1.93	0.05	1.78	0.08
$\gamma_1 - \gamma_2 = 0$			−0.24	0.81	−0.34	0.74	0.01	0.99

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

with the traditional Keynesian effects, indicating that consumers are not behaving in a Ricardian way, as 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 taxes (TAX_{t-1}) across the three different estimations. The positive sign in the short-run elasticity of taxes to private consumption suggests a Ricardian behaviour in the absence of fiscal consolidations. Apparently, an increase in taxes today leads to increased spending, as consumers anticipate that there is no need for increased taxation in the future.

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 taxation on private consumption (the null hypothesis: $\gamma_1 - \gamma_2 = 0$ is not rejected on all specifications).

Therefore, 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 ($FC^m = 0$), in the case of taxes, because there is some evidence of non-Keynesian effects.

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). This 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.

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$$\begin{aligned}\Delta C_{it} = {} & c_i + \lambda C_{it-1} + \omega_0 Y_{it-1} + \omega_1 \Delta Y_{it} + \delta_0 Y^{av}_{it-1} + \delta_1 \Delta Y^{av}_{it} + \\ & \left(\alpha_{10} FCE_{it-1} + \alpha_{30} \Delta FCE_{it} + \beta_{10} TF_{it-1} + \beta_{30} \Delta TF_{it} + \gamma_{10} TAX_{it-1} + \gamma_{30} \Delta TAX_{it} + \eta_{50} \Delta M^l_{it}\right) \times FC^m_{it} MX^l_{it} + \\ & \left(\alpha_{20} FCE_{it-1} + \alpha_{40} \Delta FCE_{it} + \beta_{20} TF_{it-1} + \beta_{40} \Delta TF_{it} + \gamma_{20} TAX_{it-1} + \gamma_{40} \Delta TAX_{it} + \eta_{60} \Delta M^l_{it}\right) \times \left(1 - FC^m_{it}\right) MX^l_{it} + \\ & \left(\alpha_{11} FCE_{it-1} + \alpha_{31} \Delta FCE_{it} + \beta_{11} TF_{it-1} + \beta_{31} \Delta TF_{it} + \gamma_{11} TAX_{it-1} + \gamma_{31} \Delta TAX_{it} + \eta_{51} \Delta M^l_{it}\right) \times FC^m_{it} \left(1 - MX^l_{it}\right) + \\ & \left(\alpha_{21} FCE_{it-1} + \alpha_{41} \Delta FCE_{it} + \beta_{21} TF_{it-1} + \beta_{41} \Delta TF_{it} + \gamma_{21} TAX_{it-1} + \gamma_{41} \Delta TAX_{it} + \eta_{61} \Delta M^l_{it}\right) \times \left(1 - FC^m_{it}\right)\left(1 - MX^l_{it}\right) + \mu_{it}\end{aligned} \tag{3}$$

In addition to the repressors previously explained, MX^l_{it} denotes a monetary expansion in period t ($t = 1, \ldots, T$) for country i ($i = 1, \ldots, N$), 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 found some evidence of non-Keynesian effects during fiscal consolidations in six out of the nine possible estimations.[13] Table 4 shows some of the most relevant estimation results.

It can be seen 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 does not hold for those 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 both fiscal contractions and monetary expansions ($\gamma_{30} > 0$) occur. Just as 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). The Wald coefficient restriction tests, available on the working paper, 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 is related to liquidity restrictions, which may prevent a Ricardian behaviour, thus undermining the permanent income hypothesis. If households do indeed have liquidity constrains, then a fiscal consolidation could well signal a future tax decrease and also 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 and 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 control for these. Table 5 summarizes the robustness tests computed for specification (3). In addition, we have also computed different measures to identify the fiscal and monetary episodes, by either relaxing or restricting the *ad hoc* measures criteria (e.g. decreasing the multiple of the panel standard deviation by 0.25 pp in FC3, MX1, MX2 and MX3 and also by 0.5 pp of the GDP criteria in FC1 and FC2) with similar results.

Further robustness tests suggest cross-section dependence. Therefore, we re-estimated specification (3) with Driscoll and Kraay (1998) standard errors (Table 6).

We can see that evidence of the previously reported pattern still persists in the second and third outputs. When fiscal consolidations are matched by monetary expansions, there is evidence of non-Keynesian elasticities for government final consumption expenditure and social transfers in the second output and also taxes in the third output. On the other hand, when fiscal consolidations are not matched by monetary expansions, we either have Keynesian or not statistically significant non-Keynesian multipliers.

4.3. Measuring the success of fiscal consolidations

In this section, we investigate which factors 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^1_t) is based on Afonso and Jalles

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Table 4. Fixed effects estimation for specification (3): first output

			FC^1, MX^3		FC^2, MX^1		FC^3, MX^1	
λ	C_{t-1}		-0.088^{***} (-3.56)		-0.089^{***} (-3.83)		-0.089^{***} (-3.88)	
ω_0	Y_{t-1}		0.090^{***} (3.19)		0.095^{***} (3.57)		0.100^{***} (3.75)	
ω_1	ΔY_t		0.811^{***} (11.28)		0.803^{***} (11.54)		0.794^{***} (11.54)	
δ_0	Y^{av}_{t-1}		-0.021 (-1.30)		-0.030^{**} (-2.11)		-0.0297^{**} (-2.11)	
δ_1	ΔY^{av}_t		-0.172^{**} (-2.47)		-0.142^{**} (-2.09)		-0.130^{*} (-1.93)	
α_{10}	FCE_{t-1}		0.050 (1.43)		0.191 (1.28)		-0.854^{***} (-14.77)	
α_{30}	ΔFCE_t		-0.217^{***} (-3.78)		-0.360^{*} (-1.68)		-0.029 (-0.23)	
β_{10}	TF_{t-1}	$\times FC^m$	0.008 (0.56)		0.026 (0.84)		1.298^{***} (22.00)	
β_{30}	ΔTF_t	$\times MX^l$	-0.129^{*} (-1.88)		0.039 (0.14)		-11.46^{***} (-20.27)	
γ_{10}	TAX_{t-1}		-0.053^{**} (-2.16)		-0.201^{*} (-1.68)		-0.548^{***} (-9.85)	
γ_{30}	ΔTAX_t		-0.133^{***} (-3.26)		0.470^{***} (4.47)		2.689^{***} (17.68)	
η_{50}	ΔM^l_t		0.001^{**} (2.13)		0.002 (0.42)		-0.216^{***} (-20.60)	
α_{20}	FCE_{t-1}		-0.005 (-0.24)		-0.036^{**} (-2.28)		-0.039^{**} (-2.52)	
α_{40}	ΔFCE_t		0.268^{**} (2.49)		0.015 (0.13)		0.014 (0.13)	
β_{20}	TF_{t-1}	$\times(1-FC^m)$	0.013 (1.12)		-0.018 (-1.63)		-0.018 (-1.56)	
β_{40}	ΔTF_t	$\times MX^l$	-0.042 (-0.89)		-0.027 (-0.55)		-0.028 (-0.56)	
γ_{20}	TAX_{t-1}		-0.010 (-0.66)		0.054^{***} (3.64)		0.053^{***} (3.58)	
γ_{40}	ΔTAX_t		-0.029 (-0.57)		-0.007 (-0.14)		-0.010 (-0.19)	
η_{60}	ΔM^l_t		0.000 (0.59)		-0.000 (-0.64)		-0.001 (-0.59)	
α_{11}	FCE_{t-1}		0.017 (0.78)		0.006 (0.31)		0.003 (0.18)	
α_{31}	ΔFCE_t		0.279^{***} (2.73)		0.298^{***} (3.67)		0.374^{***} (4.95)	
β_{11}	TF_{t-1}	$\times FC^m$	-0.010 (-0.58)		0.003 (0.28)		-0.003 (-0.29)	
β_{31}	ΔTF_t	$\times(1-MX^l)$	-0.080 (-1.02)		-0.019 (-0.26)		-0.036 (-0.39)	
γ_{11}	TAX_{t-1}		-0.013 (-0.67)		-0.002 (-0.10)		0.002 (0.10)	
γ_{31}	ΔTAX_t		0.105 (1.54)		-0.012 (-0.27)		-0.032 (-0.63)	
η_{51}	ΔM^l_t		0.000 (0.57)		0.001 (1.37)		0.002^{*} (1.70)	
α_{21}	FCE_{t-1}		-0.022 (-1.50)		-0.016 (-1.12)		-0.018 (-1.30)	
α_{41}	ΔFCE_t		0.012 (0.19)		0.049 (0.74)		0.040 (0.61)	
β_{21}	TF_{t-1}	$\times(1-FC^m)$	0.003 (0.40)		0.005 (0.66)		0.005 (0.75)	
β_{41}	ΔTF_t	$\times(1-MX^l)$	0.041 (1.12)		0.061^{*} (1.83)		0.059^{*} (1.80)	
γ_{21}	TAX_{t-1}		0.015 (1.23)		0.017 (1.59)		0.015 (1.43)	
γ_{41}	ΔTAX_t		0.025 (1.05)		0.043^{*} (1.74)		0.041^{*} (1.70)	
η_{61}	ΔM^l_t		0.000 (1.15)		-0.001 (-0.99)		-0.000 (-0.93)	
	N		468		468		468	
	R^2		0.766		0.763		0.770	
			t-stat.	p-val.	t-stat.	p-val.	t-stat.	p-val.
Redundant FE likelihood ratio			3.48	0.00	3.85	0.00	4.06	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% level, respectively.
FE, fixed effects.

(2012), who define a fiscal consolidation as being successful, if the change in the CAPB (Δb_t) for 2 consecutive years is greater than the standard deviation (σ) of the full panel sample:

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

We have also included a measure computed by Alesina and 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 2 years after the

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Table 5. 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 in the absence of monetary expansions. Evidence seems stronger when fiscal consolidations are matched by monetary expansions. Evidence of non-Keynesian effects for government final consumption expenditure in the absence of monetary expansions. Could not compute some estimations owing to near singular matrix problems.
Sample with 'peripheral' countries	Some evidence of non-Keynesian effects for all of the budgetary components, which overall seems to be stronger when fiscal consolidations are matched by monetary expansions. Could not compute some estimations owing to near singular matrix problems.
1970–1998	Some evidence of non-Keynesian effects for all of the budgetary components. For government final consumption expenditure and social transfers, evidence seems to be stronger when fiscal consolidations are matched by monetary expansions. The opposite holds for taxes.
1999–2013	We could not compute any estimation, owing to a near singular matrix.

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

end of the fiscal adjustment ($Debt_{t+2}$) is lower than the debt-to-GDP ratio in the last year of the adjustment ($Debt_t$):

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

Table 7 shows the successful fiscal episodes for the different countries.

The identification of the leading policy option for the fiscal consolidation – either expenditure-based 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 cyclically adjusted 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):

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

Following Afonso and Jalles' (2012) research, we computed the composition of the adjustment for three different thresholds, in order that λ assumes the values of 1/2, 2/3 and 3/4. A similar process was conducted for the revenue-based consolidations. We estimated a probit model based on Afonso and Jalles (2012), in order to assess whether the reported differences between the expenditure-based and revenue-based consolidations are statistically relevant and impinge on the success of the fiscal adjustments:

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

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

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

D_i is the duration of the fiscal consolidation and Δb_i refers to the change in the CAPB, which accounts for the size of the consolidation. EXP_i was defined in (6) as a dummy variable which accounts for expenditure-based consolidations, according to different thresholds, whilst the same was carried out on the revenue side.

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Table 6. Cross-section dependence robust fixed effects estimation for specification (3): first output

			FC^1, MX^3	FC^2, MX^1	FC^3, MX^1
λ	C_{t-1}		-0.083^{***} (-3.64)	-0.090^{***} (-3.87)	-0.089^{***} (-4.15)
ω_0	Y_{t-1}		0.088^{***} (3.49)	0.100^{***} (3.98)	0.100^{***} (4.12)
ω_1	ΔY_t		0.818^{***} (11.75)	0.801^{***} (14.02)	0.794^{***} (13.44)
δ_0	Y^{av}_{t-1}		-0.016 (-1.11)	-0.031^{**} (-2.18)	-0.0297^{**} (-2.09)
δ_1	ΔY^{av}_t		-0.149^{*} (-1.79)	-0.142^{**} (-2.11)	-0.130 (-1.66)
α_{10}	FCE_{t-1}		0.033 (1.12)	0.981^{***} (5.85)	-0.854^{***} (-14.99)
α_{30}	ΔFCE_t		-0.017 (-0.11)	-2.286^{***} (-4.99)	-0.029 (-0.20)
β_{10}	TF_{t-1}	TAX_{t-1}	-0.024 (-1.21)	-0.276^{***} (-4.72)	1.298^{***} (20.81)
β_{30}	ΔTF_t	ΔTAX_t	0.039 (0.50)	-3.037^{***} (-5.07)	-11.464^{***} (-18.73)
γ_{10}	TAX_{t-1}		-0.018 (-0.70)	-0.621^{***} (-5.81)	-0.548^{***} (-9.14)
γ_{30}	ΔTAX_t		-0.010 (-0.13)	-1.984^{***} (-4.91)	2.689^{***} (14.37)
η_{50}	ΔM^l_t		0.002 (2.64)	0.024^{***} (4.37)	-0.216^{***} (-20.17)
α_{20}	FCE_{t-1}		-0.007 (-0.29)	-0.037^{*} (-1.69)	-0.039^{*} (-1.85)
α_{40}	ΔFCE_t		0.193 (3.11)	0.027 (0.25)	0.014 (0.14)
β_{20}	TF_{t-1}	$\times(1-FC^m)$	0.010 (1.30)	-0.019^{*} (-1.73)	-0.018^{*} (-1.70)
β_{40}	ΔTF_t	$\times MX^l$	-0.033 (-0.94)	-0.040 (-0.80)	-0.028 (-0.56)
γ_{20}	TAX_{t-1}		-0.010 (-0.59)	0.053^{***} (4.23)	0.053^{***} (4.23)
γ_{40}	ΔTAX_t		-0.042 (-1.22)	0.008 (0.18)	-0.010 (-0.18)
η_{60}	ΔM^l_t		0.000 (0.92)	-0.001 (-1.12)	-0.001 (-0.72)
α_{11}	FCE_{t-1}		0.006 (0.29)	-0.002 (-0.08)	0.003 (0.21)
α_{31}	ΔFCE_t		0.256^{*} (1.83)	0.316^{**} (2.70)	0.374^{***} (4.46)
β_{11}	TF_{t-1}	$\times FC^m$	-0.001 (-0.07)	0.005 (0.40)	-0.003 (-0.23)
β_{31}	ΔTF_t	$\times(1-MX^l)$	-0.058 (-0.77)	-0.043 (-0.81)	-0.036 (-0.47)
γ_{11}	TAX_{t-1}		-0.013 (-0.52)	-0.000 (-0.02)	0.002 (0.09)
γ_{31}	ΔTAX_t		0.054 (1.32)	0.031 (0.70)	-0.032 (-0.67)
η_{51}	ΔM^l_t		0.001 (1.07)	0.002 (1.08)	0.002 (1.44)
α_{21}	FCE_{t-1}		-0.024 (-1.20)	-0.016 (-0.75)	-0.018 (-0.88)
α_{41}	ΔFCE_t		0.016 (0.22)	0.044 (0.60)	0.040 (0.55)
β_{21}	TF_{t-1}	$\times(1-FC^m)$	0.001 (0.20)	0.006 (0.78)	0.005 (0.74)
β_{41}	ΔTF_t	$\times(1-MX^l)$	0.048 (1.56)	0.060^{**} (2.52)	0.059^{**} (2.66)
γ_{21}	TAX_{t-1}		0.014 (1.02)	0.014 (0.97)	0.015 (1.07)
γ_{41}	ΔTAX_t		0.019 (0.65)	0.041^{*} (1.77)	0.041^{*} (1.68)
η_{61}	ΔM^l_t		0.000 (0.81)	-0.001 (-1.24)	-0.000 (-1.23)
	N		468	468	468
	R^2		0.748	0.756	0.760

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

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 recent literature, which has to do with the possible influence of 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 and Ardagna (2013) also account for the possible role of the monetary policy in differentiating the effects of expenditure-based versus revenue-based adjustments.

Table 8 shows the results for the success measure constructed by Afonso and Jalles (2012), based on FC^2.[14] The results for the other criteria used to compute fiscal consolidations are available on request.

We can see that, according to the measure first computed by Afonso and Jalles (2012), we find no statistically significant results for the impact of neither expenditure-based nor revenue-based consolidations on the success of

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Table 7. Successful fiscal consolidations according to the different criteria (1970–2013)

	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	11–12	88, 11–12	88, 11–12		88	88
Italy	92, 12	82, 92, 12	82, 92, 12	92–94		
Netherlands	91, 96	91, 96	91, 96	93	93, 96	93, 96
Portugal	83, 11	83, 11	83, 11		86, 88	86, 88
Spain			10			
Sweden	97	96–97	96–97	97–99	96–97	96–97
UK	97–99, 11	97–98, 11	11	97–00	97–98, 00	00
No. of successful years	25	32	28	29	19	17

Source: The author's computations.
Notes: SU^1, success measure based on Afonso and Jalles (2012); SU^2, success measure based on Alesina and Ardagna (2013); FC^1, measure based on Giavazzi and Pagano (1996); FC^2, measure based on Alesina and Ardagna (1998); FC^3, measure based on Afonso (2010).

the adjustment. Nevertheless, 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 fiscal consolidations. These results hold across for FC^1, FC^2 or FC^3. With regard to the role of the monetary policy, we find no statistically significant results.[15]

Table 9 shows the results for the success criterion SU^2, based on FC^1.[16] The results are similar to the ones found in the SU^1 case, with regard to 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, the size of the consolidation has a negative impact on the success of the consolidation and is thus not robust across the different criteria.

Regarding the role of the monetary developments in the FC^2 case (available on the working paper), there is some evidence that real currency devaluations (MX^2) contribute negatively to the success of adjustments. However, because 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 those found for either MX^2 or MX^3. So we would rather state 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. Longer lasting consolidations seem to contribute positively for the success of the adjustment. In addition, there is some evidence that fiscal consolidations based on tax raises have a negative impact on the success of fiscal consolidations in the case of the evolution of the debt-to-GDP ratio.

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 and Jalles (2012), but the opposite is verified for SU^2. The role of the monetary policy is also unclear. Table 10 shows the robustness test for specification (8).

The robustness tests suggest that the pattern we observed regarding the impact of the revenue-based consolidations in the whole sample might be driven both by 'peripheral' countries and the period before the introduction of the Euro. In the case of 'Central-European' countries, we have opposite findings, as revenue-based consolidations seem to contribute positively for the success of the adjustment, both in the SU^1 and SU^2 cases.

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Table 8. Success of fiscal consolidations for SU^1 based on FC^2

	Expenditure			Revenue		
Specification	1	2	3	4	5	6
constant	−3.513*** (−2.74)	−3.486*** (−2.72)	−3.507*** (−2.76)	−3.374*** (−2.86)	−3.374*** (−2.67)	−3.370*** (−2.66)
duration	0.862* (1.87)	0.873* (1.91)	0.864* (1.91)	0.862* (1.87)	0.844* (1.75)	0.837* (1.74)
Δcapb	1.020*** (3.17)	1.020*** (3.16)	1.022*** (3.18)	1.020*** (3.17)	1.025*** (3.09)	1.032*** (3.10)
exp12	0.045 (0.10)					
exp23		−0.084 (−0.19)				
exp34			0.728 (0.03)			
rev12				−0.045 (−0.10)		
rev23					−0.233 (−0.52)	
rev34						−0.289 (−0.62)
mx2	0.312 (0.58)	0.354 (0.72)	0.340 (0.73)	0.318 (0.58)	0.274 (0.56)	0.28 (0.59)
R^2	0.436	0.437	0.436	0.436	0.439	0.440
N	58	58	58	58	58	58

Notes: Used robust heteroskedastic-consistent standard errors. The *t*-statistics are in parentheses.
*,
**, and
***denotes statistically significant at a 10%, 5% and 1% 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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Table 9. Success of fiscal consolidations for SU^2 based on FC^1

	Expenditure			Revenue		
Specification	1	2	3	4	5	6
constant	−1.115 (−1.25)	−1.190 (−1.36)	−1.301 (−1.41)	−1.245 (−1.48)	−0.815 (−0.95)	−1.271 (−1.45)
duration	0.690*** (3.42)	0.698*** (3.41)	0.702*** (3.16)	0.690*** (3.42)	0.765*** (3.66)	0.708*** (3.40)
Δcapb	−0.225** (−2.22)	−0.244** (−2.49)	−0.274*** (−3.00)	−0.225** (−2.22)	−0.342*** (−3.23)	−0.240** (−2.44)
exp12	−0.134 (−0.25)					
exp23		0.064 (0.135)				
exp34			0.746 (1.23)			
rev12				0.134 (0.25)		
rev23					−1.033* (−1.69)	
rev34						0.804 (1.43)
mx2	0.163 (0.34)	0.136 (0.89)	0.217 (0.43)	0.163 (0.34)	−0.055 (−0.10)	0.119 (0.24)
R^2	0.367	0.367	0.393	0.367	0.411	0.440
N	48	48	48	48	48	48

Notes: Used robust heteroskedastic-consistent standard errors. The *t*-statistics are in parentheses.

*,

**, and

***denotes statistically significant at a 10%, 5% and 1% 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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Table 10. Robustness tests for estimations based on specification (8)

Sample restriction	Summary results
Sample with 'Central-European' countries	Similar pattern, compared with the unrestricted case, regarding the duration and size of the consolidations. Expenditure-based consolidations seem to contribute negatively for the success of the adjustment, both in the SU1 and SU2 case, whereas we did not find any statistically significant results regarding the revenue based consolidations.
Sample with 'periphery' countries	Similar pattern for the SU1 case, regarding the duration and the size of the consolidations. We had mixed evidence regarding the impact of the type of adjustment on the success of fiscal consolidations. We could not compute most of the estimations for the SU2 case due to lack of variability of some variables, because the expenditure-based consolidations seem to be almost perfectly associated with successful adjustments, whilst the opposite holds for the revenue-based ones.
1970–1998	Similar pattern for the SU1 case regarding the duration and the size of the consolidations. Additionally, expenditure-based consolidations seem to have a positive impact on the success of the adjustment, whilst the reverse holds for the revenue-based ones. In the SU2 case, the results are similar to the ones found for the unrestricted sample, except for the size of the consolidations, which did not turn out any statistically significant results.
1999–2013	Obtained similar results for the duration and size of the consolidation for the SU1 case. Additionally, we have found some evidence that expenditure-based consolidations have a negative impact on the success of the adjustments, whilst the opposite holds for the revenue-based ones. Could not compute any estimation for the SU2 case, owing to the lack of variability of some variables.

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

5. CONCLUSIONS

This paper aims to provide new insights about expansionary fiscal consolidations in the EMU, by incorporating monetary developments on specifications that have been previously used in empirical research. The FE 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 in order to accommodate 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 of the standard Keynesian impact of government final consumption expenditure, social transfers and taxation on private consumption.

Overall, when fiscal consolidations are not matched by a monetary expansion, then the non-Keynesian effects captured earlier disappear. The size of the increase in private consumption resulting from 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, which allows individuals to smooth their consumption.

Therefore, our evidence favours, for the existence of the so-called expansionary fiscal consolidations, a policy mix between fiscal consolidations and monetary easing, because expansionary effects of the fiscal policy may occur when fiscal consolidations are matched by monetary expansions.

Moving to the success of the fiscal consolidations, 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 the consolidations in this regard is unclear.

Additionally, whole sample estimations suggest that tax-based consolidations have a negative impact on the success of the adjustment, if we consider the evolution of the debt-to-GDP ratio. Restricted sample robustness tests show that this pattern is found in 'peripheral' countries and also the pre-Euro period.

The overall role of monetary policy in the success of fiscal consolidations is unclear. On the one hand, there is some (although 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

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expansions based on the real interest rate, as these nearly 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.

APPENDIX

Table A1. 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, excluding interest of general government adjusted for the cyclical component: adjustment based on potential GDP excessive deficit procedure.	UUTGBP
Cyclically adjusted total revenue: general government: ESA 1995.	URTGAP
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	

NOTES

1. See Giavazzi and Pagano (1990).
2. See Hellwig and Neumann (1987).
3. See, for example, Giavazzi and Pagano (1990), Perotti (1999), Ardagna (2004), Afonso (2006, 2010) and Alesina and Ardagna (2013).
4. See, for example, Afonso and Jalles (2012), and Alesina and Ardagna (2013).
5. Giavazzi and Pagano (1990), Alesina and Ardagna (1998), Afonso (2010) and Alesina and Ardagna (2013).
6. See, for example, Afonso and Sousa (2011).
7. For full description of the original series, see Table A1 in the Appendix.
8. Originally, we also included Luxembourg, which was dropped, owing to the lack of information on monetary data.
9. The original specification in Afonso (2010) used the OECD's GDP, instead of the panel average. Nevertheless, because OECD only displays that series starting from 1995, we followed Afonso and Jalles (2012) and used the panel average GDP.
10. For instance, in order to obtain the variable *Y,* we make the following calculation: $Y = \ln[(GDP/DEF)/N]$, where *GDP* stands for the GDP at current prices and *DEF* and *N* correspond respectively to the GDP deflator and the total population.
11. 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 use of this model, in comparison with pooled ordinary least square.
12. We report the redundant fixed effect (FE) likelihood ratio for all estimations. In all cases, the no cross-country heterogeneity assumption is always rejected, which means that the FE estimator is more adequate than pooled ordinary least square.
13. Note that, because we have three different criteria for fiscal and monetary developments, the assessment of their relationship within the current framework yields nine possible estimation outputs. The other outputs are available in the working paper.
14. 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).
15. 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 they perfectly predict the success of the fiscal consolidations.
16. The results for FC^2 and FC^3 are available in the working paper version.

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