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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 for 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.

JEL: C23, E21, E5, E62, H5, H62

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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 1990's, 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' 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, while 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, since the expectational view of fiscal policy was to

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 (2010) and Alesina and Ardagna (2013).

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 (2010)'s and Afonso and Jalles (2014)'s 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 organised as follows. Section two reviews the related literature. Section three presents an identification of the fiscal and monetary episodes and their respective relationship. In Section four we conduct the empirical analysis of expansionary fiscal consolidations, resorting to panel estimations, which accommodates the developments of monetary policy. We also assess the success of the fiscal consolidations in this section. Section five concludes the paper.

2. Literature survey

Hellwig and Neumann (1987) were pioneers with regards to the assessment of the expansionary fiscal consolidation hypothesis. They argue that fiscal consolidation in Germany in the 1980's, under Chancellor Kohl, had such a positive impact on private sector confidence, that demand actually increased. Supposedly, fiscal consolidation by the Federal Government and monetary tightness by the Bundesbank led to continued 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 1980's, 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 stabilisation was due to the government focus on decreasing spending, rather than increasing taxation, and also due to the

liberalisation 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 OECD countries from 1960 to 1994. 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 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 increase in times of "fiscal stress", which the author defined as periods of high debt-to-GDP ratio, or following periods of exceptionally high debt accumulation rates. His findings differ for other periods, since in "normal" times, the Keynesian effects of a fiscal consolidation (either through spending cuts, or tax increases) on private consumption dominate.
Giavazzi *et al.* (2000) address the issue of expansionary fiscal consolidation in OECD countries from 1973 to 1996, and in developing countries from 1960 to 1995. In OECD countries, evidence of 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 regards 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 fourteen 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.
Pescatori *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.
Alesina and Ardagna (2013) also use Pescatori *et al.* (2011)'s 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.
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

4. See, for example, Afonso and Jalles (2012) and Alesina and Ardagna (2013).

are substantially reduced over the four 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 provide 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 Real Business Cycle reporting significantly lower multipliers. Moreover, the multiplier effect of public spending is usually in the interval (0, 1) while negative multipliers may be associated with public employment lowering private labor 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 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 one 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 one year or at least 1.5 percentage points of GDP on average over the last two years. Afonso (2010)'s assessment of fiscal episodes relies on a different method: a fiscal episode occurs

5. Giavazzi and Pagano (1990), Alesina and Ardagna (1998), Afonso (2010) and Alesina and Ardagna (2013).

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 two 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 percent occurs between fiscal episodes 1 and 2, and 1 and 3, respectively, and 87 percent between criteria 2 and 3 (see Table 1).

All the criteria capture the cases studied by Giavazzi and Pagano (1990), as fiscal contractions is identified in Denmark in 1983-86, 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 2007-08 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.

[Table 1]

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 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 IMF's "Action Based Approach", which is computed according to Pescatori *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, intent 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 which could be used as a 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 one year, or the average change in two years in the different indicators was greater than 1.5 times, or 1.0 time the panel standard deviation respectively:

$$ME_t^l = \begin{cases} 1, & \text{if } |\Delta M_t^1| > 1.5\sigma^l \\ 1, & \text{if } \left|\dfrac{\Delta M_{t-1}^1 + \Delta M_t^1}{2}\right| > \sigma^l \\ 0, & \text{otherwise} \end{cases}, \; l = 1,2,3 \tag{1}$$

ME_t^l denotes a monetary episode in period t, according to criteria 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. 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

6. See, for example, Afonso and Sousa (2011).

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 percent 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.

[Table 2]

4. Empirical assessment

4.1. Data description

The data consists on annual frequency time series ranging from 1970 to 2013 for private consumption, GDP, general government final consumption, social transfers, taxes, cyclically adjusted primary balance, general government debt, revenue and expenditure, taken from the AMECO database.[7] We used 11 countries who belong to the EMU, namely Austria, Belgium, Germany, Finland, France, Greece, Ireland, Italy, Netherlands, Portugal and Spain and also Denmark, Sweden and United Kingdom, which are not in the EMU,[8] but are geographically and politically linked to the remaining. This 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 request, 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. Since the variables are already transformed as logarithmic growth rates, not using such levels would obscure the existence of a possible level relation.

7. For full description of the original series, see Table A.1 in the Appendix.

8. Originally, we also included Luxembourg, which was dropped, owing to the lack of information on monetary data.

4.2. Modelling expansionary fiscal consolidations

The strategy for accessing the potential differences between fiscal expansions and fiscal contractions is based on Afonso (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:

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

where $i(i = 1, ..., N)$ indicates the different countries, and $t(t = 1, ...T)$ stands for the period. We also have: C – private consumption; Y– GDP; Y^{av} – panel's GDP average;[9] 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.[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_{it}^m is equal to one, there is a fiscal consolidation in period t, for country i, according to the criteria m. c_i is an autonomous term that 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 are identically distributed across countries with zero mean and constant variance.

4.2.1. Core specification outputs. We use the Fixed Effects (FE) estimation whenever we are interested in analysing the impact of variables that change over time. It explores the relationship between predictor and dependent variables within a country. The FE model removes the effect of time-invariant characteristics from the predictor variables, 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 which do not vary across time. The source of country heterogeneity is given by the intercept

9. The original specification in Afonso (2010) used the OECD's GDP, instead of the panel average. Nevertheless, since 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, DEF and N correspond respectively to the GDP deflator and the total population.

c_i, in specification (2) with Fixed Effects, allowing for correlation between the latter and the regressors.[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 OLS. If we reject this hypothesis, then FE is more adequate than pooled OLS, 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 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.

[Table 3]

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).

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 to pooled OLS.

12. We report the redundant FE likelihood ratio for all estimations. The no cross-country heterogeneity assumption is always rejected, which means that the FE estimator is more adequate than pooled OLS.

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 differ for periods of no fiscal consolidation ($FC^m = 0$), in the case of taxes, since 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.

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

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 found some evidence of non-Keynesian effects during fiscal consolidations in 6 out of the 9 possible estimations.[13] Tables 4 and 5 show some of the most relevant estimation results.

[Table 4]

[Table 5]

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.

13. 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 on request.

The second and third estimation results also show some evidence of non-Keynesian elasticity on taxes, when there 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_{30} is not statistically significant). The Wald coefficient restriction tests, available on request, 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 materialise in a current private consumption increase, due to limitations in access to credit markets. Such is summarised 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 6 summarises the robustness tests computed for specification (3). In addition, we have also computed different measures to identify the fiscal and monetary episodes, either relaxing or restricting the *ad-hoc* measures criteria (e.g. decreasing the multiple of the panel standard deviation by 0.25pp in FC^3, MX^1, MX^2 and MX^3 and also by 0.5pp of the GDP criteria in FC^1 and FC^2) with similar results.

[Table 6]

Further robustness tests suggest cross-section dependence. Therefore we reestimated specification (3) with Driscoll and Kraay (1998) standard errors.

[Table 7]

[Table 8]

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_t^l) is based on Afonso and 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:

$$SU_t^1 = \begin{cases} 1, & \text{if } \sum_{i=0}^{1} \Delta b_{t+i} > \sigma \\ 0, & \text{otherwise} \end{cases} \tag{4}$$

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 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 ($Debt_t$):

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

Table 9 shows the successful fiscal episodes for the different countries.

[Table 9]

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 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):

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

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 b_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 which accounts for expenditure-based consolidations, according to different thresholds, whilst 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 recent literature, which is related with the possible influence of monetary expansions in determining the success of fiscal consolidations.

For instance, Pescatori *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 10 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 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

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).

across for either FC^1, FC^2 or FC^3. With regards the role of the monetary policy, we find no statistically significant results.[15]

[Table 10]

Table 11 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 regards 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.

[Table 11]

Regarding the role of the monetary developments in the FC^2 case (available on request), there is some evidence that real currency devaluations (MX^2) contribute negatively to the success of adjustments. However, since we cannot check the robustness of these results with a monetary expansion based on the real short term interest rate (MX^1), because of the same problem reported earlier for SU^1 , we would not extract a clear conclusion here. Furthermore, the fact that MX^1 perfectly predicts the success of the fiscal consolidations, could actually lead to opposite conclusions to 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 12 shows the robustness tests for specification (8).

[Table 12]

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

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 uppon request.

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.

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 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 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, since 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 which 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 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.

	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	10-12	89, 95, 08-09, 13	91-92, 94, 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	Â 13	08-09	Â 13
Sweden	02-03	96-99	02	96-97	02	96-97
United Kingdom	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
# Years with episodes	52	62	63	61	51	50
Avg duration (years)	1.86	2.48	1.62	1.65	1.31	1.43

TABLE 1. Identification of the fiscal episodes according to the different criteria (1970-2013).

Source: The author's computations. *Notes:* 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).

	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, 91, 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, 89-91, 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
# Years with episodes	96	93	98	125	125	122
Avg duration (years)	1.55	1.72	2.00	1.87	3.29	2.18

TABLE 2. Identification of the monetary episodes according to the different criteria (1970-2013).

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.

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

TABLE 3. Fixed Effects estimation results for specification (2).

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

			FC^1, MX^3	FC^2, MX^1	FC^3, MX^1
λ	C_{t-1}		-0.088***	-0.089***	-0.089***
			(-3.56)	(-3.83)	(-3.88)
ω_0	Y_{t-1}		0.090***	0.095***	0.100***
			(3.19)	(3.57)	(3.75)
ω_1	ΔY_t		0.811***	0.803***	0.794***
			(11.28)	(11.54)	(11.54)
δ_0	Y^{av}_{t-1}		-0.021	-0.030**	-0.030**
			(-1.30)	(-2.11)	(-2.11)
δ_1	ΔY^{av}_t		-0.172**	-0.142**	-0.130*
			(-2.47)	(-2.09)	(-1.93)
α_{10}	FCE_{t-1}		0.050	0.191	-0.854***
			(1.43)	(1.28)	(-14.77)
α_{30}	ΔFCE_t		-0.217***	-0.360*	-0.029
			(-3.78)	(-1.68)	(-0.23)
β_{10}	TF_{t-1}		0.008	0.026	1.298***
			(0.56)	(0.84)	(22.00)
β_{30}	ΔTF_t	$\times FC^m$	-0.129*	0.039	-11.46***
		$\times MX^l$	(-1.88)	(0.14)	(-20.27)
γ_{10}	TAX_{t-1}		-0.053**	-0.201*	-0.548***
			(-2.16)	(-1.68)	(-9.85)
γ_{30}	ΔTAX_t		-0.133***	0.470***	2.689***
			(-3.26)	(4.47)	(17.68)
η_{50}	ΔM^l_t		0.001**	0.002	-0.216***
			(2.13)	(0.42)	(-20.60)

TABLE 4. Fixed Effects estimation for specification (3): 1st output.

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

			FC^1, MX^3		FC^2, MX^1		FC^3, MX^1	
α_{20}	FCE_{t-1}		-0.005		-0.036**		-0.039**	
			(-0.24)		(-2.28)		(-2.52)	
α_{40}	ΔFCE_t		0.268**		0.015		0.014	
			(2.49)		(0.13)		(0.13)	
β_{20}	TF_{t-1}		0.013		-0.018		-0.018	
			(-1.12)		(-1.63)		(-1.56)	
β_{40}	ΔTF_t	$\times(1-FC^m)$	-0.042		-0.027		-0.028	
		$\times MX^l$	(-0.89)		(-0.55)		(-0.56)	
γ_{20}	TAX_{t-1}		-0.010		0.054***		0.053***	
			(-0.66)		(3.64)		(3.58)	
γ_{40}	ΔTAX_t		-0.029		-0.007		-0.010	
			(-0.57)		(-0.14)		(-0.19)	
η_{60}	ΔM_t^l		0.000		-0.000		-0.001	
			(0.59)		(-0.64)		(-0.59)	
α_{11}	FCE_{t-1}		0.017		0.006		0.003	
			(0.78)		(0.31)		(0.18)	
α_{31}	ΔFCE_t		0.279***		0.298***		0.374***	
			(2.73)		(3.67)		(4.95)	
β_{11}	TF_{t-1}		-0.010		0.003		-0.003	
			(-0.58)		(0.28)		(-0.29)	
β_{31}	ΔTF_t	$\times FC^m$	-0.080		-0.019		-0.036	
		$\times(1-MX^l)$	(-1.02)		(-0.26)		(-0.39)	
γ_{11}	TAX_{t-1}		-0.013		-0.002		0.002	
			(-0.67)		(-0.10)		(0.10)	
γ_{31}	ΔTAX_t		0.105		-0.012		-0.032	
			(1.54)		(-0.27)		(-0.63)	
η_{51}	ΔM_t^l		0.000		0.001		0.002*	
			(0.57)		(1.37)		(1.70)	
α_{21}	FCE_{t-1}		-0.022		-0.016		-0.018	
			(-1.50)		(-1.12)		(-1.30)	
α_{41}	ΔFCE_t		0.012		0.049		0.040	
			(0.19)		(0.74)		(0.61)	
β_{21}	TF_{t-1}		0.003		0.005		0.005	
			(0.40)		(0.66)		(0.75)	
β_{41}	ΔTF_t	$\times(1-FC^m)$	0.041		0.061*		0.059*	
		$\times(1-MX^l)$	(1.12)		(1.83)		(1.80)	
γ_{21}	TAX_{t-1}		0.015		0.017		0.015	
			(1.23)		(1.59)		(1.43)	
α_{41}	ΔTAX_t		0.025		0.043*		0.041*	
			(1.05)		(1.74)		(1.70)	
η_{61}	ΔM_t^l		0.000		-0.001		0.000	
			(1.15)		(-0.99)		(-0.93)	
	N		468		468		468	
	R^2		0.766		0.763		0.770	
Redundant FE likelihood ratio			t-stat. 3.48	p-val. 0.00	t-stat. 3.85	p-val. 0.00	t-stat. 4.06	p-val. 0.00

TABLE 5. Fixed Effects estimation for specification (3): 1st output (cont.).

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.

Sample restriction	Summary results
"central-European" countries	Some evidence of non-keynesian effects for taxes during fiscal consolidations, which holds both in the presence and absence of monetary expansions. Evidence seems stronger when fiscal consolidations are matched by monetary expansions. Evidence of non-keynesian effects for Government Final Consumption Expenditure in the absence of monetary expansions. Could not compute some estimations due to near singular matrix problems.
"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 due 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 due to near singular matrix.

TABLE 6. Robustness test for estimations based on specification (3).

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.

			FC^1, MX^3	FC^2, MX^1	FC^3, MX^1
λ	C_{t-1}		-0.083***	-0.090***	-0.089***
			(-3.64)	(-3.87)	(-4.15)
ω_0	Y_{t-1}		0.088***	0.100***	0.100***
			(3.49)	(3.98)	(4.12)
ω_1	ΔY_t		0.818***	0.801***	0.794***
			(11.75)	(14.02)	(13.44)
δ_0	Y^{av}_{t-1}		-0.016	-0.031**	-0.030**
			(-1.11)	(-2.18)	(-2.09)
δ_1	ΔY^{av}_t		-0.149*	-0.142**	-0.130
			(-1.79)	(-2.11)	(-1.66)
α_{10}	FCE_{t-1}		0.033	0.981***	-0.854***
			(1.12)	(5.85)	(-14.99)
α_{30}	ΔFCE_t		-0.017	-2.286***	-0.029
			(-0.11)	(-4.99)	(-0.20)
β_{10}	TF_{t-1}		-0.024	-0.276***	1.298***
			(-1.21)	(-4.72)	(20.81)
β_{30}	ΔTF_t	$\times FC^m$ $\times MX^l$	0.039	-3.037***	-11.464***
			(0.50)	(-5.07)	(-18.73)
γ_{10}	TAX_{t-1}		-0.018	-0.621***	-0.548***
			(-0.70)	(-5.81)	(-9.14)
γ_{30}	ΔTAX_t		-0.010	-1.984***	2.689***
			(-0.13)	(-4.91)	(14.37)
η_{50}	ΔM^l_t		0.002**	0.024***	-0.216***
			(2.64)	(4.37)	(-20.17)

TABLE 7. Cross-section dependence robust Fixed Effects estimation for specification (3): 1st output.

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

			FC^1, MX^3	FC^2, MX^1	FC^3, MX^1
α_{20}	FCE_{t-1}		-0.007	-0.037*	-0.039*
			(-0.29)	(-1.69)	(-1.85)
α_{40}	ΔFCE_t		0.193***	0.027	0.014
			(3.11)	(0.25)	(0.14)
β_{20}	TF_{t-1}		0.010	-0.019*	-0.018*
			(1.30)	(-1.73)	(-1.70)
β_{40}	ΔTF_t	$\times(1-FC^m)$ $\times MX^l$	-0.033	-0.040	-0.028
			(-0.94)	(-0.80)	(-0.56)
γ_{20}	TAX_{t-1}		-0.010	0.053***	0.053***
			(-0.59)	(4.23)	(4.23)
γ_{40}	ΔTAX_t		-0.042	0.008	-0.010
			(-1.22)	(0.18)	(-0.18)
η_{60}	ΔM_t^l		0.000	-0.001	-0.001
			(0.92)	(-1.12)	(-0.72)
α_{11}	FCE_{t-1}		0.006	-0.002	0.003
			(0.29)	(-0.08)	(0.21)
α_{31}	ΔFCE_t		0.256*	0.316**	0.374***
			(1.83)	(2.70)	(4.46)
β_{11}	TF_{t-1}		-0.001	0.005	-0.003
			(-0.07)	(0.40)	(-0.23)
β_{31}	ΔTF_t	$\times FC^m$ $\times(1-MX^l)$	-0.058	-0.043	-0.036
			(-0.77)	(-0.81)	(-0.47)
γ_{11}	TAX_{t-1}		-0.013	-0.000	0.002
			(-0.52)	(-0.02)	(0.09)
γ_{31}	ΔTAX_t		0.054	0.031	-0.032
			(1.32)	(0.70)	(-0.67)
η_{51}	ΔM_t^l		0.001	0.002	0.002
			(1.07)	(1.08)	(1.44)
α_{21}	FCE_{t-1}		-0.024	-0.016	-0.018
			(-1.20)	(-0.75)	(-0.88)
α_{41}	ΔFCE_t		0.016	0.044	0.040
			(0.22)	(0.60)	(0.55)
β_{21}	TF_{t-1}		0.001	0.006	0.005
			(0.20)	(0.78)	(0.74)
β_{41}	ΔTF_t	$\times(1-FC^m)$ $\times(1-MX^l)$	0.048	0.060**	0.059**
			(1.56)	(2.52)	(2.66)
γ_{21}	TAX_{t-1}		0.014	0.014	0.015
			(1.02)	(0.97)	(1.07)
α_{41}	ΔTAX_t		0.019	0.041*	0.041*
			(0.65)	(1.77)	(1.68)
η_{61}	ΔM_t^l		0.000	-0.001	-0.000
			(0.81)	(-1.24)	(-1.23)
	N		468	468	468
	R^2		0.748	0.756	0.760

TABLE 8. Cross-section dependence robust Fixed Effects estimation for specification (3): 1st output (cont.).

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.

	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, 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, 12Â	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
United Kingdom	97-99, 11	97-98, 11	11	97-00	97-98, 00	0
# Successful years	25	32	28	29	19	17

TABLE 9. Successful fiscal consolidations (1970-2013).

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).

	Expenditure			**Revenue**		
Specification	1	2	3	4	5	6
constant	-3.513***	-3.486***	-3.507***	-3.374***	-3.374***	-3.370***
	(-2.74)	(-2.72)	(-2.76)	(-2.86)	(-2.67)	(-2.66)
duration	0.862*	0.873*	0.864*	0.862*	0.844*	0.837*
	(1.87)	(1.91)	(1.91)	(1.87)	(1.75)	(1.74)
$\Delta capb$	1.020***	1.020***	1.022***	1.020***	1.025***	1.032***
	(3.17)	(3.16)	(3.18)	(3.17)	(3.09)	(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	0.354	0.340	0.318	0.274	0.280
	(0.58)	(0.72)	(0.73)	(0.58)	(0.56)	(0.59)
R^2	0.436	0.437	0.436	0.436	0.439	0.440
N	58	58	58	58	58	58

TABLE 10. Success of fiscal consolidations for SU^1 based on FC^2.

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).

	Expenditure			**Revenue**		
Specification	1	2	3	4	5	6
constant	-1.115	-1.190	-1.301	-1.245	-0.815	-1.271
	(-1.25)	(-1.36)	(-1.41)	(-1.49)	(-0.95)	(-1.45)
duration	0.690***	0.698***	0.702***	0.690***	0.765***	0.708***
	(3.42)	(3.41)	(3.16)	(3.42)	(3.66)	(3.40)
$\Delta capb$	-0.225**	-0.244**	-0.274***	-0.225**	-0.342***	-0.240**
	(-2.22)	(-2.49)	(-3.00)	(-2.22)	(-3.23)	(-2.44)
exp12	-0.134					
	(-0.25)					
exp23		0.064				
		(0.14)				
exp34			0.746			
			(1.23)			
rev12				0.134		
				(0.25)		
rev23					-1.033*	
					(-1.69)	
rev34						0.804
						(1.43)
mx2	0.163	0.136	0.217	0.163	-0.055	0.119
	(0.34)	(0.89)	(0.43)	(0.34)	(-0.10)	(0.24)
R^2	0.367	0.367	0.393	0.367	0.411	0.440
N	48	48	48	48	48	48

TABLE 11. Success of fiscal consolidations for SU^2 based on FC^1.

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).

Sample restriction	Summary results
"central-European" countries	Similar pattern, compared to the unrestricted case, concerning the duration and size of the consolidations. Expenditure based consolidations seem to contribute negatively for the success of the adjustment, both in the SU^1 and SU^2 case, while we didn't find any statistically significant results concerning the revenue based consolidations.
"peripheral" countries	Similar pattern for the SU^1 case regarding the duration and the size of the consolidations. We got mixed evidence concerning the impact of the type of adjustment on the success of the fiscal consolidations. We could not compute most of the estimations for the SU^2 case due to lack of variability of some variables, since the expenditure based consolidations seem to be almost perfectly associated with successful adjustments, while the opposite holds for the revenue based ones.
1970 – 1998	Similar pattern for the SU^1 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, while the reverse holds for the revenue based ones. In the SU^2 case, the results are similar to the ones found for the unrestricted sample, except for the size of the consolidations, which didn't turn out any statistically significant results.
1999 – 2013	Obtained similar results for the duration and size of the consolidation for the SU^1 case. Additionally, we have found some evidence that expenditure based consolidations have a negative impact on the success of the adjustments, while the opposite holds for the revenue based ones. Could not compute any estimation for the SU^2 case due to lack of variability of some variables.

TABLE 12. Robustness test for estimations based on specification (8).

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.

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Appendix: 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	

Table A.1. Data Sources.

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