Expansionary fiscal consolidations in Europe: part of conventional wisdom?*

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Abstract

In order to assess whether expansionary fiscal consolidations can be part of conventional wisdom, panel data models for private consumption are estimated for the EU15 countries, using annual data over the period 1970–2005. Three alternative approaches to determine fiscal episodes are used, and the level of government indebtedness is also taken into account. The results show some evidence in favour of the existence of expansionary fiscal consolidations, for a few budgetary spending items (general government final consumption, social transfers, and taxes), depending on the specification and on the time span used. On the other hand, the possibility of asymmetric effects of fiscal episodes does not seem to be corroborated by the results.

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Keywords: fiscal policy; expansionary fiscal consolidations; non-Keynesian effects; panel data models; European Union

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Contents

1. Introduction

The fiscal adjustments that occurred in Denmark and in Ireland in the 1980s were used to first investigate the possibility of expansionary fiscal consolidations.[1] The evidence for these two countries seemed to show that a contractionary fiscal policy may well be expansionary when undertaken in a situation of public accounts distress, and co-ordinated with an adequate exchange rate policy. In other words, when an increase of public expenditures casts doubts on the sustainability of fiscal policy and on the level of the debt-to-GDP ratio, one may observe an increase of private saving and a reduction of private consumption. By the opposite reasoning, after a reduction in public spending, fiscal policy may induce an increase in private consumption.

Non-Keynesian effects may be also associated with tax increases at high levels of government indebtedness. This kind of argument is based on "the expectational view of fiscal policy." For instance, if the fiscal consolidation programme appears to the public as a serious attempt to reduce the public sector borrowing requirements, there may be an induced wealth effect, leading to an increase in private consumption, as maintained by Blanchard (1990) and Sutherland (1997). Furthermore, the reduction of the government borrowing requirements diminishes the risk premium associated with public debt issuance, contributes to reduce real interest rates and allows the crowding-in of private investment. However, if consumers do not think that the fiscal consolidation is credible, then the customary negative Keynesian effect on consumption will prevail.

Several fiscal episodes in Europe during the last two decades have given rise to a growing body of theoretical and mostly empirical literature concerning the so-called "non-Keynesian" effects of fiscal policy. This strand of literature contributed to challenging the broadly accepted Keynesian notion concerning the existence of a positive fiscal policy

[1] See Giavazzi and Pagano (1990). The time span of the fiscal consolidation in Ireland, 1987–1989, varies with authors. For instance Bradley and Whelan (1997) consider the period 1987-1990. The dating of fiscal policy episodes is a controversial issue in the empirical analysis, as discussed below in section 3.

multiplier, since the expansionary fiscal contraction possibility may not be discarded so lightly.[2]

This paper contributes to the existing literature on fiscal adjustments by looking at the evidence from a new angle and timing to answer the question: can expansionary fiscal consolidations be considered part of conventional wisdom? Using different criteria to define the relevant fiscal episodes I empirically test for expansionary fiscal contractions specifically in the EU15 countries in the period 1970–2005. Moreover, I also take into account the level of government indebtedness and assess as well the possibility of asymmetric effects of fiscal episodes.

The organisation of the paper is as follows. Section two briefly reviews the underpinnings of expansionary fiscal consolidations and overviews the available empirical evidence. Section three uses alternative methodological approaches to determine fiscal episodes. Section four presents the empirical analysis on expansionary fiscal consolidations in the EU15 via the estimation of private consumption panel data specifications, which use budgetary items as explanatory variables. Finally, section five contains my concluding remarks.

2. Expansionary fiscal consolidations

2.1. Motivating expansionary fiscal consolidations

Fiscal policy may have non-Keynesian effects on private consumption and investment decisions. It is therefore pertinent to identify the conditions under which a fiscal expansion may either contribute to the increase of economic activity or increase the likelihood of a recession. The basic underlying idea has been put forward by Feldstein (1982), who stated that permanent public expenses reductions may be expansionist if they are seen as an indication of future tax cuts, giving rise to expectations of a permanent

[2] Bertola and Drazen (1993), Barry and Devereux (1995) and Perotti (1999) presented several theoretical explanations concerning the existence of those effects. For an overview of the topic, see also Perotti (1998) and Alesina, Perotti and Tavares (1998).

income increase. Blanchard (1990), Sutherland (1997) and Perotti (1999) have argued that there is a higher probability of fiscal policy being non-Keynesian when there is a significant public debt-to-GDP ratio. As the argument goes, “"perverse" savings reactions are all the more likely if public debt is already high, since the private sector may fear tax increases further down the road to offset a debt explosion” (OECD, 1999).

According to Keynesian explanations, budget deficit reductions, after the implementation of spending cuts for instance, should result in a temporary slowdown of aggregate demand and of economic activity. According to neoclassical theory, a budget reduction would have no effect on economic activity since the supply side is supposed to be the main determinant of economic growth. Keynesian theory postulates that after a fiscal contraction, aggregate demand reduction is the consequence whatever the instruments used. Such reduction will occur either directly, through the decrease in public consumption and investment, or indirectly, when families reduce their consumption as a consequence of a lower disposable income, brought about by the increase of taxes or by the decrease of public transfers.

The frequently assumed positive correlation between private consumption and fiscal expansion may be reversed if some particular conditions are in place. For instance, a significant and sustained reduction of government expenditures may lead consumers to assume that a permanent tax reduction will also take place in the near future. In that case, an increase in permanent income and in private consumption may well occur, also generating better expectations for private investment. However, if the reduction in expenses is small and temporary, private consumption may not respond positively to the fiscal cutback. In other words, it appears reasonable to assume that under the right conditions, consumers might anticipate benefits from fiscal consolidation and act as described above.

Blanchard (1990) and Sutherland (1997) maintain that non-Keynesian effects may be associated with tax increases at high levels of government indebtedness. This kind of argument is based on “the expectational view of fiscal policy”. If the fiscal consolidation appears to the public as a serious attempt to reduce the public sector borrowing

requirements, there may be an induced wealth effect, leading to an increase in private consumption. On the other hand, the reduction of the government borrowing requirements diminishes the risk premium associated with public debt issuance, contributes to reduce real interest rates and allows the crowding-in of private investment. However, if consumers do not think that fiscal consolidation is credible, then the usual negative Keynesian effect on consumption will prevail.

Interestingly, the theoretical possibility of the existence of expansionary fiscal consolidations echoed in the so-called "German perspective" of fiscal consolidations, expressed in 1981 by the German Council of Economic Experts. Such view would afterwards have an influence on the fiscal convergence criteria of the Maastricht Treaty, calling for discipline of public accounts as a precondition for stable economic growth.[3]

Blanchard (1990) presents a model where the initial level of public debt is an important determinant of the effects of fiscal policy on private consumption. For instance, the increase in taxes would have two effects: the first effect results from the fact that an increase in taxes shifts some of the tax burden from future generations to the present generations, and contributes therefore to reducing current private consumption. The second effect would be a positive wealth effect, related to the idea that an increase in taxes today will avoid an increase of taxes in the future and would also allow the long-term loss of income to be reduced. A present increase in taxes might therefore reduce the uncertainty about future fiscal policy. Following this line of reasoning, consumers can then decrease accumulated saving, some of which was probably set up as a precaution to meet future tax increases. This second effect may be the prevailing one, when for instance there is already a high debt-to-GDP ratio.

When there is a small debt-to-GDP ratio, that is, in the absence of fiscal distress, an increase of government spending crowds out private consumption because of an expectation of higher future taxes and an expectation that permanent income is indeed lower. However, if public expenses keep rising beyond a certain limit, there will be also

[3] See Hellwig and Neumann (1987), Bergman and Hutchison (1997) and De Bonis and Paladini (1997).

an increased probability that fiscal consolidation might occur. Bertola and Drazen (1993) define this moment as a "trigger point," after which a fiscal adjustment is highly probable. When the fiscal adjustment occurs, there are expectations that there will be significant future tax cuts, leading therefore to an increase in the consumer's permanent income. The same happens with private consumption, and consumers tend to exhibit Ricardian behaviour. As Bertola and Drazen (1993, p. 12) put it, "a policy innovation that would be contractionary in a static model may be expansionary if it induces sufficiently expectations of future policy changes in the opposite direction". For instance, Cour et al. (1996) maintain that Ricardian behaviour might have been in place during the fiscal consolidations of Denmark and Ireland in the 1980s.[4] In fact, an increase in public expenditures, financed by public debt, might put at risk the sustainability of fiscal policy and households would therefore increase private saving.

Sutherland (1997) considers a model where consumers have finite horizons, in such a way that a tax raise reduces private consumption and increases national saving. Along the lines explained by Blanchard (1990), Sutherland also supposes that consumers expect the government to push a fiscal consolidation when the debt-to-GDP ratio goes beyond a given threshold. If the public debt ratio is low, an increase in taxes reduces private consumption. However, when some public debt limit is reached, there is a greater probability that a tax increase may raise private consumption, basically because it postpones the costs of the fiscal consolidation that, with finite-horizon households, will be supported mainly by future generations. In such a setting a tax hike could in an un-Keynesian way increase consumers' inter-temporal income and consumer spending. This might lead to a decrease in private saving that could even be sufficient to offset the increase of public saving and therefore yield a decrease of national saving (assuming for simplicity's sake a closed economy). In other words, when there is a considerable debt-to-GDP ratio, there is a higher probability of consumers displaying Ricardian behaviour, maybe assuming there could be a fiscal policy sustainability problem ahead.[5]

[4] The application of the Ricardian equivalence to these two countries is nevertheless contested by Creel (1998). For instance, for the EU15, Afonso (2005b) reports evidence of overall government Ricardian behaviour.

[5] Evidence of unsustainable fiscal policies in the European Union may be found in Uctum and Wickens (2000) and Afonso (2005a).

In the same way, when there is a significant debt-to-GDP ratio, a budget deficit increase, due to the raise of public expenditures, might also have a contractionary effect, a result opposite to the Keynesian explanation. Consumers would exhibit a Keynesian behaviour when the aforementioned ratio is small, but they start acting in a less and less Keynesian and more in a Ricardian way when the ratio increases. They simply become more aware of the fact that they are probably not going to succeed in shifting the deficit financing costs to the next generations. In other words, for high levels of debt-to-GDP ratios, the rising uncertainty about the future tax path leads consumers to partially switch from Keynesian behaviour to Ricardian behaviour.

Perotti (1999) presents another model to explain the effect of fiscal episodes on private consumption. The underlying assumptions of the model include non lump-sum taxes and the hypothesis that politicians discount the future more than consumers do. In other words, consumers have a perception that the future value of taxes will be higher than its actual value. Still another hypothesis is the existence of rationed consumers in the economy in such a way that restricted consumers end up spending their entire disposable income. Present in the model is also the idea that the higher the debt-to-GDP ratio, the more likely the possibility of non-Keynesian fiscal effects.

Alesina and Perotti (1997) define two types of fiscal adjustment: Type 1 adjustment, when the budget deficit is reduced through cuts in social expenditures (unemployment subsidies, minimum income subsidies) and cuts in public sector wages; and Type 2 adjustment, when the budget deficit is reduced with the increase of taxes on labour income and with cuts in public investment expenditures. For instance, according to those authors, the fiscal episode of Ireland in 1987-1989 was a Type 1 adjustment, while the 1983-1986 fiscal episodes in Denmark could be classified as a Type 2 adjustment.

Finally, Giavazzi and Pagano (1990) and Alesina and Perroti (1997) stress the role of exchange rates in promoting successful fiscal adjustments, since a significant exchange rate depreciation occurred before and during the fiscal consolidations of Ireland and

Denmark in the 1980s.[6] Indeed, the importance of currency devaluations before/during fiscal contractions also seems to play a role in the success of those consolidations. See, for instance, Hjelm (2003) and Lambertini and Tavares (2005).

2.2. Overview of previous evidence

Available empirical evidence seems to show that the existence of non-Keynesian effects may well depend upon the size and the persistence of the fiscal adjustment. However, the available empirical work so far does not seem to completely reject the expansionary fiscal contraction hypothesis. The composition of the adjustment is also relevant, that is, to what degree the fiscal contraction is based on tax increases and public investment or government consumption cuts.[7]

Another point that seems compelling is the fact that an increase in public expenditure will have typical Keynesian effects when the level of public debt or of the budget deficit is small. If a country has an important budget deficit or a very high debt-to-GDP ratio, a fiscal consolidation may well produce the non-Keynesian effects discussed above.

Table 1 summarises some of the empirical evidence found in the literature, concerning the existence of non-Keynesian effects of fiscal policy.

3. Determination of fiscal episodes in the EU15

A critical point when assessing the existence of non-Keynesian effects of fiscal policy is the choice of the measure of fiscal adjustments. The literature uses several definitions for timing fiscal contractions, relying essentially on the structural budget balance concept,

[6] Giavazzi and Pagano (1996), McDermott and Westcott (1996), Bergman and Hutchison (1997) and Creel (1998) also analyse these fiscal episodes.

[7] Alesina and Perotti (1995, 1997), Giavazzi and Pagano (1996), McDermott and Wescott (1996), Alesina and Ardagna (1998), Perotti (1999), and Giavazzi, Jappelli and Pagano (2000) present empirical results concerning the composition and size determinants of successful adjustments. Heylen and Everaert (2000) empirically contest the idea that current expenditures reductions are the best policy to get a successful fiscal consolidation. Von Hagen, Hughes-Hallet and Strauch (2001) and EC (2003) provide additional descriptive analysis and case studies, and Briotti (2005) reviews the literature.

the balance that would arise if both expenditures and taxes were determined by potential rather than actual output.

The use of the structural total budget balance instead of the structural primary budget balance, could have the advantage of using information concerning the fact that the existence of a high level of interest expenditures, may well mean that a fiscal contraction is quite plausible in the short term as a requisite to reduce budgetary imbalances. However, the structural budget does not allow the correction of all the effects on budget balance resulting from changes in economic activity such as inflation or real interest rate changes. In order to try to exclude some of those effects, the usually adopted measure turns out to be the cyclically adjusted primary budget balance. This measure is frequently used either as percentage of GDP or as a percentage of potential output.

Besides the choice of the budget measure, there are also differences in the literature as to how to define the period of a fiscal contraction or expansion. According to the chosen definition, the number of fiscal episodes changes as well as the turning points of fiscal policy.

Alesina and Ardagna (1998) adopted a fiscal episode definition that allows that some stabilisation periods may have only one year.[8] On the other hand, the definition used by Giavazzi and Pagano (1996) decreases the probability of fiscal adjustment periods with only one year by using a limit of 3 percentage points of GDP for a single year consolidation.[9] However, the above definitions, by choosing arbitrarily 2 or 3 years fiscal adjustment periods, end up determining the number of years subjectively. In other words, in selecting the time span of fiscal episodes one incurs the risk of finding either an excessive number of periods, or of neglecting single year length fiscal episodes.

In order to identify fiscal policy episodes in the EU15, I used a simple approach trying also to minimise, but necessarily not avoiding, *ad-hoc* definitions of fiscal episodes.

[8] The change in the primary cyclically adjusted budget balance is at least 2 percentage points of GDP in one year or at least 1.5 percentage points on average in the last two years.
[9] The cumulative change in the primary cyclically adjusted budget balance is at least 5, 4, 3 percentage points of GDP in respectively 4, 3 or 2 years, or 3 percentage points in one year.

Annual data for the fifteen EU countries, over the period 1970 to 2005, was collected for the primary cyclically adjusted budget balance, computed by the European Commission (a precise description of the data is given in the Appendix). Therefore, a possible measure of fiscal impulse is the first difference of the primary structural budget balance, as a percentage of GDP.

With 505 annual observations available, for the group of the 15 EU countries, the average change in the primary structural budget balance is 0.04 and the standard deviation 1.578. Figure 1 shows that the distribution is centred on zero but skewed to the right with a corresponding long right tail.

Our definition of fiscal episode, *FE*, in period *t*, is as follows:

$$FE_t = \begin{cases} 1, \text{if } \Delta b_t > \gamma\sigma \\ 1, \text{if } \sum_{i=0}^{1} \Delta b_{t-i} / 2 > \sigma, \\ 0, \text{otherwise} \end{cases} \qquad (1)$$

where b is the primary structural budget balance in period t and σ is the respective standard deviation for the panel sample while γ is applied to determine a multiple of the standard deviation as commonly used in the literature. For simplicity I use γ=1.5.[10] In other words, a fiscal episode occurs when either the change in the primary cyclically adjusted balance is at least one and a half times the standard deviation in one year, or when the change in the primary cyclically adjusted balance is at least one standard deviation on average in the last two years.

Using the definition in (1) it is possible to determine both contractionary and expansionary fiscal episodes. In order to allow for similar definitions available in previous studies, I compute also the episodes using the definitions used by Giavazzi and Pagano (1996) and by Alesina and Ardagna (1998), labelled respectively measures *FE1*

[10] As in all the related literature, here there is also an element of arbitrariness. In this case, 1.5σ is 2.4 percentage points of GDP implying a more demanding threshold to determine a fiscal episode.

and *FE2*, while the criterion defined in (1) provides our measure *FE3*. This will provide some robustness check for the results.

Table 2 identifies the fiscal episodes in the EU15 countries, according with the proposed definitions for the fiscal episodes based in the change in the cyclically adjusted primary budget balance.

According to Table 2, the number of years with fiscal episodes labelled as contractions ranges from 58, in the approach of equation (1), to 81, following Giavazzi and Pagano (1996) approach. Episodes of fiscal expansion are less common, ranging from 39 to 51 respectively for methods three and one, while fiscal consolidations range from 58 to 81 respectively also for methods three and one. The average duration of the reported fiscal contractions is around 2.5 years for the method inspired on Giavazzi and Pagano (1996), and around 1.8 years for the other two methods. For instance Giavazzi, Jappelli, and Pagano (2000) reported that extreme fiscal episodes account for a high proportion of their data sample, since for a set of OECD countries they labelled around 62 per cent of the observations as a fiscal episode.

Furthermore, one can also observe that, on average for the three approaches, roughly 44 per cent of the fiscal contraction episodes in the EU15 countries occurred in the 1990s. No doubt the limitations imposed by the Maastricht Treaty and by the Stability and Growth Pact (SGP) urged the EU countries to consolidate public finances from the mid-1990s onwards in the run up to the European Monetary Union (EMU).

Moreover, it is worth noticing that all three methods for determining the fiscal episodes identify the usually mentioned fiscal contractions of Denmark in 1983-84, of Ireland in 1988-89 and also the fiscal expansion of Sweden in 1991-92.[11]

[11] Recently Hauptmeier, Heipertz and Schuknecht (2006) reviewed some of the characteristics of the main fiscal consolidations episodes reported in the EU for the 19980s and 1990s.

4. Empirical analysis of expansionary fiscal consolidations

4.1. Empirical specifications

The empirical approach of the paper is based on panel estimations for the EU15 overall data sample. One of the advantages of using a panel sample is that it allows the use of more observations and gives more degrees of freedom. Indeed, since for some countries the length of the time span could be a problem, country-specific regressions might offer imprecise estimates. Another advantage of a panel approach may be the reduction of multicollinearity among variables (see notably Hsiao, 2002).

The empirical strategy to assess the evidence on expansionary fiscal consolidations will rely on the estimation of private consumption specifications, which use budgetary items as explanatory variables. This is quite in line with some of the existing empirical literature. Therefore, the following baseline specification is used

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

where the index i (i=1,…,N) denotes the country, the index t (t=1,…,T) indicates the period and c_i stands for the individual effects to be estimated for each country i. Moreover, we have: C – private consumption; Y – GDP; Y^{oecd} – OECD's GDP; FCE – general government final consumption expenditure; TF – social transfers; TAX – taxes, and all the abovementioned variables are taken as the logarithms of the respective real per capita observations. FC^m is a dummy variable that controls for the existence of fiscal episodes that are labelled as contractions, with $m=1, 2, 3$, for each of the three fiscal episode determination strategies used in the previous section.

According to the procedure explained in (1), the dummy variable FC^m assumes the following values: $FC^m = 1$ when there is a fiscal consolidation episode and $FC^m = 0$

when those fiscal adjustments do not occur. Additionally, it is assumed that the disturbances u_{it} are independent across countries.

In specification (2), ω_1 and δ_1 are the short-run elasticities of consumption to income and to OECD's income respectively. Moreover, α_3, β_3, and γ_3 are the fiscal short-run elasticities of the consumption function for the case when a fiscal consolidation occurs (i. e. $FC^m = 1$). It is straightforward to see, for instance, that $-\omega_0/\lambda$ is the long-run elasticity of consumption to income. Similarly, the long-run effects for the fiscal variables, in the presence of a fiscal consolidation episode, are given by $-\alpha_1/\lambda$, $-\beta_1/\lambda$, and $-\gamma_1/\lambda$, respectively for general government final consumption, social transfers, and taxes.

On the other hand, in the absence of a fiscal consolidation episode (i. e. $FC^m = 0$), the fiscal short-run elasticities are given by α_4, β_4, and γ_4, while the long-run effects are determined by $-\alpha_2/\lambda$, $-\beta_2/\lambda$, and $-\gamma_2/\lambda$, again respectively for general government final consumption, social transfers, and taxes.

Theoretically one would expect, in the absence of fiscal consolidation episodes, $FC^m = 0$, the usual Keynesian effects, that is, for instance, a positive effect of public expenditures on private consumption decisions, $\alpha_4 > 0$, $-\alpha_2/\lambda > 0$, and a negative effect of taxes on private consumption, $\gamma_4 < 0$, $-\gamma_2/\lambda < 0$. However, according to the theoretical underpinnings discussed in section two, if a fiscal consolidation episode occurs, the standard Keynesian effects might be to some extent mitigated or even reversed, with private consumption reacting differently to fiscal developments.

Specification (2) is a standard fixed effects model, essentially linear regression models in which the intercept terms vary over the individual cross section units. The existence of differences between the several countries should then be taken into account by the autonomous term that may change from country to country, in each cross-section sample, in order to capture individual country characteristics.

In the previous specification there is nevertheless an implicit assumption that the underlying model is homogeneous, i. e. the coefficients are the same for all countries. As a matter of fact, one of the problems with panel data estimations, as, for example, mentioned by Haque, Pesaran and Sharma (2000), is the possibility that the real model might be heterogeneous, with different coefficients for the explanatory variables in the cross-section dimension. Assuming the same coefficients for all the countries, with the exception of the intercept, may give rise to non-linearity in the estimations, even if the relation between the variables is linear.

An alternative estimator proposed by Pesaran and Smith (1995), the mean group estimator, is based on the separate estimation of the coefficients for each cross-section unit, through the least squares method, and then computing the arithmetic mean of those coefficients. Nevertheless, this alternative procedure does not allow for the hypothesis that some of the coefficients may indeed be similar for several countries.

4.2. Data

In order to assess the possibility of expansionary fiscal consolidations regimes for the EU15, I use annual data spanning the years 1970-2005 for private consumption, GDP, taxes, general government final consumption, and social transfers. Taxes are the sum of current taxes on income and wealth (direct taxes) and taxes linked to imports and production (indirect taxes).

All variables are taken as the logarithms of real per capita observations. This gives a maximum of 36 years of annual observations for 15 countries and a maximum possible of 540 observations per series. Of the 15 countries in the panel data set, 12 are currently in EMU – Austria, Belgium, Germany, Finland, France, Greece, Ireland, Italy, Luxemburg, Netherlands, Portugal and Spain – and 3 others have not adopted the euro – Denmark, Sweden and United Kingdom. The source of the data is the European Commission AMECO database (updated on 14 November 2005). Table 3 reports the main descriptive statistics for the aforementioned series. Data for OECD population and GDP are taken from the OECD national accounts publications.

4.3. Unit root tests

This sub-section tests the relevant series for unit roots. The motivation behind panel data unit root tests is to increase the power of unit root tests by increasing the span of the data while minimising the risk of encountering structural breaks due to regime shifts.

Several tests for unit roots within panel data have been proposed to address dynamic heterogeneous panels. Two alternative panel unit root tests are performed in this section in order to assess the existence of unit roots in our data sample. In the first category of tests, for instance, Levin, Lin, and Chu (2002) proposed a test based on heterogeneous panels with fixed effects where the null hypothesis assumes that there is a common unit root process. The basic augmented Dickey-Fuller (ADF) equation is

$$\Delta y_{it} = \alpha y_{it-1} + \sum_{j=1}^{k_i} \beta_{ij} \Delta y_{it-j} + \delta X_{it} + \varepsilon_{it} \ . \qquad (3)$$

The null hypothesis of a unit root to be tested is then H_0: $\alpha=0$, against the alternative H_1: $a<0$.[12]

Instead, Im, Pesaran, and Shin (2003) proposed a test that allows for individual unit root processes so that α in (3) may vary across cross-sections, hence relaxing the assumption that $\alpha_1=\alpha_2=\ldots=\alpha_N$. The null hypothesis may in this case be written as H_0: $\alpha=0$, for all i. The alternative hypothesis is now

given by $H_1 = \begin{cases} \alpha_i = 0, \text{for } i = 1, 2, ..., N_1 \\ \alpha_i \langle 0, \text{for } i = N_1 + 1, N_2 + 2, ..., N \end{cases}$, implying that some fraction of the

[12] Levin, Lin and Chu (2002) mention that this type of test is particularly useful for panels of moderate size, between 10-250 cross-sections and 25-250 time series observations per cross section, therefore a category where this paper's data sample fits.

individual processes are stationary.[13] Table 4 reports the results of the aforementioned unit root tests for the relevant series.

For the entire sample period it is possible to see that the common unit root test rejects the existence of a unit root at least at the 5 per cent significance level for all series. On the other hand, the individual root test allows the rejection of the null unit root hypothesis for general government final consumption and for social transfers, both in level and in first differences, and only in first differences for private consumption, GDP, and taxes.

4.4. Estimation results

The fixed effects model is a typical choice for macroeconomists and is generally more adequate than the random effects model. For instance, if the individual effects are somehow a substitute for non-specified variables, it is probable that each country-specific effect is correlated with the other independent variables. Moreover, since the country sample includes all the relevant countries, and not a random sample from a bigger set of countries, the fixed effects model is a more obvious choice.

As mentioned by Judson and Owen (1997), when the individual observation sample (countries in our case) is picked from a larger population (for instance all the developed countries), it might be suitable to consider the specific constant terms as randomly distributed through the cross-section units. However, and even if the present country sample includes a small number of countries, it is sensible to admit that the EU15 countries have similar specific characteristics, not shared by the other developed countries in the world.[14] This is particularly true if one considers the fiscal rule-based framework underlying the Stability and Growth Pact, which has been progressively implemented since the late 1990s in the EU15 countries. In this case, it would seem

[13] For instance, Phillips and Moon (2000) provide further discussions on panel unit root tests in panel data models.

[14] Additionally, Judson and Owen (1999) show that even if the existence of a lagged endogenous variable could imply biased and inconsistent fixed effects panel estimators, such bias is minor when the cross section dimension is small in relation to the time dimension of the panel. This holds for an unbalanced panel and at least T=30, as in the present case.

adequate to choose the fixed effects formalisation, even if it were not correct to generalise the results afterwards to the entire population, which is also not the purpose of the paper.

Table 5 presents the results of the estimation of equation (2), for the change in the logarithm of real per capita private consumption, for the three methods used in section three to determine the fiscal episodes.

According to the results reported in Table 5, in all specifications both the short-run and the long-run elasticity of private consumption to income are statistically significant. The short-run elasticity is approximately 0.66–0.69 in the three specifications. The long-run effect of income is close to one, ranging from 0.95 to 0.97, which indicates that the relation between private consumption and income is rather stable for the EU15 countries.[15] The short-run elasticity for the OECD income is also significant.

Regarding general government final consumption there seems to be no statistically significant short-run effect on private consumption, either when there are fiscal consolidation episodes or not (even though the sign of the estimated coefficients for ΔFCE, α_3 and α_4, is positively in line with the usual Keynesian effects). However, the long-run effect of government final consumption on private consumption turns out to be statistically significant with the first method for determining fiscal episodes and when there are fiscal consolidations (α_1); with method two (both with and without fiscal consolidations); and with method three when there are no fiscal consolidations (α_2).

Interestingly, the long-run elasticity of private consumption with respect to general government final consumption is negative, which indicates that a reduction of government consumption increases private consumption in the long-run. Moreover, one should also notice that the magnitude of such long-run elasticity is higher when a fiscal consolidation episode occurs ($FC^m = 1$ in (2)), for the first two methods used to determine the fiscal episodes. Therefore, cuts in general government final consumption

[15] The share of private consumption in GDP has some heterogeneity across the EU15 countries, with the country average for the entire sample period ranging from 0.52–0.53 in Finland, Denmark and the Netherlands to 0.66–0.67 in Greece and Portugal.

seem to stimulate private consumption in the long-run, with or without fiscal consolidation episodes, but that stimulus is higher in the presence of such fiscal episodes. For instance, and taking the results from method two (see column II in Table 5), a 1 euro decrease in general government final consumption is estimated to raise long-run private consumption by 24 cents, if there are no fiscal consolidation episodes, and by 39 cents when a fiscal consolidation takes place. Wit method one such effects are 21 and 41 cents, respectively without and with fiscal consolidations.

Concerning taxes, the short-run effect does not seem to be overall statistically significant, with the exception of the first approach (column I in Table 5), indicating that a tax raise, together with a fiscal consolidation episode, could increase private consumption (a non-Keynesian effect). On the other hand, the coefficients of lagged taxes (γ_1, γ_2) always come out statistically significant, implying a similar significance for the respective long-run effect of taxes on private consumption. Since such long-run elasticity is positive, this would indicate that tax increases contribute to increase private consumption in the long-run, again in a non-Keynesian fashion. Moreover, this long-run elasticity is more statistically significant when a fiscal consolidation episode takes place, and its magnitude is also higher under such circumstances ($\gamma_1>\gamma_2$). For instance, in the presence of a fiscal consolidation episode a 1-euro raise in taxes could contribute to increase private consumption in the long-run by 37-45 cents.

Another point worth mentioning is that the long-run effects of both general government final consumption and taxes are quite similar in absolute value and statistically significant, when a fiscal consolidation episode occurs (see values of α_1 and γ_1 in column I of Table 5 and their corresponding long-run counterparts). Therefore, one can envisage, for this case, the long-run effect on private consumption as given approximately by *0.41*(FCE-TAX)*, which would imply that increases of general government final consumption net of taxes negatively impinge on private consumption. Put in other words, faced with an increase in general government final consumption net of taxes consumers would behave in a Ricardian way by presuming the need for future higher taxes.

In what concerns social transfers, the results from Table 5 do not show any statistical significance, implying an absence of relevant effects on private consumption from that fiscal component.

In order to assess possible effects from the institutional changes that occurred in the EU in the 1990s, alternative sub-sample periods can be considered to take into account the signing of the European Union Treaty on 7 February 1992 in Maastricht, with the setting up of the convergence criteria. Therefore, I split the time sample into the pre- and post-Maastricht, using 1992 as the first year of the new EU fiscal framework, and re-estimated the specifications for the resulting two time intervals. This might be a way of controlling for common changes in fiscal policy as response to common problems as, for instance, the need to make additional efforts in order to comply with the EMU convergence criteria. Table 6 reports the estimation results for the post-Maastricht period.

Concerning the post-Maastricht period the estimation results seem to be more in line with the results obtained previously for the entire time series sample, even if taxes (general government final consumption) gain (loose) statistical significance. On the other hand, it is possible to notice that now the long-run elasticity of social transfers is now statistically significant and negative, generally regardless of the existence of fiscal consolidation episodes (see β_1 and β_2). If higher social transfers lead to lower private consumption, this could be somehow seen as an indication of a substitution effect or as a non-Keynesian effect with consumers anticipating future higher taxes to finance the current social transfers.

Concerning the pre-Maastricht period the overall estimation results do not seem to show any significant effects, either in the short or in the long-run, from fiscal variables on private consumption. This turned out to be true for all the three measures used to determine a fiscal episode, while the existence of fiscal consolidation episodes do not seem to play a role either. Therefore, these results are not reported.

As an additional test, I also estimated (2) only for the period 1980-2005, and since the results are not very different from the ones for the period 1992-2005, they are not reported in the text.

4.5. The relevance of the government indebtedness

It has been mentioned in the literature that the effects of government spending on private consumption may depend on the level of government indebtedness. Specifically, the effects of government spending could become less Keynesian if large increases in general government debt occur or if debt-to –GDP ratios are already at a high level.

To assess how different levels of government indebtedness may impinge on the responsiveness of private consumption, I considered two alternative thresholds for the debt-to-GDP ratio by using two dummy variables *Byear* and *Bcountry*. These debt ratio thresholds variables are defined as follows:

$$Byear_{it} = \begin{cases} 1, \text{ debt ratio} \rangle \text{ year average} \\ 0, \text{ otherwise} \end{cases} \tag{4}$$

where "year average" is the simple average of the debt-to-GDP ratio in year *t* for the entire cross country sample, and

$$Bcountry_{it} = \begin{cases} 1, \text{ debt ratio} \rangle \text{ country average} \\ 0, \text{ otherwise} \end{cases} \tag{5}$$

where "country average" is the simple average of the debt-to-GDP ratio for country *i* for the entire time series sample.[16]

[16] For instance, the period average of the debt-to-GDP ratio ranged from 10.3 and 42.1 per cent respectively for Luxembourg and Germany to 86.2 and 100.6 percent respectively in Italy and in Belgian. On the other hand, the simple cross-country average for the debt ratio had a minimum value of 27.5 per cent in 1973 and a maximum value of 72.9 per cent in 1995.

These debt threshold variables can then be interacted with the dummy variables that reflect the existence of fiscal consolidation episodes, in order to see if the existence of a higher or a lower level of public indebtedness in the previous period makes a difference for private consumption decisions.

For instance, for the *Byear* dummy the testable empirical specification can be extended from (2) and written in the following way:

$$\Delta C_{it} = c_i + \lambda C_{it-1} + \omega_0 Y_{it-1} + \omega_1 \Delta Y_{it} + \delta_0 Y_{it-1}^{oecd} + \delta_1 \Delta Y_{it}^{oecd} + \tag{6}$$

$$(\alpha_{10} FCE_{it-1} + \alpha_{30} \Delta FCE_{it} + \beta_{10} TF_{it-1} + \beta_{30} \Delta TF_{it} + \gamma_{10} TAX_{it-1} + \gamma_{30} \Delta TAX_{it}) FC_{it}^{m} (1 - Byear_{it-1}) +$$

$$(\alpha_{20} FCE_{it-1} + \alpha_{40} \Delta FCE_{it} + \beta_{20} TF_{it-1} + \beta_{40} \Delta TF_{it} + \gamma_{20} TAX_{it-1} + \gamma_{40} \Delta TAX_{it})(1 - FC_{it}^{m})(1 - Byear_{it-1}) +$$

$$(\alpha_{11} FCE_{it-1} + \alpha_{31} \Delta FCE_{it} + \beta_{11} TF_{it-1} + \beta_{31} \Delta TF_{it} + \gamma_{11} TAX_{it-1} + \gamma_{31} \Delta TAX_{it}) FC_{it}^{m} Byear_{it-1} +$$

$$(\alpha_{21} FCE_{it-1} + \alpha_{41} \Delta FCE_{it} + \beta_{21} TF_{it-1} + \beta_{41} \Delta TF_{it} + \gamma_{21} TAX_{it-1} + \gamma_{41} \Delta TAX_{it})(1 - FC_{it}^{m}) Byear_{it-1} + \mu_{it}.$$

According to the estimation results for specification (6), reported in Table 7, now general government final consumption is not statistically significant in explaining private consumption, regardless of the existence of a fiscal consolidation episode, and when the ratio is below the debt threshold. This result holds for the three different methodologies used to determine fiscal consolidation episodes. If the debt ratio is above the debt threshold and in the absence of a fiscal consolidation episode, the long-run effect of the general government final consumption (α_{21}) varies across the three methods of determination of fiscal episodes.

Regarding social transfers, the short-run effect on private consumption is positive and statistically significant when there are no fiscal consolidation episodes and when the debt-to-GDP ratio is below the defined threshold (β_{40}). On the other hand, in the presence of a fiscal consolidation episode and if the previous period debt-to-GDP ratio was already above the debt ratio threshold, social transfers have a negative (non-Keynesian) long-run

effect on private consumption (β_{31}). The same is true for the long-run effect of social transfers (β_{11}).

The results from Table 7 indicate also that taxes have a positive (non-Keynesian) long-run effect on private consumption when there are no fiscal consolidations and when the debt ratio is below the relevant threshold (γ_{20}). Additionally, for the cases when the debt ratio is above the threshold, the significance of such non-Keynesian effects increases, which could be interpreted along the lines proposed by Blanchard (1990), as a reduction of uncertainty about future fiscal policy unbalances. Moreover, the robustness of the result seems to be higher when a fiscal consolidation occurs (γ_{11}), under the first two strategies used to determine the existence of fiscal episodes (columns I and II of Table 7).[17]

The alternative set of results for specification (6), using as the dummy threshold for the debt-to-GDP ratio the average in year *t* for the entire country sample, as determined in (5), are reported in Table 8.

These additional results show that when the debt threshold is not surpassed, general government final consumption has a negative (non-Keynesian) long-run effect on private consumption and this effect is of a bigger magnitude when there is a fiscal consolidation episode ($|\alpha_{10}| > |\alpha_{20}|$). This result is mostly visible for the first and third strategies used to determine the occurrence of fiscal episodes (columns I and III in Table 8), and it also holds somehow when the country debt-to-GDP ratio is above the country average and when there is a consolidation episode (α_{11} in column I).[18]

Taxes depict a positive (non-Keynesian) long-run effect on private consumption when the debt-to-GDP ratio is below the relevant threshold. When the debt ratio threshold is

[17] The interaction of the year average for the debt dummy with the fiscal episode dummy results in a split of the fiscal episodes into two roughly equal sized sub-samples (for the three methods used to determine the fiscal episodes).

[18] One can mention that the use of the country average for the debt dummy interaction results approximately in a two thirds (one third) sub-sample of fiscal consolidations episodes coupled with the debt-to-GDP ratio above (below) the threshold.

surpassed a positive and statistically long-run effect of taxes on private consumption is mostly visible when coupled with a fiscal consolidation episode (γ_{11}).

Social transfers have a statistically significant negative (non-Keynesian) long-run effect when a fiscal consolidation episode occurs and the debt ratio is above the threshold, for the last two methods used to determine the fiscal episodes (β_{11}, columns II and III in Table 8). Below the debt threshold social transfers have a positive (Keynesian) short- and long-run impact on private consumption, which is only significant for the first method of selection of fiscal episodes (β_{10} and β_{30} in column I).

4.6. Are contractions different from expansions?

In this sub-section I briefly investigate the possibility of non-Keynesian effects being more likely to occur when a fiscal episode is characterised by a fiscal contraction, rather than by a fiscal expansion. This could imply the existence of asymmetric effects of fiscal policy, as argued notably by Giavazzi, Jappelli and Pagano (2000).

In the current set up this assessment of asymmetric responses to fiscal policy episodes can be done using the following alternative specification:

$$\Delta C_{it} = c_i + \lambda C_{it-1} + \omega_0 Y_{it-1} + \omega_1 \Delta Y_{it} + \delta_0 Y_{it-1}^{oecd} + \delta_1 \Delta Y_{it}^{oecd} + \qquad (7)$$

$$(\alpha_5 FCE_{it-1} + \alpha_6 \Delta FCE_{it} + \beta_5 TF_{it-1} + \beta_6 \Delta TF_{it} + \gamma_5 TAX_{it-1} + \gamma_6 \Delta TAX_{it}) \times (1 - FC_{it}^m) \times (1 - FX_{it}^m)$$

$$+(\alpha_2 FCE_{it-1} + \alpha_4 \Delta FCE_{it} + \beta_2 TF_{it-1} + \beta_4 \Delta TF_{it} + \gamma_2 TAX_{it-1} + \gamma_4 \Delta TAX_{it}) \times (1 - FC_{it}^m) \times FX_{it}^m$$

$$+(\alpha_1 FCE_{it-1} + \alpha_3 \Delta FCE_{it} + \beta_1 TF_{it-1} + \beta_3 \Delta TF_{it} + \gamma_1 TAX_{it-1} + \gamma_3 \Delta TAX_{it}) \times FC_{it}^m + \mu_{it}.$$

In (7) FC^m is still a dummy variable that controls for the existence of contractionary fiscal episodes. Therefore, as before, FC^m assumes the following values: $FC^m = 1$ when there is a contractionary fiscal episode and $FE^m = 0$ when such episode does not occur. On the other hand, FX^m is a dummy variable that controls for the existence of expansionary fiscal

episodes. FX^m assumes the following values: $FX^m = 1$ when there is an expansionary fiscal episode and $FX^m = 0$ when such episode does not occur.

For instance, we can notice in (7) the several possibilities for the occurrence of fiscal episodes, as follows. The last line from the bottom is relevant for the cases when contractionary fiscal episodes occur ($FC^m = 1$ and $FX^m = 0$). The second line from the bottom captures the cases when expansionary fiscal episodes occur ($FC^m = 0$ and $FX^m = 1$). The third line from the bottom corresponds to a situation where no fiscal episodes occur at all ($FC^m = 0$ and $FX^m = 0$).

The estimation results for (7) are reported in Table 9. For the case where a fiscal consolidation occurs the results are naturally virtually identical to what was reported before in Table 5. When a fiscal expansion episode takes place one can notice that the long-run effect of taxes on private consumption is still positive (non-Keynesian) even if less statistically significant, which in the end does not seem to support the idea of asymmetric consumer behaviour (γ_2).

Interestingly, in the absence of fiscal episodes, the long-run effect of taxes is also present (γ_5), while the negative long-run impact of general government final consumption expenditure on private consumption also holds true, even if now only statistically significant for the third strategy of determination of fiscal episodes (α_5 in column III).

Again, specification (7) was estimated only for the post-Maastricht period and the results are presented in Table10. Overall, for this sub-period, there is more statistical evidence of effects of fiscal components on private consumption than for the entire time sample. Once more, when a fiscal consolidation takes place, the results are similar to the ones reported in Table 6, with social transfers depicting a negative long-run effect on private consumption (β_1) and taxes having a positive (non-Keynesian) long-run effect (γ_1).

In the presence of fiscal expansions, broadly similar effects on private consumption can be observed, as when a fiscal consolidation occurs. Eventually, one could notice that

when a fiscal expansion takes place the magnitude of the short-run effects of taxes on private consumption is somewhat bigger than in the absence of fiscal episodes ($\gamma_4 > \gamma_6$), and also that the long-run effects are not statistically significant in the case of a fiscal contraction (γ_3). Nevertheless, overall one has to conclude that this evidence does not seem to give much support to the hypothesis of asymmetric effects of fiscal episodes.

Still from Table 10, one can see that in the absence of fiscal episodes, general government final consumption has mostly no impact on private consumption. On the other hand, negative long-run effects can be detected both for social transfers (β_5) and for taxes (γ_5), while the short-run effect in the case of taxes (γ_6) is also statistically significant and negative. Such effects were essentially absent when the entire time sample was considered, which could imply some differences in the public perception of fiscal policy in the post-Maastricht period.

5. Conclusion

In this paper I assessed whether expansionary fiscal consolidation in the European Union can be considered part of conventional wisdom. In other words, the paper searches for possible evidence of so-called non-Keynesian effects of fiscal policy, and this was done via panel specifications of private consumption.

Fiscal episodes, expansions and contractions, were determined using the first difference of the primary structural budget balance as the relevant indicator, together with three alternative strategies. The first one was used by Giavazzi and Pagano (1996), and the second was used by Alesina and Ardagna (1998). The third one, proposed in this paper, assumes that a fiscal episode occurs when either the change in the primary cyclically adjusted balance is at least one and a half times the standard deviation of the overall sample in one year, or when the change in the primary cyclically adjusted balance is at least one standard deviation on average in the last two years. The resulting fiscal episodes for the EU-15 countries over the period 1970 to 2005, allow us to identify a set of fiscal

episodes for the entire country sample, which encompasses fiscal contractions usually mentioned in the related literature.

The estimation results for the period 1970s-1990s, using a fixed effects panel data strategy show that the long-run elasticity of private consumption with respect to general government final consumption is negative, which indicates that a reduction of government consumption increases private consumption in the long-run. The magnitude of such long-run elasticity is higher when a fiscal consolidation episode occurs.

On the other hand, the results seem to indicate that a tax raise, together with a fiscal consolidation episode, could have a positive long-run effect on private consumption. Furthermore, increases of general government final consumption net of taxes negatively impinge on private consumption in the long-run. Put in other words, given an increase in government final consumption net of taxes, consumers may behave in a Ricardian way by presuming the need for future higher taxes.

The long-run elasticity of social transfers is statistically significant and negative, regardless of the existence of fiscal consolidation episodes, but only for the post-Maastricht period. This negative effect on private consumption could be interpreted as an indication of a substitution effect, if the government replaces consumers in paying for, say, some health items, or as a non-Keynesian effect with consumers anticipating future higher taxes to finance the current social transfers.

Interacting debt threshold variables with the fiscal consolidation episodes dummies, gives additional information regarding whether the existence of a higher or a lower level of public indebtedness in the previous period makes a difference for private consumption decisions. For instance, the short-run effect on private consumption of social transfers is positive and statistically significant when there are no fiscal consolidation episodes and when the debt-to-GDP ratio is below the defined threshold (the cross-country year average). On the other hand, in the presence of a fiscal consolidation episode and if the previous period debt-to-GDP ratio was already above the debt ratio threshold, social transfers have a negative (non-Keynesian) long-run effect on private consumption. The

same is true for the long-run effect of social transfers. Additionally, the possibility of asymmetric effects of fiscal episodes does not seem to be corroborated by the results.

Overall, the results obtained for the EU15 for the period 1970–2005 seem to hint to the existence of some possible Ricardian behaviour from consumers when a fiscal consolidation event takes place. However, one must be cautious to welcome into conventional wisdom the idea of expansionary fiscal consolidations. Specific country analysis, outside the scope of this paper, could provide additional insight into the possibility of such theoretical reasoning. Moreover, it is far from clear whether one can use the positive expansionary fiscal consolidations experiences that occurred in the past in a few countries as a rational for similar policy prescriptions in other EU countries.

Appendix – Data sources

Original series	Ameco codes *
Total population, millions.	1.0.0.0.NPTN
Gross Domestic Product at current market prices, thousand national currency.	1.1.0.0.UVGD
Price deflator of Gross Domestic Product, national currency, 1995 = 100.	3.1.0.0.PVGD
Private final consumption expenditure at 1995 constant prices, thousand national currency.	1.1.0.0.OCPH
Final consumption expenditure of general government, national currency, current prices.	1.0.0.0.UCTG0F, 1.0.0.0.UCTG0
Social benefits other than social transfers in kind, general government, national currency, current prices.	1.0.0.0.UYTGHF, 1.0.0.0.UYTGH
Current taxes on income and wealth (direct taxes), general government, national currency, current prices.	1.0.0.0.UTYGF, 1.0.0.0.UTYG
Taxes linked to imports and production (indirect taxes), general government, national currency, current prices.	1.0.0.0.UTVGF, 1.0.0.0.UTVG
General government consolidated gross debt, excessive deficit procedure (based on ESA 1995) and former definition (linked series) (% of GDP at market prices).	1.0.319.0.UDGGL
Net lending (+) or net borrowing (-) excluding interest of general government adjusted for the cyclical component. Adjustment based on potential GDP excessive deficit procedure (% of GDP at market prices).	1.0.319.UBLGBP
OECD GDP - at current prices and current exchange rates, million USD. $	
OECD GDP - volume indices (2000 = 100). $	
OECD Population - mid year estimates in thousands. $	

Note: * series from the EC AMECO database. $ - series from the OECD: “National Accounts - Volume I”.

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Figures and tables

Figure 1 – Changes in the primary cyclically adjusted budget balance: 1970-2005

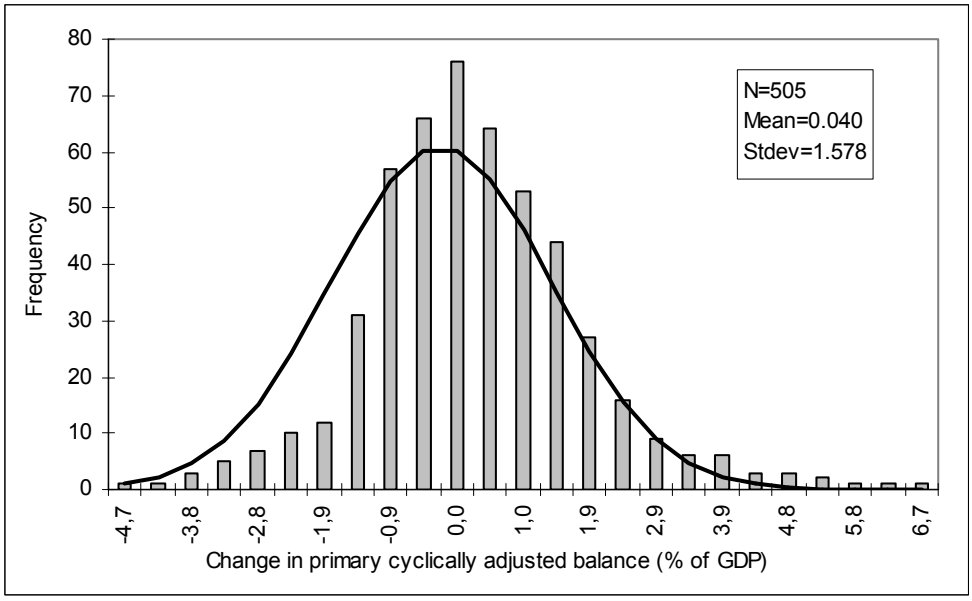

Table 1 – Some empirical results on non-Keynesian fiscal effects

Reference	Sample	Tests performed	Method	Results
Giavazzi and Pagano (1990)	10 OECD countries (1973-1989); Ireland (1961-1987); Denmark (1971-1987)	Effect of fiscal contractions on private consumption.	OLS	Public spending cuts increase private consumption.
De Ménil (1996)	OECD countries (1960-1992)	Effect on consumption of public expenditures increase.	OLS	Keynesian effects in countries where consumers are not constrained; null multipliers in countries without liquidity restrictions.
Giavazzi and Pagano (1996)	OECD countries (1976-1992)	Effect on consumption of budget deficit increase.	OLS, 2SLS	There are non-Keynesian effects from public spending and taxes.
Perroti (1999)	OECD countries (1965-1994)	Effect on private consumption of a budget deficit increase.	VAR	The bigger the debt-to-GDP ratio the more likely is that the fiscal consolidation turns out to be expansionist.
Miller and Russek (1999)	19 OECD countries (1970-1996)	Effect on private consumption of a budget deficit increase.	OLS pooled regression	Some evidence of non-Keynesian effects.
Giavazzi, Jappelli and Pagano (2000)	OECD countries (1973-1996); Developing countries (1960-1995)	Effect on national saving of fiscal stimulus.	OLS with fixed effects	Fiscal contractions are expansionary when based on tax increases instead of spending cuts.
Heylen and Everaert (2000)	OECD countries (1975-1995)	Effect on the debt-to-GDP ratio of budget components.	OLS	Inconclusive.
Afonso (2001)	EU15 countries (1970-2001)	Effect on private consumption of a budget deficit increase.	OLS pooled	Little evidence of non-Keynesian effects.
Von Hagen et al. (2001)	OECD countries (1960-1998)	Descriptive analysis, output equations.	Probit model	Inconclusive.
van Aarle and Garretsen (2003)	EU countries (1990-1998)	Effect on private consumption of budgetary components.	OLS pooled	Inconclusive.
Giudice et al. (2004)	14 EU countries (1790-2002)	Effects on growth.	EC QUEST model	Evidence of non-Keynesian effects.
Weyerstrass et al. (2006)	Finland, France, Ireland, Italy Neherlands (70:I-05:I); 9 EU countries (77-04)	Effect on private consumption of budgetary components.	OLS pooled	Limited evidence in favour of non-Keynesian effects.

Table 2 – Fiscal episodes (FE), based on the change in the cyclically adjusted primary budget balance

Country	FE1		FE2		FE3	
	Expansions	Contractions	Expansions	Contractions	Expansions	Contractions
AU	76	97	76	84, 97, 01	76	84, 97, 01
BE		82-85, 95-96		82-83, 85, 95		82-83
DK	76, 94	83-87, 95-97	76, 82, 94	83-86, 95-96	76, 94	83-86, 95-96
FI	79-80, 87	76-77, 95-96, 00-01	78-79, 87	76-77, 95-96, 00-01	79, 87	76-77, 95-96, 00-01
FR		96-97		95-96		96
GE	75, 90-92	82-83	75, 90-91	82-83	75, 90-91	83
GR	81, 85, 89-90, 01-04	82-83, 87, 91-97	75, 81, 85, 88-89, 01-02, 04	82-83, 86-87, 91-92, 94-97, 05	81, 85, 88-89, 01-02	82-83, 86-87, 91-92, 94-95, 05
IR	75, 78-79, 01-02	76-77, 83-86, 88-89, 04	74-75, 78-79, 95, 99, 01-02	76-77, 83-84, 88-89, 04	74-75, 78-79, 01-02	76-77, 83-84, 88, 04
IT		77, 83, 92-94		77, 83, 91-93		77, 83, 92-93
LU	86-87, 02-05	83-85, 01	86-87, 02-04	83-85, 01	86-87, 02-03	83-85, 01
NL		93, 95-98		91, 93, 95-96		95-96
PT	74, 80-81	82-86, 92	80-81, 05	82-83, 86, 92	80-81, 05	82-83, 86, 92
SP		95-98		95-96		95-96
SW	74, 79-80, 91-94, 02-03	84, 87, 95-99	74, 79, 91-93, 01-02	76, 83-84, 87, 95-97	74, 79, 91-93, 02	87, 95-97
UK	72-75, 92-93, 02-04	81, 95-99	72-73, 92-93, 02-03	81, 95-98	72-73, 92-93, 02-03	95-98
Years with episodes	51	81	47	71	39	58
Average duration (years)	2.0	2.5	1.6	1.8	1.6	1.8

FE1 – Measure used by Giavazzi and Pagano (1996): the cumulative change in the primary cyclically adjusted budget balance is at least 5, 4, 3 percentage points of GDP in respectively 4, 3 or 2 years, or 3 percentage points in one year.
FE2 – Measure used by Alesina and Ardagna (1998): the change in the primary cyclically adjusted budget balance is at least 2 percentage points of GDP in one year or at least 1.5 percentage points on average in the last two years.
FE3 – Measure based on (1).

Table 3 – Descriptive statistics (full sample): 1970-2005

Series	Mean	Std dev	Min	Max	N
C	2.423	0.905	1.078	4.794	540
ΔC	0.021	0.023	-0.081	0.122	525
Y	2.984	0.968	1.418	5.542	540
ΔY	0.023	0.024	-0.083	0.105	525
FCE	1.298	1.148	-0.742	4.252	540
ΔFCE	0.034	0.042	-0.080	0.414	525
TF	1.034	1.128	-1.956	3.808	538
ΔTF	0.036	0.054	-0.516	0.356	522
TAX	1.617	1.199	-0.534	4.705	530
ΔTAX	0.029	0.043	-0.115	0.171	522

Note: variables are taken as logarithms of real per capita observations. For example, C=log(CONS/YDEF)*(1/POP), where CONS – private consumption; YDEF – price deflator of GDP, national currency; POP – population.
Source: AMECO Database, updated on 14 November 2005.

Table 4 – Panel unit root results (1970-2005)

Series	Common unit root (LLC)			Individual unit root (IPS)		
	Statistic	Probability	N	Statistic	Probability	N
C	-4.64	0.000	505	0.92	0.817	505
ΔC	-8.41	0.000	500	-9.91	0.000	500
Y	-2.17	0.015	503	2.56	0.995	503
ΔY	-11.13	0.000	493	-11.78	0.000	493
FCE	-11.01	0.000	518	-5.32	0.000	518
ΔFCE	-13.39	0.000	508	-13.39	0.000	508
TF	-9.61	0.000	511	-4.74	0.000	511
ΔTF	-11.72	0.000	501	-11.49	0.000	501
TAX	-4.28	0.000	500	0.95	0.830	500
ΔTAX	-13.76	0.000	498	-14.00	0.000	498

Notes: LLC – Levin, Lin and Chu. IPS – Im, Pesaran, and Shin.

Table 5 – Fixed effects' estimation results for specification (2), 1970–2005

			FE[1] (I)	lr	FE[2] (II)	lr	FE[3] (III)	lr
λ	C_{t-1}		-0.072 ***		-0.070 ***		-0.069 ***	
			(-4.29)		(-4.20)		(-4.15)	
ω_0	Y_{t-1}		0.069 ***	0.970	0.068 ***	0.966	0.066 ***	0.951
			(4.39)		(4.38)		(4.26)	
ω_1	ΔY_t		0.693 ***		0.690 ***		0.688 ***	
			(14.54)		(14.31)		(14.32)	
δ_0	Y_{t-1}^{oecd}		0.004		0.004		0.004	
			(0.62)		(0.69)		(0.74)	
δ_1	ΔY_t^{oecd}		0.043 ***		0.041 ***		0.040 **	
			(2.70)		(2.56)		(2.50)	
α_1	FCE_{t-1}		-0.029 ***	-0.410	-0.027 ***	-0.390	-0.020	-0.290
			(-2.16)		(-1.90)		(-1.35)	
α_3	ΔFCE_t		0.002		0.022		0.014	
			(0.03)		(0.42)		(0.26)	
β_1	TF_{t-1}		-0.008		-0.013		-0.013	
		$\times FC^m$	(-0.70)		(-1.12)		(-1.09)	
β_3	ΔTF_t		-0.012		0.001		0.021	
			(-0.19)		(0.01)		(0.28)	
γ_1	TAX_{t-1}		0.029 **	0.405	0.032 ***	0.451	0.026 **	0.372
			(2.5)		(2.63)		(2.03)	
γ_3	ΔTAX_t		0.073 *		0.025		0.030	
			(1.67)		(0.52)		(0.56)	
α_2	FCE_{t-1}		-0.015	-0.214	-0.017 *	-0.241	-0.019 *	-0.290
			(-1.56)		(-1.73)		(-1.94)	
α_4	ΔFCE_t		0.028		0.025		0.023	
			(0.95)		(0.84)		(0.78)	
β_2	TF_{t-1}		-0.006		-0.006		-0.005	
		$\times(1-FC^m)$	(-0.75)		(-0.70)		(-0.65)	
β_4	ΔTF_t		0.022		0.020		0.019	
			(1.07)		(0.96)		(0.87)	
γ_2	TAX_{t-1}		0.015 *	0.209	0.016 *	0.222	0.017 **	0.252
			(1.86)		(1.94)		(2.17)	
γ_4	ΔTAX_t		-0.008		-0.002		-0.003	
			(-0.33)		(-0.08)		(-0.13)	
N			505		505		505	
$\bar{R}^2$			0.550		0.577		0.547	

Notes: The t statistics are in parentheses. *, **, *** - statistically significant at the 10, 5, and 1 percent level respectively. The data sample includes yearly observations for the EU15 countries over the period 1970–2005. lr – long-run elasticity of private consumption with respect to the relevant explanatory variables. FC^1 – measure used by Giavazzi and Pagano (1996); FC^2 – measure used by Alesina and Ardagna (1998); FC^3 – measure based on (1).

Table 6 – Fixed effects' estimation results for specification (2), post-Maastricht, 1992–2005

			FE^1 (I)	lr	FE^2 (II)	lr	FE^3 (III)	lr
λ	C_{t-1}		-0.216 ***		-0.226 ***		-0.222 ***	
			(-3.51)		(-3.62)		(-3.60)	
ω_0	Y_{t-1}		0.150 ***	0.696	0.068 ***	0.694	0.155 ***	0.698
			(3.02)		(4.38)		(3.17)	
ω_1	ΔY_t		0.592 ***		0.588 ***		0.594 ***	
			(7.81)		(7.55)		(7.71)	
δ_0	Y_{t-1}^{oecd}		0.051 **		0.050 *		0.048 *	
			(1.97)		(1.91)		(1.86)	
δ_1	ΔY_t^{oecd}		0.043		0.042		0.042	
			(1.35)		(1.26)		(1.28)	
α_1	FCE_{t-1}		-0.027	-0.127	-0.071 *	-0.164	-0.023	-0.135
			(-1.01)		(-1.33)		(-1.08)	
α_3	ΔFCE_t		0.037		0.036		0.052	
			(0.77)		(0.68)		(0.88)	
β_1	TF_{t-1}		-0.062 ***	-0.287	-0.050 ***	-0.222	-0.053 ***	-0.240
			(-3.28)		(-2.69)		(-2.98)	
β_3	ΔTF_t	$\times FC^m$	0.015		0.084		0.096	
			(0.20)		(1.16)		(1.23)	
γ_1	TAX_{t-1}		0.091 ***	0.422	0.092 ***	0.406	0.087 ***	0.392
			(3.24)		(3.36)		(3.18)	
γ_3	ΔTAX_t		0.015		0.019		0.027	
			(0.30)		(0.36)		(0.50)	
α_2	FCE_{t-1}		-0.043	-0.202	-0.043	-0.192	-0.044 *	-0.198
			(-1.62)		(-1.63)		(-1.67)	
α_4	ΔFCE_t		-0.015		-0.016		-0.018	
			(-0.28)		(-0.31)		(-0.36)	
β_2	TF_{t-1}		-0.050 ***	-0.229	-0.048 ***	-0.213	-0.048 ***	-0.218
			(-3.33)		(-3.25)		(-3.30)	
β_4	ΔTF_t	$\times(1-FC^m)$	0.013		0.002		0.002	
			(0.30)		(0.94)		(0.05)	
γ_2	TAX_{t-1}		0.095 ***	0.438	0.095 ***	0.421	0.095 ***	0.427
			(3.51)		(3.54)		(3.55)	
γ_4	ΔTAX_t		0.097 ***		0.097		0.094 ***	
			(2.99)		(3.06)		(3.04)	
N			206		206		206	
$\bar{R}^2$			0.617		0.618		0.618	

Notes: The t statistics are in parentheses. *, **, *** - statistically significant at the 10, 5, and 1 percent level respectively. The data sample includes yearly observations for the EU15 countries over the period 1992–2005. lr – long-run elasticity of private consumption with respect to the relevant explanatory variables. FC^1 – measure used by Giavazzi and Pagano (1996); FC^2 – measure used by Alesina and Ardagna (1998); FC^3 – measure based on (1).

Table 7 – Fixed effects' estimation results for specification (6), *Byear* dummy for debt ratio threshold, 1970–2005

			FE[1] (I)	Lr	FE[2] (II)	lr	FE[3] (III)	lr
λ	C_{t-1}		-0.073 ***		-0.072 ***		-0.074 ***	
			(-4.22)		(-4.14)		(-4.20)	
ω_0	Y_{t-1}		0.065 ***	0.894	0.064 ***	0.887	0.064 ***	0.862
			(3.96)		(3.95)		(3.89)	
ω_1	ΔY_t		0.678 ***		0.675 ***		0.668 ***	
			(16.06)		(15.50)		(15.49)	
δ_0	Y_{t-1}^{oecd}		0.014		0.002		0.002	
			(0.22)		(0.23)		(0.23)	
δ_1	ΔY_t^{oecd}		0.040 **		0.038 **		0.036 **	
			(2.47)		(2.30)		(2.21)	
α_{10}	FCE_{t-1}		-0.018	-0.251	-0.017	-0.231	-0.019	-0.261
			(-1.04)		(-0.88)		(-0.95)	
α_{30}	ΔFCE_t		0.029		0.069		0.039	
			(0.43)		(0.72)		(0.43)	
β_{10}	TF_{t-1}		0.006		0.005		0.004	
			(0.51)		(0.34)		(0.25)	
β_{30}	ΔTF_t	$\times FC^m$	0.077		0.104		0.090	
		$\times$ (1-*Byear*)	(0.99)		(1.2)		(0.93)	
γ_{10}	TAX_{t-1}		0.015	0.209	0.015	0.206	0.018	0.249
			(1.09)		(0.94)		(1.10)	
γ_{30}	ΔTAX_t		0.095		0.040		0.025	
			(1.61)		(0.56)		(0.33)	
α_{20}	FCE_{t-1}		-0.017	-0.227	-0.017	-0.233	-0.017	-0.227
			(-1.28)		(-1.28)		(-1.28)	
α_{40}	ΔFCE_t		0.035		0.030		0.003	
			(1.05)		(0.92)		(0.09)	
β_{20}	TF_{t-1}		-0.004		-0.002		-0.001	
			(-0.38)		(-0.23)		(-0.10)	
β_{40}	ΔTF_t	$\times$(1-FC^m)	0.039 **		0.038 **		0.039 **	
		$\times$(1-*Byear*)	(2.12)		(2.09)		(2.15)	
γ_{20}	TAX_{t-1}		0.019 *	0.262	0.018 *	0.253	0.018 *	0.243
			(1.86)		(1.75)		(1.72)	
γ_{40}	ΔTAX_t		-0.012		-0.002		0.003	
			(-0.39)		(-0.06)		(0.09)	

Notes: The t statistics are in parentheses. *, **, *** - statistically significant at the 10, 5, and 1 percent level respectively. The data sample includes yearly observations for the EU15 countries over the period 1970–2005. lr – long-run elasticity of private consumption with respect to the relevant explanatory variables. FC^1 – measure used by Giavazzi and Pagano (1996); FC^2 – measure used by Alesina and Ardagna (1998); FC^3 – measure based on (1).

Table 7 (cont.) – Fixed effects' estimation results for specification (6), *Byear* dummy for debt ratio threshold, 1970–2005

			FE[1] (I)	Lr	FE[2] (II)	lr	FE[3] (III)	lr
α_{11}	FCE_{t-1}		-0.018	-0.250	-0.021	-0.294	0.003	
			(-1.10)		(-1.26)		(0.15)	
α_{31}	ΔFCE_t		0.022		0.029		0.057	
			(0.45)		(0.60)		(1.09)	
β_{11}	TF_{t-1}		-0.027 **	-0.371	-0.025 **	-0.349	-0.034 ***	-0.455
		$\times FC^m$	(-2.22)		(-1.97)		(-2.91)	
β_{31}	ΔTF_t	$\times Byear$	-0.1385 **		-0.129 *		-0.062	
			(-2.13)		(-1.93)		(-0.69)	
γ_{11}	TAX_{t-1}		0.040 ***	0.545	0.041 ***	0.572	0.028 *	0.375
			(3.25)		(3.43)		(1.94)	
γ_{31}	ΔTAX_t		0.070		0.046		0.061	
			(1.38)		(0.95)		(1.04)	
α_{21}	FCE_{t-1}		0.020 **	0.275	-0.022	-0.310	-0.030 **	-0.405
			(2.37)		(-1.64)		(-2.12)	
α_{41}	ΔFCE_t		0.066		0.067		0.058	
			(1.00)		(1.08)		(0.99)	
β_{21}	TF_{t-1}		0.004		0.004		0.007	
		$\times(1-FC^m)$	(0.30)		(0.35)		(0.59)	
β_{41}	ΔTF_t	$\times Byear$	-0.045		-0.048		-0.053	
			(-0.76)		(-0.84)		(-0.97)	
γ_{21}	TAX_{t-1}		0.020 **	0.275	0.019 **	0.259	0.024 ***	0.318
			(2.37)		(2.23)		(2.75)	
γ_{41}	ΔTAX_t		0.023		0.021		0.018	
			(0.68)		(0.63)		(0.56)	
N			489		489		489	
$\bar{R}^2$			0.546		0.543		0.540	

Notes: The t statistics are in parentheses. *, **, *** - statistically significant at the 10, 5, and 1 percent level respectively. The data sample includes yearly observations for the EU15 countries over the period 1970–2005. lr – long-run elasticity of private consumption with respect to the relevant explanatory variables. FC^1 – measure used by Giavazzi and Pagano (1996); FC^2 – measure used by Alesina and Ardagna (1998); FC^3 – measure based on (1).

Table 8 – Fixed effects' estimation results for specification (6), *Bcountry* dummy for debt ratio threshold, 1970–2005

			FE[1] (I)	lr	FE[2] (II)	lr	FE[3] (III)	lr
λ	C_{t-1}		-0.076 ***		-0.074 ***		-0.075 ***	
			(-4.32)		(-4.08)		(-4.14)	
ω_0	Y_{t-1}		0.068 ***	0.895	0.065 ***	0.873	0.067 ***	0.886
			(4.19)		(3.93)		(4.06)	
ω_1	ΔY_t		0.683 ***		0.679 ***		0.675 ***	
			(16.11)		(15.34)		(15.55)	
δ_0	Y_{t-1}^{oecd}		0.002		0.003		0.003	
			(0.38)		(0.48)		(0.47)	
δ_1	ΔY_t^{oecd}		0.039 **		0.039 **		0.035 **	
			(2.45)		(2.30)		(2.11)	
α_{10}	FCE_{t-1}		-0.201 ***	-2.645	-0.084	-1.134	-0.131 **	-1.745
			(-5.63)		(-1.59)		(-2.39)	
α_{30}	ΔFCE_t		-0.273 ***		-0.024		-0.084	
			(-2.64)		(-0.15)		(-0.55)	
β_{10}	TF_{t-1}		0.093 ***	1.223	0.035		0.049	
			(4.85)		(1.21)		(1.64)	
β_{30}	ΔTF_t	$\times FC^m \times$ (1-*Bcountry*)	0.209 ***		0.135		0.161	
			(3.04)		(1.05)		(1.28)	
γ_{10}	TAX_{t-1}		0.105 ***	1.376	0.051 *	0.683	0.075 ***	0.997
			(5.56)		(1.77)		(-2.67)	
γ_{30}	ΔTAX_t		0.186 ***		0.040		0.030	
			(2.90)		(0.39)		(0.31)	
α_{20}	FCE_{t-1}		-0.025 *	-0.334	-0.027 **	-0.362	-0.027 **	-0.356
			(-1.94)		(-2.00)		(-2.01)	
α_{40}	ΔFCE_t		0.025		0.020		0.020	
			(0.73)		(0.58)		(0.59)	
β_{20}	TF_{t-1}	$\times(1-FC^m) \times$ (1-*Bcountry*)	-0.002	-0.032	-0.001		0.001	
			(0.24)		(-0.05)		(0.05)	
β_{40}	ΔTF_t		0.028		0.029		0.029	
			(1.42)		(1.34)		(1.43)	
γ_{20}	TAX_{t-1}		0.027 ***	0.356	0.027 **	0.360	0.025 **	0.332
			(2.71)		(2.57)		(2.41)	
γ_{40}	ΔTAX_t		-0.035		-0.026		-0.023	
			(-1.09)		(-0.80)		(-0.70)	

Notes: The t statistics are in parentheses. *, **, *** - statistically significant at the 10, 5, and 1 percent level respectively. The data sample includes yearly observations for the EU15 countries over the period 1970–2005. lr – long-run elasticity of private consumption with respect to the relevant explanatory variables. FC^1 – measure used by Giavazzi and Pagano (1996); FC^2 – measure used by Alesina and Ardagna (1998); FC^3 – measure based on (1).

Table 8 (cont.) – Fixed effects' estimation results for specification (6), *Bcountry* dummy for debt ratio threshold, 1970–2005

			FE^1 (I)	lr	FE^2 (II)	lr	FE^3 (III)	lr
α_{11}	FCE_{t-1}		-0.028 **	-0.363	-0.024	-0.320	-0.010	
			(-2.02)		(-1.63)		(-0.64)	
α_{31}	ΔFCE_t		0.009		0.028		0.061	
			(0.19)		(0.53)		(1.22)	
β_{11}	TF_{t-1}		-0.014		-0.021 *	-0.278	-0.021 *	-0.274
		$\times FC^m$	(-1.12)		(-1.78)		(-1.81)	
β_{31}	ΔTF_t	$\times$ *Bcountry*	-0.068		-0.065		0.042	
			(-1.09)		(-1.04)		(0.65)	
γ_{11}	TAX_{t-1}		0.038 ***	0.499	0.040 ***	0.534	0.027	0.354
			(3.33)		(3.70)		(2.41)	
γ_{31}	ΔTAX_t		0.072		0.062		0.088 *	
			(1.55)		(1.37)		(1.92)	
α_{21}	FCE_{t-1}		-0.018	-0.240	-0.017	-0.229	-0.023	-0.311
			(-1.30)		(-1.23)		(-1.68)	
α_{41}	ΔFCE_t		0.043		0.051		0.044	
			(0.69)		(0.82)		(0.74)	
β_{21}	TF_{t-1}	$\times(1-FC^m)$	0.004		0.004		0.005	
		$\times$ *Bcountry*	(0.44)		(0.43)		(0.50)	
β_{41}	ΔTF_t		0.010		-0.004		-0.017	
			(0.16)		(-0.07)		(-0.29)	
γ_{21}	TAX_{t-1}		0.015	0.190	0.013	0.180	0.018 *	0.234
			(1.61)		(1.49)		(1.92)	
γ_{41}	ΔTAX_t		0.038		0.035		0.030	
			(1.17)		(1.07)		(0.97)	
N			489		489		489	
$\bar{R}^2$			0.553		0.543		0.542	

Notes: The t statistics are in parentheses. *, **, *** - statistically significant at the 10, 5, and 1 percent level respectively. The data sample includes yearly observations for the EU15 countries over the period 1970–2005. lr – long-run elasticity of private consumption with respect to the relevant explanatory variables. FC^1 – measure used by Giavazzi and Pagano (1996); FC^2 – measure used by Alesina and Ardagna (1998); FC^3 – measure based on (1).

Table 9 – Fixed effects' estimation results for specification (7), dummy variables for expansions and contractions, 1970–2005

			FE[1] (I)	lr	FE[2] (II)	lr	FE[3] (III)	lr
λ	C_{t-1}		-0.073 ***		-0.070 ***		-0.070 ***	
			(-4.35)		(-4.20)		(-4.23)	
ω_0	Y_{t-1}		0.070 ***	0.961	0.066 ***	0.949	0.065 ***	0.925
			(4.42)		(4.23)		(4.15)	
ω_1	ΔY_t		0.689 ***		0.681 ***		0.675 ***	
			(14.37)		(13.89)		(14.04)	
δ_0	Y_{t-1}^{oecd}		0.004		0.004		0.004	
			(0.65)		(0.69)		(0.76)	
δ_1	ΔY_t^{oecd}		0.042 ***		0.040 ***		0.037 **	
			(2.59)		(2.50)		(2.31)	
α_5	FCE_{t-1}		-0.015	-0.198	-0.015	-0.207	-0.017 *	-0.233
			(-1.41)		(-1.53)		(-1.74)	
α_6	ΔFCE_t		0.036		0.039		0.037	
			(1.14)		(1.17)		(1.18)	
β_5	TF_{t-1}		-0.005		-0.006		-0.005	
			(-0.60)		(-0.67)		(-0.63)	
β_6	ΔTF_t	$\times(1\text{-}FC^m)$ $\times(1\text{-}FX^m)$	0.020		0.022		0.020	
			(0.86)		(0.92)		(0.87)	
γ_5	TAX_{t-1}		0.014 *	0.184	0.015 *	0.202	0.017 **	0.226
			(1.72)		(1.82)		(2.06)	
γ_6	ΔTAX_t		-0.006		0.005		0.005	
			(-0.23)		(0.19)		(0.20)	
α_2	FCE_{t-1}		-0.025		-0.024		-0.036	
			(-0.96)		(-1.00)		(-1.42)	
α_4	ΔFCE_t		-0.072		-0.069		-0.126 *	
			(-0.97)		(-1.05)		(-1.78)	
β_2	TF_{t-1}	$\times(1\text{-}FC^m)$ $\times FX^m$	-0.015		-0.012		-0.017	
			(-1.01)		(-0.89)		(-1.16)	
β_4	ΔTF_t		0.033		0.011		-0.024	
			(0.63)		(0.21)		(-0.39)	
γ_2	TAX_{t-1}		0.032 *	0.438	0.030 *	0.404	0.047 **	0.641
			(1.67)		(1.80)		(2.52)	
γ_4	ΔTAX_t		0.009		0.010		0.030	
			(0.15)		(0.17)		(0.45)	
α_1	FCE_{t-1}		-0.030 **	-0.409	-0.026 *	-0.359	-0.020	-0.273
			(-2.09)		(-1.74)		(-1.31)	
α_3	ΔFCE_t		0.001		0.026		0.017	
			(0.02)		(0.48)		(0.32)	
β_1	TF_{t-1}		-0.008		-0.014		-0.013	
		$\times FC^m$	(-0.72)		(-1.20)		(-1.13)	
β_3	ΔTF_t		-0.014		-0.004		0.017	
			(-0.22)		(-0.05)		(0.22)	
γ_1	TAX_{t-1}		0.030 **	0.406	0.033 ***	0.445	0.027 **	0.375
			(2.50)		(2.66)		(2.14)	
γ_3	ΔTAX_t		0.073 *		0.025		0.030	
			(1.65)		(0.52)		(0.57)	
N			505		505		505	
$\bar{R}^2$			0.549		0.547		0.550	

Notes: The t statistics are in parentheses. *, **, *** - statistically significant at the 10, 5, and 1 percent level respectively. The data sample includes yearly observations for the EU15 countries over the period 1970–2005. lr – long-run elasticity of private consumption with respect to the relevant explanatory variables. FC^1, FX^1– measure used by Giavazzi and Pagano (1996); FC^2, FX^2– measure used by Alesina and Ardagna (1998); FC^3, FX^3– measure based on (1).

Table 10 – Fixed effects' estimation results for specification (7), dummy variables for expansions and contractions, 1992–2005

			FE[1] (I)	lr	FE[2] (II)	lr	FE[3] (III)	lr
λ	C_{t-1}		-0.218 ***		-0.233 ***		-0.238 ***	
			(-3.41)		(-3.58)		(-3.83)	
ω_0	Y_{t-1}		0.147 ***	0.675	0.156 ***	0.668	0.161 ***	0.674
			(2.95)		(3.22)		(3.35)	
ω_1	ΔY_t		0.549 ***		0.590 ***		0.562 ***	
			(6.59)		(7.49)		(7.11)	
δ_0	Y_{t-1}^{oecd}		0.058 **		0.053 *		0.057 **	
			(2.07)		(1.88)		(2.03)	
δ_1	ΔY_t^{oecd}		0.042		0.043		0.044	
			(1.27)		(1.20)		(1.29)	
α_5	FCE_{t-1}		-0.048 *	-0.222	-0.039		-0.044	
			(-1.72)		(-1.48)		(-1.64)	
α_6	ΔFCE_t		-0.010		-0.028		-0.026	
			(-0.16)		(-0.45)		(-0.47)	
β_5	TF_{t-1}		-0.056 ***	-0.256	-0.058 ***	-0.265	-0.056 ***	-0.259
			(-3.39)		(-3.63)		(-3.65)	
β_6	ΔTF_t	$\times(1-FC^m)$ $\times(1-FX^m)$	-0.009		-0.025		-0.024	
			(-0.20)		(-0.57)		(-0.56)	
γ_5	TAX_{t-1}		0.106 ***	0.489	0.104 ***	0.477	0.106 ***	0.488
			(3.48)		(3.45)		(3.58)	
γ_6	ΔTAX_t		0.107 ***		0.093 **		0.100 ***	
			(2.72)		(2.35)		(2.73)	
α_2	FCE_{t-1}		-0.078 *	-0.358	-0.028		-0.084 *	-0.384
			(-1.74)		(-0.71)		(-2.03)	
α_4	ΔFCE_t		-0.157		0.029		-0.276 **	
			(-1.61)		(0.28)		(-2.55)	
β_2	TF_{t-1}	$\times(1-FC^m)$ $\times FX^m$	-0.061 ***	-0.278	-0.050 **	-0.230	-0.074 ***	-0.341
			(-2.67)		(-2.15)		(-2.92)	
β_4	ΔTF_t		-0.077		0.072		-0.228 **	
			(-0.67)		(0.83)		(-2.17)	
γ_2	TAX_{t-1}		0.140 ***	0.646	0.104 ***	0.477	0.164 ***	0.755
			(3.08)		(3.45)		(4.32)	
γ_4	ΔTAX_t		0.154 *		0.183 **		0.315 ***	
			(1.79)		(2.23)		(3.78)	
α_1	FCE_{t-1}		-0.033		-0.032		-0.031	
			(-1.14)		(-1.15)		(-1.10)	
α_3	ΔFCE_t		0.035		0.041		0.044	
			(0.71)		(0.77)		(0.75)	
β_1	TF_{t-1}		-0.069 ***	-0.316	-0.057 ***	-0.260	-0.060 ***	-0.274
		$\times FC^m$	(-3.51)		(-2.95)		(-3.25)	
β_3	ΔTF_t		0.003		0.081		0.087	
			(0.04)		(1.08)		(1.10)	
γ_1	TAX_{t-1}		0.104 ***	0.477	0.097 ***	0.477	0.098 ***	0.452
			(3.25)		(3.21)		(3.25)	
γ_3	ΔTAX_t		0.023		0.018		0.026	
			(0.41)		(0.31)		(0.44)	
N			206		206		206	
$\bar{R}^2$			0.611		0.612		0.625	

Notes: The t statistics are in parentheses. *, **, *** - statistically significant at the 10, 5, and 1 percent level respectively. The data sample includes yearly observations for the EU15 countries over the period 1992–2005. lr – long-run elasticity of private consumption with respect to the relevant explanatory variables. FC^1, FX^1– measure used by Giavazzi and Pagano (1996); FC^2, FX^2– measure used by Alesina and Ardagna (1998); FC^3, FX^3– measure based on (1).