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The (Pro-) Cyclicality of Government Consumption in the EU and Official Expectations of Future Output Growth: New Evidence

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Abstract

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1. Introduction

The euro area sovereign bond market crisis had its roots in investors' concerns about the fiscal position of many of the area's member states (Caceres *et al.*, 2010). The crisis highlighted the diverging fiscal positions of EU member states, both those in and not in the euro area, and the scope for sharp and rapid deteriorations in government deficit and debt positions to occur over a short timespan. These developments called into question the efficacy of budgetary surveillance and practice at country and EU levels and arose even though the Stability and Growth Pact (adopted in 1997) has a "preventive arm" geared to ensuring detailed scrutiny of EU member states' budgetary positions and the attainment of fiscal targets. Central to the preventive arm is the submission by euro area member states and non-euro area member states of Stability Programmes and Convergence Programmes (henceforth, SCPs), respectively, for review by other member states and the European Commission. SCPs outline governments' economic outlook and fiscal policy over the medium term (specifically, a four-year-ahead horizon, including the current year). These documents have been part of EU fiscal surveillance since the 1990s and, up until 2010, were subject to a comprehensive and standalone assessment by the Commission.

The European Semester was adopted in 2010 with the purpose of providing better *ex-ante* economic and budgetary policies among member states through a more integrated framework for assessing public finance plans. The Semester, which took effect in 2011, spans the first six months of the calendar year and had the effect of seeing SCPs being submitted to the Commission for review in April, rather than in the autumn. The introduction of the Semester broadly coincided with a new "six-pack" (of five regulations and one directive) intended to strengthen the Pact by improving procedures aimed at reducing government deficits (including the imposition of sanctions for failing to eliminate an excessive deficit) and tackling macroeconomic imbalances. Within the Semester, the assessment of the SCPs by the Commission was shortened and incorporated into the country reports of the member states.

One aspect of prudent fiscal policy, both in general and within the EU, is controlling public expenditure dynamics. Doing so can help avoid fiscal policy having a pro-cyclical influence on economic activity and can contribute to EU fiscal rules being respected. Persistent spending overruns in the EU were a feature of the pre-crisis era and constituted a weak link in fiscal policy (European Commission, 2007). As part of the "six pack" of reforms introduced in 2011, member states need to constrain government expenditure to help put it on a sustainable path, as well as adhere to already in-place operational rules concerning the structural budget balance. For those member states who have not attained their medium-term objective of achieving a

structural budget balance close to balance or in surplus, net expenditure should grow at a lower rate than medium-term potential output growth. Moreover, particular spending restraint should be exercised when the economy is experiencing a cyclical upswing.

Such action during the growth phase of the cycle would be in line with conventional policy advice that fiscal policy should be acyclical or counter-cyclical. The former would involve government "sitting on its hands" during the economic cycle with the automatic stabilisers alone exercising a (counter-cyclical) influence on output, while an active counter-cyclical policy would complement the automatic stabilisers with government reducing discretionary expenditure during cyclical upturns and raising spending during downturns. Should fiscal policy not be conducted in either an acyclical or counter-cyclical manner but in a pro-cyclical way, governments would be acting to exacerbate the economic cycle and to offset the effects of the automatic stabilisers on the economy.

With the European Semester and the associated reforms of the EU fiscal rules in place since 2011, an evaluation of the intended cyclicality of fiscal policy contained in member states' annual SCPs since then and a comparison with *ex-post* data seem appropriate. In this paper, the focus is on the expenditure side of national budgets alone and not on the cyclicality of member state budgets as a whole. Government consumption and GDP data contained in the SCPs are used for such an assessment. The results demonstrate that discretionary government expenditure policy is intended by EU member state governments to behave in a pro-cyclical manner, running counter to the spirit and intention of the EU fiscal rules and to claims that initiatives such as the Semester and "six pack" reforms would bring benefits to policymaking.

Moreover, the paper shows that government consumption can also be adjudged to be pro-cyclical *ex-post*, using data from the EU Commission's AMECO database, but to a lesser extent than arises *ex-ante*. The role of expectations in budget forecasting and planning is used to explain policy being more pro-cyclical *ex-ante* than *ex-post* and the results point to governments' output growth expectations not being rational, with expectations shown to be extrapolative in nature. Specifically, past movements in GDP appear to influence current GDP growth rate expectations. In practice, it would appear that the recent growth performance experienced across EU member states has affected future growth expectations. In that sense, notwithstanding the increased surveillance that has been taking place in recent years, the results here suggest that the assessment of fiscal policy within the EU is still subject to the biases of official forecasters. Forecasting bias on the part of national fiscal authorities has

been reported previously by Strauch *et al.* (2004), Jonung and Larch (2006) and, more recently, Beetsma *et al.* (2019). The bias reported here is of undue pessimism, which does not threaten fiscal sustainability in contrast to the optimism bias documented in other studies.

2.   *Literature Review*

Most empirical studies of the cyclicality of fiscal policy use *ex-po*st data. In a recent review of the literature in this area, Ihori and Itaya (2018) summarise a finding of pro-cyclicality arising in most developing countries in the literature on this subject, which their own empirical analysis supports and which they find also arises in some industrialised countries. Those studies have been wide-ranging in the countries covered and in the methodologies used. Among the earliest analyses in this area, Gavin and Perotti (1997) find pro-cyclical policy occurring in Latin American economies. Both Kaminsky *et al.* (2004) and Ilzetzki and Vegh (2008) detect pro-cyclicality arising in developing countries. The former paper finds fiscal policy to be counter-cyclical in industrial countries. Arreaza *et al.* (1999) observe pro-cyclical fiscal policy in OECD countries, while Lane (2003) finds both government investment and government consumption to be pro-cyclical for the same country grouping. Talvi and Vegh (2005) find the cyclical components of real GDP and those of real government consumption to be positively correlated in OECD countries, with the exception of the G7 countries. In a study of 14 EU member states, Balassonne *et al.* (2010) identify asymmetrical effects occurring during the economic cycle with both overall and primary budget balances deteriorating during downturns but not improving in the upturn phases.

The literature also compares the stance of fiscal policy on an *ex-ante* and *ex-post* basis. The *ex-ante* analysis indicates the fiscal stance intended by governments in their budgetary plans, assessed using their economic and fiscal projections, while the *ex-post* data show what actually transpired. Forni and Momigliano (2005, p. 299) argue that an examination of the information available at that time budgetary decisions are made is important in assessing past policy as *ex-post* data may "provide a misleading basis for such analysis." Bernoth *et al.* (2008) find pro-cyclical fiscal policy being evident *ex-post* among a panel of OECD countries, with a more counter-cyclical stance planned *ex-ante*. Beetsma and Giuliodori (2010) observe planned fiscal policy as acyclical in EU member states and counter-cyclical in other OECD countries. Cimadomo (2016) concludes that the balance of the international evidence indicates a more counter-cyclical fiscal stance arising *ex-ante* than *ex-post*.

Another relevant issue in assessing the cyclicality of fiscal policy is the role played by official growth forecasts. For a number of European countries, Jonung and Larch (2006) and Strauch *et al.* (2004) detect the presence of forecast bias in the budgetary process. In particular, Jonung and Larch (2006) contend that many euro area countries over the period 1987-2003 exhibited an "optimism bias" where official growth forecasts, on average, over-estimate the underlying speed of growth of the economy. In response to the distortionary effect of such forecasts on the budgetary process, they call for member states to use an independent forecasting authority to "foster the production of unbiased forecasts". They find independent fiscal institutions to have no statistically significant bias in their forecasting.

A methodological issue highlighted in the literature is that the endogeneity that arises between national output and its fiscal components can hamper the identification of the cyclical orientation of fiscal policy empirically. The difficulty is that, say, an observed positive correlation between the growth rates of real GDP and real discretionary government expenditure does not necessarily mean that increased output growth leads government to raise its spending, rather it could be that higher government expenditure in itself causes output to increase. The most basic econometric issue posed by the endogeneity between output and fiscal variables is that it results in ordinary least squares (OLS) parameter estimates that are biased downwards. Studies such as Ilzetzki and Vegh (2008) and Cronin and McQuinn (2018) use a variety of econometric techniques to address this endogeneity issue in assessing the cyclicality of fiscal policy.

Against this background, this paper has two purposes. First, it evaluates the intended cyclicality of fiscal policy in the EU in the current decade, a period when there has been a renewed emphasis on fiscal discipline in the post-financial crisis era. It does so using an annual database of government consumption and output projections from the SCPs of EU member states from 2011 (when the European Semester took effect) to 2018. The cyclicality of fiscal policy on an *ex-post* basis is assessed using EU AMECO data and is compared to the *ex-ante* results. The second purpose is to examine the nature of official output growth forecasts as a possible explanation of the differences between the *ex-ante* and *ex-post* results and, in particular, to look for the presence of bias in such forecasts or otherwise.

3.   *Data and Methodology*

3.1 Data

SCPs provide four-year ahead (including the current year) forecasts for many fiscal and output variables, with those projections taking account of the impact of budgetary policy on the economic outlook. In using the SCPs to assess the cyclicality of fiscal policy, it is necessary to capture discretionary changes in fiscal policy alone, i.e. devoid of the direct effect of the economic cycle on the public finances. The growth rate of real government consumption in the current year is suitable as such a policy variable. It is available in tables found in SCPs that account for projected real GDP growth rates. Since government consumption expenditure is fully at the discretion of government, there is no need for an adjustment to it in respect of the effect of cyclically-sensitive outlays, such as transfer payments' effect on total government expenditure.[1] Projections for real government investment growth are not included in SCPs (nor are growth rates of total government expenditure). Not only are there *a priori* issues with using tax variables in the assessment of the cyclicality of fiscal policy (Ihori and Itaya, 2018) but data relating to suitable tax rates to use are not readily identifiable in SCPs. Variables such as the government deficit ratio, as already noted, are endogenous to output, while cyclically-adjusted budget balances raise well-documented issues of measuring output gaps, concerns which are particularly acute for small open economies (Cronin and McCoy, 1999). Consequently, the growth rate in real government consumption expenditure is the fiscal variable used here in assessing the cyclicality of fiscal policy, while the real GDP growth rate provides the measure of economic activity.

SCPs are standardised in format and a table outlining "macroeconomic prospects" appears in each one. This table contains the real GDP growth rate forecast for the current year (i.e. the year in which the particular SCP is being submitted), as well as its components, including the real final government consumption growth rate. The forecasts for the current year for both variables were collected from the SCPs submitted by member states over the period 2011 to 2018 (the period in which the European Semester has been in effect). SCPs are available for all 28 EU member states over the eight years with the exceptions of Greece in all years, Portugal in 2011, Cyprus between 2013 and 2015, and Croatia which only starting submitting programmes in 2015. Since one of the econometric methodologies (that of Pedroni) employed in section 4 requires balanced panels, those four countries are dropped from the sample and the panels then comprise data for the remaining 24 countries, implying that 192 observations of

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[1] In 2018, government consumption constituted some 44 per cent of total government expenditure in the European Union (source: EU AMECO database and authors' calculations).

the real government consumption growth rate and of the real GDP growth rate are used in the estimations.

3.2 Methodological approach

With this choice of regression variables, the basic econometric approach taken, as per Ilzetzki and Vegh (2008) and Cronin and McQuinn (2018), is to regress percentage changes in real government consumption (denoted g below) on percentage changes in real GDP (denoted y below). The beta coefficient (β) in the regression estimation indicates the cyclicality of fiscal policy with a positive value indicating pro-cyclicality arising over time, a negative value that a counter-cyclical policy has been occurring, and an insignificant coefficient signalling an acyclical fiscal stance.

All data included in SCPs are annual and the focus here is on the current year real government consumption and real GDP growth rate projections and the relationship between them. Output and government outlay projections beyond the current year are not considered because they will be affected by future budgetary policy decisions and, consequently, an *ex-ante* versus *ex-post* comparison would not be appropriate for them. The data for the *ex-post* comparison are taken from the EU AMECO database.

The basic *ex-ante* regression is then:

$$g_{i,t|t} = \beta y_{i,t|t} + v_{i,t} \tag{a}$$

Where $g_{i,t|t}$ is the in-year forecast for the growth rate of real government consumption in year t, the year in which the particular SCP for country i is published, $y_{i,t|t}$ is the in-year forecast growth rate of real GDP in the SCP, and $v_{i,t}$ is an error term.

The basic *ex-post* regression is:

$$g_{i,t} = \beta y_{i,t} + u_{i,t} \tag{b}$$

Where $g_{i,t}$ is the *ex-post* growth rate in real government consumption in year t for country i, $y_{i,t}$ is its *ex-post* growth rate in real GDP, and $u_{i,t}$ is an error term.

Equations (a) and (b) are estimated here using a standard fixed effects approach, with dummies for the individual countries. As outlined earlier, OLS estimates of these two equations can

present the difficulty that that the covariance between the output growth rate and the error term may not be zero due to endogeneity between GDP and government consumption. To control for this potential endogeneity, the approach of Cronin and McQuinn (2018) is adopted to a panel setting. This includes estimating equations (a) and (b) using a standard fixed-effects model, with the fully-modified panel data approach of Pedroni (1999) and Pedroni (2004) acting as a cross-check on those estimates. The Pedroni model used here involves the Phillips-Hansen FM-OLS approach to estimating relationships between variables with country-specific time series data.

4. Econometric Results

4.1 Ex-ante and ex-post results

The results where the standard fixed effects approach is applied to the estimation of equations (a) and (b) are those reported in the tables below. The beta coefficients estimates from the application of the Pedroni method are of similar values to those of the standard fixed effects approach and are reported in footnotes (the full Pedroni estimates and related statistics are available on request from the authors).

Table 1 then reports the results when the *ex-ante* data from the SCPs are used. The highly significant beta coefficient value of 0.61 indicates intended fiscal policy to be pro-cyclical in nature.[2] The measure of fit (centred R-square value) is 0.44, while the results for the country-specific dummy results are also provided in the table. A standard F-test indicates that the fixed effects specification is warranted over an OLS one.

In Table 2, which reports the results where the *ex-post* data are used, the beta coefficient estimate, while statistically significant, is much lower, at 0.23, than the estimate in Table 1.[3][4] The null hypothesis that the coefficient on the $y_{i,t|t}$ variable (of 0.61) in the fixed effects model of Table 1 is the same as that on the $y_{i,t}$ variable (of 0.23) in Table 2 is rejected with the chi-squared (with one degree of freedom) statistic having a value of 13.27 and a significance level of 0.0003. The results then suggest that fiscal policy in the EU is pro-cyclical, irrespective of

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[2] The beta coefficient using the Pedroni approach is 0.56 and statistically significant.

[3] In this case, the Pedroni-based estimate of the beta coefficient is 0.31 and statistically significant.

[4] The *ex-post* real GDP output growth rate for Ireland was extremely high in 2015, reflecting the effects of shifts in capital assets. Excluding Ireland from the dataset does not have any noticeable impact on the results reported in Tables 1 to 4.

whether you examine the issue from an *ex-post* or an *ex-ante* perspective. Policy, however, appears to be substantially more pro-cyclical *ex-ante* than *ex-post*.

Both Marinheiro (2008) and Cronin and McQuinn (2018) use an additional regression equation in their investigations of *ex-ante* versus *ex-post* fiscal behaviour, of the following form:

$$g_{i,t} = \beta y_{i,t|t} + u_{i,t} \qquad\qquad (c)$$

The estimation of this equation with the dataset here gives the results shown in Table 3. The regression of the *ex-post* real government consumption expenditure growth rate on *ex-ante* real GDP growth renders a beta coefficient of 0.55. Z-tests indicate this to be statistically insignificantly different from the beta estimate of 0.61 in Table 1 and significantly different from the coefficient of 0.23 in Table 2. As with Marinheiro (2008), this is interpreted as fiscal policy that was intended *ex-ante* to be pro-cyclical not reacting to unforeseen errors in the output forecasts made by the member states and thus rendering fiscal policy to be much less pro-cyclical *ex-post* than was initially intended. Consequently, it is necessary to assess whether errors did occur in member states' forecasting processes and what form they took. This is addressed in the next sub-section of the paper.

Before moving to that section, it is worth considering whether the finding of a pro-cyclicality to fiscal policy in the EU during the sample period is sensitive to other influences on government expenditure plans. Cimadomo (2012) controls for the influence of the political cycle by adding a dummy variable with a value of one in parliamentary election years and zero otherwise. A similar procedure is employed here with 51 of the 192 observations being years when such general elections took place during the 2011 to 2018 sample period.[5] A dummy variable, which has a value of one in an election year and zero in all other years, is used to capture this potential influence on government spending. Another influence on government expenditure plans in the EU would be the expenditure benchmark, introduced as part of the 2011 "six-pack" reforms. This acts to constrain the government spending of member states that have not met their MTO. When the benchmark applies, the net growth rate of government spending must be at or below a country's medium-term potential output growth rate. Its purpose is to help steer the member state towards meeting its MTO. Of the 192 observations in the dataset used here, 125 relate to member states that had not attained their MTO in the previous year. Consequently, as a test of whether having met the MTO or not had an effect

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[5] Source: http://www.parlgov.org/explore/IRL/election/

on the cyclicality of planned and actual expenditure, a second dummy variable takes a value of one if the MTO had not been met in the previous year and zero otherwise.

When these two dummy variables are added to the regression equations (a), (b) and (c) above, the coefficient on the election dummy variable is insignificant in all three cases, while that on the MTO dummy variable is significant and negative for the augmented estimation of equations (a) and (b).[6]   Accordingly, a member state not having met its MTO has a damping effect on government expenditure, as intended by the benchmark, given the real GDP growth rate.   The value and significance of the coefficient on the GDP variable in all three regressions is broadly unchanged.   This is a similar finding to Cimadimo (2012) on the effect of the electoral cycle. Consequently, the addition of these variables does not affect the assessment of the cyclicality of fiscal policy in the EU over 2011 to 2018.

4.2   Issue of Governments forecast/output expectations

The results in the previous sub-section indicate fiscal policy to be more pro-cyclical *ex-ante* than *ex-post*.   In seeking to explain this difference, the nature of official forecasts (i.e. those of member state governments) of future economic activity needs to be considered, in particular to examine whether a bias is evident in those forecasts.   This issue has been highlighted previously in the literature.   Strauch *et al.* (2004) provide an analysis of the forecasting in the earliest SCPs (those between 1991 and 2002).   Bias in budgetary projections are found to be owing in part to where member states are in the economic cycle, with member states not using the information available to them efficiently.   Focusing on the forecasting performance of the governments of the four largest EU member states (Germany, France, Italy, and the UK), Jonung and Larch (2006) find an optimism bias in official forecasts of output growth.   They argue that this bias could be addressed by having independent national authorities prepare member states' official forecasts.

Figures 1 presents the average forecast errors – calculated as the actual outturn less the forecast – for GDP growth rates across the 24 different countries for the 2011-2018 period.   On average, official forecasters were unduly pessimistic in their output growth expectations.   Most of the countries (17 of them) have a positive error, indicating that the official forecasts were on average less than the actual outcome, while only seven countries had negative errors.   For the

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[6] To save space, these results are not reported in tabular form here but are available from the authors on request. The values of the coefficient on the significant MTO dummy variable in the augmented regressions (a) and (b) are -0.66 and -0.78, respectively.

sample as a whole, the average forecast error was 0.39 per cent, while, when Ireland is excluded, the average is 0.22 per cent.[7]

To test for bias in the forecasts, three separate tests are used here. First, according to Keane and Runkle (1990) and Bonham and Cohen (2001), two conditions must hold in order for expectations in forecasting to be deemed rational. When $y_{i,t}$ is regressed on $y_{i,t|t}$, the coefficient on the regressor must be insignificantly different from one and the country dummies must be insignificantly different from zero. The results of such a regression of $y_{i,t}$ on $y_{i,t|t}$ and country fixed effects are shown in Table 4. From that table, it is clear that the second condition is violated as the standard F-test test of whether the dummies are different from zero indicate it to be strongly rejected.

A second test of rationality is to follow the recent approach of Croushore and Van Norden (2018) and test whether the forecast error (the difference between $y_{i,t}$ and $y_{i,t|t}$) is statistically different from zero. The null hypothesis that the forecast error is insignificant is rejected at the one per cent level with a p-value of 0.007.[8]

Finally, whether official forecasters follow some form of adaptive expectations/extrapolation approach in making projections is considered. In other words, does recent economic activity (recorded as *ex-post* data) have an effect on the official GDP forecast? In Table 5, the coefficient and diagnostic results of the regression of the *ex-ante* GDP growth rate, $y_{i,t|t}$, on the most up-to-date observation of the first-lag of the actual GDP growth rate, denoted as $y_{i,t-1}$ (as taken from the EU AMECO database) are presented. It is apparent that past realisations of GDP appear to have a significant impact on future expectations of GDP, i.e. official forecasters follow an adaptive expectations-based forecasting/generating process rather than a rational expectations approach. The positive coefficient on the lagged observation of economic activity suggests that forecasters believe that if output contracts then this will be followed by a further decline, or if output expands then a further increase will ensue. If the coefficient on lagged output growth had been equal to zero then past changes in output would have no influence on future forecasts, which would be in line with the rational expectations hypothesis.

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[7] If Malta, which had the next highest average forecast error, is also excluded then the average error would still be 0.12 per cent.

[8] The null hypothesis that the mean of the forecast error is equal to 0 is rejected with a p-value of 0.00.

5. *Conclusion*

Prior to the financial crisis of 2008 and the euro area sovereign bond crisis that emerged soon after, fiscal policy in EU member states was not conducted in a satisfactory manner. The European Commission (2011, p. 70) notes "persistently lax fiscal policy" prevailing for the ten years after the introduction of the euro in 1999, while Beetsma *et al.* (2009) find implemented budgetary adjustment routinely falling short of that planned. The results presented here point to fiscal policy in the EU remaining pro-cyclical in the current decade, even though there was a tightening of surveillance procedures and preventive measures after the crisis, including the initiation of the European Semester in 2011. The econometric estimations show government consumption to be pro-cyclical *ex-ante* based on the data included in the SCPs submitted by member states as part of the Semester. Such a policy stance is unwelcome as it indicates intended budgetary policy acting to aggravate the output growth cycle when it having no effect or a counter-cyclical effect would be preferable.

A comparison between the cyclicality of fiscal policy *ex-ante* and *ex-post* since 2011 is also made. Tests suggest that government consumption on an *ex-post* basis could have been more pro-cyclical but for official Government forecasts of real GDP growth being unduly pessimistic. This bias arises because official forecasters were influenced by past realisations of actual GDP growth, i.e. the relatively poor performance of European economic activity post-2011. Governments thus were too pessimistic in forecasting real GDP growth, yet their intention was still to exercise fiscal policy in a pro-cyclical manner.

From a policy perspective, it is disappointing that after all the changes to surveillance and preventive procedures after the financial crisis, the supervision and analysis of fiscal policy is still adversely affected by a bias in official growth forecasts. Based on their assessment of an optimism bias in official forecasts, Jonung and Larch (2006) argued for the adoption of fiscal councils in the preparation of government budgetary and economic forecasts, including those in SCPs, to address bias. Such councils have become commonplace in the meantime among EU member states. The findings presented here based on data for recent years indicate that the optimism bias identified in previous studies of official forecasts in the EU no longer arises, but has been replaced by undue pessimism in forecasting. This may reflect governments adopting a cautious approach to macroeconomic forecasting during the euro area sovereign debt crisis and the years that immediately followed. While such a form of bias may be less troublesome for budgetary policy than when actual growth rates prove poorer than forecast (which, for

example, might require a tightening of budgetary policy to meet particular targets), it nevertheless indicates that there remains scope for improvement in member states' forecasting.

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Table 1. The Cyclicality of Fiscal Policy *Ex-ante* - Fixed Effects Model

	Dependent Variable: $g_{i,t|t}$			
Variable	**Coefficient**	**Std. Error**	**T-Stat**	**Signif.**
$y_{i,t|t}$	0.61	0.08	7.21	0.00
Belgium	-0.05	0.50	-0.09	0.93
Germany	0.81	0.51	1.59	0.11
Estonia	-0.54	0.54	-1.01	0.32
Ireland	-1.94	0.55	-3.52	0.00
Spain	-2.30	0.50	-4.56	0.00
France	0.07	0.50	0.13	0.89
Italy	-0.61	0.49	-1.23	0.22
Luxembourg	-0.16	0.55	-0.29	0.77
Malta	-1.36	0.56	-2.42	0.02
The Netherlands	-0.07	0.50	-0.14	0.89
Austria	-0.33	0.51	-0.65	0.51
Slovenia	-1.62	0.51	-3.19	0.00
Slovakia	-1.96	0.54	-3.61	0.00
Finland	-0.21	0.50	-0.42	0.68
Latvia	-0.21	0.56	-0.38	0.71
Lithuania	-0.51	0.56	-0.91	0.36
Bulgaria	0.44	0.53	0.83	0.41
Czech Republic	-1.04	0.52	-2.00	0.05
Denmark	0.06	0.51	0.11	0.91
Hungary	-1.44	0.54	-2.68	0.01
Poland	0.30	0.56	0.54	0.59
Romania	0.05	0.56	0.08	0.93
Sweden	0.05	0.54	0.09	0.93
United Kingdom	-0.28	0.51	-0.54	0.59
F(24,167)=	3.01463 (with significance level of 0.00)			

Note: N = 192, Panel (8) of annual data from 2011 – 2018

Table 2. The Cyclicality of Fiscal Policy *Ex-post* - Fixed Effects Model

	Dependent Variable: $g_{i,t}$			
Variable	**Coefficient**	**Std. Error**	**T-Stat**	**Signif.**
$y_{i,t}$	0.23	0.07	3.54	0.00
Belgium	0.36	0.69	0.52	0.60
Germany	1.40	0.69	2.02	0.04
Estonia	1.00	0.73	1.37	0.17
Ireland	-0.22	0.84	-0.26	0.79
Spain	-0.32	0.69	-0.46	0.64
France	1.00	0.69	1.45	0.15
Italy	-0.60	0.68	-0.88	0.38
Luxembourg	2.11	0.70	3.00	0.00
Malta	3.05	0.77	3.95	0.00
The Netherlands	0.08	0.69	0.11	0.91
Austria	0.50	0.69	0.72	0.47
Slovenia	-0.16	0.69	-0.23	0.82
Slovakia	1.12	0.71	1.58	0.12
Finland	0.35	0.69	0.51	0.61
Latvia	1.76	0.72	2.43	0.02
Lithuania	-0.55	0.72	-0.76	0.45
Bulgaria	0.95	0.70	1.36	0.18
Czech Republic	0.34	0.70	0.48	0.63
Denmark	0.23	0.69	0.33	0.74
Hungary	1.04	0.70	1.47	0.14
Poland	1.19	0.72	1.65	0.10
Romania	0.38	0.73	0.53	0.60
Sweden	0.95	0.70	1.36	0.17
United Kingdom	0.29	0.69	0.42	0.68
F(24,167)= 1.77 (with significance level of 0.00)				

Note: N = 192, Panel (8) of annual data from 2011 – 2018

Table 3. The Cyclicality of Fiscal Policy *Ex-post* Government Consumption growth rate Regressed on *Ex-ante* GDP growth rate - Fixed Effects Model

	Dependent Variable: $g_{i,t}$			
Variable	**Coefficient**	**Std. Error**	**T-Stat**	**Signif.**
$y_{i,t\|t}$	0.55	0.11	4.81	0.00
Belgium	0.01	0.68	0.02	0.99
Germany	1.02	0.68	1.49	0.14
Estonia	0.45	0.73	0.61	0.54
Ireland	-0.11	0.74	-0.14	0.89
Spain	-0.80	0.68	-1.17	0.24
France	0.62	0.68	0.92	0.36
Italy	-0.84	0.66	-1.26	0.21
Luxembourg	1.08	0.75	1.45	0.15
Malta	2.58	0.76	3.41	0.00
The Netherlands	-0.28	0.68	-0.41	0.68
Austria	-0.02	0.69	-0.03	0.97
Slovenia	-0.58	0.69	-0.85	0.40
Slovakia	0.32	0.73	0.44	0.66
Finland	-0.14	0.68	-0.20	0.84
Latvia	0.84	0.76	1.11	0.27
Lithuania	-1.46	0.76	-1.93	0.06
Bulgaria	0.24	0.71	0.34	0.74
Czech Republic	-0.16	0.70	-0.23	0.82
Denmark	-0.23	0.68	-0.33	0.74
Hungary	0.26	0.72	0.36	0.72
Poland	0.23	0.76	0.30	0.76
Romania	-0.50	0.76	-0.66	0.51
Sweden	0.06	0.72	0.08	0.94
United Kingdom	-0.21	0.69	-0.30	0.77
F(24,167)= 1.33613 (with significance level of 0.148)				

Note: N = 192, Panel (8) of annual data from 2011 – 2018

Table 4. Test of Forecast Rationality - Fixed Effects Model

Variable	Dependent Variable: $y_{i,t}$			
	Coefficient	**Std. Error**	**T-Stat**	**Signif.**
$y_{i,t\|t}$	0.97	0.11	8.53	0.00
Belgium	0.11	0.68	0.16	0.87
Germany	0.39	0.69	0.57	0.57
Estonia	1.25	0.73	1.71	0.09
Ireland	4.52	0.75	6.06	0.00
Spain	-0.26	0.68	-0.39	0.70
France	0.08	0.68	0.11	0.91
Italy	-0.36	0.67	-0.54	0.59
Luxembourg	-0.29	0.75	-0.39	0.70
Malta	2.34	0.76	3.09	0.00
The Netherlands	0.22	0.68	0.32	0.75
Austria	0.00	0.69	0.00	1.00
Slovenia	0.30	0.69	0.44	0.66
Slovakia	0.27	0.73	0.37	0.71
Finland	-0.27	0.68	-0.40	0.69
Latvia	0.45	0.76	0.59	0.56
Lithuania	0.48	0.76	0.64	0.52
Bulgaria	0.13	0.71	0.18	0.86
Czech Republic	0.45	0.70	0.64	0.52
Denmark	0.01	0.68	0.02	0.99
Hungary	0.12	0.72	0.17	0.86
Poland	0.33	0.76	0.44	0.66
Romania	0.65	0.76	0.86	0.39
Sweden	-0.29	0.73	-0.39	0.70
United Kingdom	0.24	0.69	0.34	0.73
F(24,167)=	2.18 (with significance level of 0.00)			

Note: N = 192, Panel (8) of annual data from 2011 – 2018

Table 5. Test of Biases in Government Expectations Formation - Fixed Effects Model

	Dependent Variable $y_{i,t|t}$			
Variable	**Coefficient**	**Std. Error**	**T-Stat**	**Signif**
$y_{i,t-1}$	0.29	0.04	7.67	0.00
Belgium	0.70	0.41	1.70	0.09
Germany	0.84	0.41	2.03	0.04
Estonia	1.33	0.43	3.08	0.00
Ireland	1.15	0.49	2.34	0.02
Spain	1.09	0.41	2.66	0.01
France	0.76	0.41	1.87	0.06
Italy	0.41	0.41	1.01	0.32
Luxembourg	2.24	0.42	5.36	0.00
Malta	1.74	0.46	3.81	0.00
The Netherlands	0.84	0.41	2.06	0.04
Austria	1.10	0.41	2.68	0.01
Slovenia	1.09	0.41	2.64	0.01
Slovakia	1.81	0.42	4.31	0.00
Finland	0.77	0.41	1.90	0.06
Latvia	2.18	0.43	5.10	0.00
Lithuania	1.78	0.43	4.15	0.00
Bulgaria	1.49	0.42	3.59	0.00
Czech Republic	1.26	0.41	3.03	0.00
Denmark	0.96	0.41	2.34	0.02
Hungary	1.77	0.42	4.25	0.00
Poland	2.18	0.43	5.12	0.00
Romania	2.39	0.43	5.53	0.00
Sweden	1.66	0.42	4.00	0.00
United Kingdom	1.15	0.41	2.79	0.01
F(24,167)= 6.50 (with significance level of 0.00)				

Note: N = 192, Panel (8) of annual data from 2011 – 2018

Figure 1: Country-specific Average GDP Forecast Error (%), 2011 – 2018