The credibility of government plans: a real-time perspective [§]

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Abstract

Should rational agents take into consideration government policy announcements? A skilled enough agent (an econometrician) could set up a model to combine the following two pieces of information in order to unveil the future course of fiscal policy in real-time: (i) the ex ante path of policy as published/announced by the government; (ii) incoming, observed data on the actual degree of implementation of ongoing plans. Following this approach, we formulate and estimate empirical models to show that government targets may convey useful information about ex post policy developments in certain circumstances, in particular when policy changes drastically, and even when past credibility is low, and when there is limited information about the implementation of plans (e.g. at the beginning of a fiscal year). Our approach complements a well-established branch of the literature that finds politically-motivated biases in policy targets. We carry out our analysis for government consumption in a number of European countries using a data sample that covers the period 1995Q1-2013Q4.

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1. Introduction

Some recent literature convincingly argues that uncertainty about government policies has been detrimental to economic growth over the past few years.[1] In fact, policy-induced uncertainty has increased to record levels since the Great Recession. In addition, uncertainty about the composition of the timing and composition of fiscal consolidations may matter for the success of such consolidation (Bi, Leeper and Leith, 2011) and may fundamentally affect medium-term macroeconomic projections and thus policy actions designed in reaction to a given perceived economic situation (Blanchard and Leith, 2013).

The uncertainty about fiscal policies in real-time boils down to the issue of the credibility of government plans.[2] These plans determine specific tax changes and spending programmes, and as such shape a number of economic agents' decisions and actions.[3] Nevertheless, the ability of ex ante budgetary plans to convey information about the ex post course of fiscal policies may be blurred by the presence of political bias and strategic behaviour by governments, as shown by a well-established branch of the literature.[4] Indeed, a large strand of the literature has analyzed from theoretical and empirical points of view the potential bias the political and institutional process might have on government fiscal policy plans, as well as the nature and properties of budgetary deviations from targets. For the case of European Union (EU) governments, this literature tends to find empirical evidence in favour of the existence of systematic political and institutional biases in revenue forecasting, while the evidence for the US is mixed, depending on the institutional coverage of the analysis (Federal government or States).[5]

In this paper we address the issue of the information content of budgetary plans from a real-time perspective. We adopt the point of view of an agent that wishes to obtain an informed and independent estimate about the future course of fiscal policy during the year. To do so, the agent (econometrician) sets out a model at the quarterly frequency in which she/he combines all the available information: announced (ex ante) forward-looking government plans, and high

[1] See e.g. Ayhan and Terrones (2012) or Baker and Davis (2102).

[2] Cowan et al. (2000) argue that the credibility of policy is critical to the success of policy in many areas, ranging from monetary policy to patent policy to tax incentives.

[3] Even the late publication of budget laws may impinge on the credibility of plans and penalize the financing costs of the government (Andersen, Lassen, and Westh, 2014).

[4] The theoretical literature on the characterization and determinants of policy credibility is quite large. An early survey is provided by Persson (1988).

[5] Some empirical papers that look at the properties and determinants government plans are Auerbach (1999), Jonung and Larch (2006), Boylan (2008), Leal et al. (2008), Beetsma et al. (2009), von Hagen (2010), Pina and Venes (2011), Frankel (2011), Jong-a-Pin et al. (2012), Frankel and Schreger (2013a, 2013b), Merola and Pérez (2013) or Kron (2014), among others.

frequency fiscal data on the (ex post) implementation of current (ongoing) government plans.[6] At each point in time, this approach allows the agent to weight in her/his forecast function what the government says it will do, and what the government is actually doing. In this respect we adopt an ex ante, real-time view, compared to the traditional post-mortem exercise in the related literature that dissects the determinants of ex post budgetary deviations.

In practical terms, we set out state-of-the-art, mixed-frequencies, time-series factor models, along the lines of Camacho and Pérez-Quirós (2010) that provide a natural framework to integrate announced plans, at the annual frequency, with data on the implementation of the plans, at the quarterly frequency. We take government consumption to be the fiscal variable defining policy in our empirical exercises, and focus on the euro area economy, namely Germany, France, Italy and Spain, as all these countries have been recently subject to fiscal consolidation processes but at different degrees of intensity.[7]

Following this approach we show that government targets may convey useful information about ex post policy developments in certain circumstances, in particular when policy changes drastically (e.g. in episodes of strong market pressure) and when there is limited information about the implementation of plans (e.g. at the beginning of a fiscal year or just around a policy change). This helps qualifying the above-mentioned, well-established results from a related literature that would advise against paying too much attention to policy targets, given that they are found to display politically-motivated biases.

The rest of the paper is organized as follows. In Section 2 we develop further the main contribution of the paper. In Section 3 we describe the data used. In Section 4 we present the models, and in Section 5 the empirical experiments carried out and the main results. Section 6 provides some conclusions and policy implications.

2. Learning about the government plan

At each quarter *t* of a given year *T* economic agents observe the government plan $\bar{g}^T$ for that very year for a given fiscal variable g^T, that denotes the rate of growth of government consumption. They can also find from official publications the track record of the government

[6] A recent literature in the field of short-term forecasting that has shown that the use of high-frequency fiscal data may improve budget forecasting and monitoring. See, e.g. Silvestrini et al. (2008), Pedregal and Pérez (2010), and Asimakopoulos et al. (2013), and the references quoted therein.

[7] In addition, focusing on EU countries has the advantage that EU fiscal rules prescribe the publication of multi-annual fiscal plans (that encompass the most recent budget) at the same date, and according to comparable statistical standards.

in living up to its past years' plans, i.e they can compute the sequence of budgetary deviations given by

$$\Psi_T = \left\{ g^{T-j} - \bar{g}^{T-j} \right\}_{j=T-1}^{1} \tag{1}$$

In a stochastic world, a government that has met its commitments in the past would present a sequence Ψ_T with zero mean, no autocorrelation and probably a low variance. It would also be expected that fiscal plans of a government with a poor track record (i.e. Ψ_T being a sequence with a non-zero mean/bias, or in general not efficient) would be assigned a very low weight by agents when trying to predict the future course of policy.

At the same time, in each quarter *t* of year *T* agents observe the time series of actual government consumption, $\Phi_{t,T} = \left\{ g_{t \in J}^{J} \right\}_{J=1}^{T}$, and may assess how consistent are these realized values with reaching the target for the current year $\bar{g}^T$. To compute an optimal projection of g^T at each quarter *t* of year *T*, one can optimally combine backward-looking data, $\Phi_{t,T}$, with forward-looking data (target), $\bar{g}^T$, conditional on Ψ_T and all the other available information, in a general model of the form $F\left(\Phi_{t,T}; \bar{g}^T / \Psi_T\right)$. The need to combine these two sources of information arises from the fact that the ability of the government to set $g^T = \bar{g}^T$ decreases as the quarters within the year go by if the cumulated sequence of quarterly data $\left\{ g_{t \in J}^{J} \right\}_{J=T}$ drifts away from the annual target $\bar{g}^T$. At the same time, if the cumulated sequence of data is assessed to be consistent with reaching the target, this would make the agent more confident on $\bar{g}^T$ even irrespective of the track record Ψ_T being good or bad.

Confronting $\bar{g}^T$ with $\left\{ g_{t \in J}^{J} \right\}_{J=T}$ every quarter is thus a learning device to help based behavioural decisions. Economic agents, by making use of $F\left(\Phi_{t,T}; \bar{g}^T / \Psi_T\right)$ can update their whole-year projection every quarter to take into account revealed data on the actual implementation of the plan. Given the standard delays in data publication by most national statistical institutes worldwide, updating this learning process might be useful for an analyst even after the calendar year is over, given that the final quarterly and annual figures for macro and fiscal aggregates for a given calendar year are typically published with a delay of two to three months.

As mentioned above, with this setup at hand we address the issue of the information content of budgetary plans from a real-time perspective. We casts an $F\left(\Phi_{t,T};\bar{g}^{T}/\Psi_{T}\right)$ model at the quarterly frequency in which we combine announced (ex ante) forward-looking government plans ($\bar{g}^{T}$), and high frequency fiscal data on the (ex post) implementation of ongoing plans ($\left\{g_{t\in J}^{J}\right\}_{J=T}$).[8] Thus, we adopt an ex ante, real-time view, compared to the traditional post-mortem exercise in the related literature on the determinants of ex post budgetary deviations.

In particular, we are interested in three baseline cases. First, a case in which the economic agent estimates the weighting function/"policy rule" $F\left(\Phi_{t,T};\bar{g}^{T}/\Psi_{T}\right)$, and projects g^{T} accordingly. Second, a case in which the agent does not take into account the past performance of the government when assessing the informational value of the forecast for the current year, i.e. in practice she/he assumes that $\Psi_{T}=0_{1\times T}$ in equation (1). This case is relevant from the real-time point of view in such cases such as for example when a newly appointed government wants to pursue a given policy and credibly commits to it, aiming at *starting from scratch* with past policy practices. Finally, a case in which the agent totally disregards the target $\bar{g}^{T}$, and projects g^{T} only on the basis of observed (backward-looking) data on the implementation of the plans.

In the following sections we will be more specific about all aspects of this general setup.

3. Some definitions and data issues

3.1. Government consumption

In the paper *g* is quarterly government consumption, as defined by the National Accounts. Compared to the prior literature looking at government targets that typically edges on annual fiscal deficits this allows us to integrate a macroeconomic perspective together with the public finance one. Indeed, *g* is a direct demand component of GDP, which represents about 15%-20% of GDP in advanced economies, and as such tends to receive specific and detailed attention when governments prepare their macroeconomic projections. At the same time, given the core role of GDP in national statistical systems, the availability of quarterly data is much richer than for standard public finance variables, in particular as regards the decomposition of nominal values between volumes and prices, as well as the availability of seasonally-adjusted data.

[8] A recent literature in the field of short-term forecasting that has shown that the use of high-frequency fiscal data may improve budget forecasting and monitoring. See, e.g. Silvestrini et al. (2008), Pedregal and Pérez (2010), and Asimakopoulos et al. (2013), and the references quoted therein.

Maybe because of this latter fact, most studies looking at the macroeconomic effects of "government spending shocks" have mainly paid attention to government consumption.[9] In addition, *g* is the only fiscal variable for which EU governments are obliged to publish their yearly target in both real (value) and nominal (volume) terms, in the framework of the publication of annual Stability and Convergence Programme (SP).

3.2. Data issues

The real-time dimension of our study and the quarterly frequency adopted, introduce the need to fine-tune the information set that would have been available to an analysts at each quarter. Available high frequency variables, notwithstanding, are heterogeneous in our case of interest, and tend to be related either to the real part of *g*, to the price part, or to the interaction of both (nominal terms). This is due to the fact that *g* covers spending in goods and services that are provided, broadly speaking, at no cost for the user: defense, judicial system, education, health, etc. In order to find suitable indicators of these activities, it is important to acknowledge that in National Accounts a great deal of these activities is accounted for at the cost of production, i.e. through the wage bill. In general, the distinction between the wage and the non-wage parts of *g* turned out to be instrumental for the selection of a number of indicators that are related to the real or price parts of *g* through the respective wage and non-wage parts in each case. For example, the evolution of real *g* is related to that of public employment, and the evolution of the deflator of *g* is linked to that of public wages per employee. In addition, given the importance of government consumption as a component of overall public spending (some 50% in the average OECD economy), we were able to find a number of timely-available, direct indicators on nominal budgetary execution. Despite the fact that the latter present the problem of being published in non-seasonally adjusted terms, it tends to present the best alternative given that provides a direct measure of *g*, even though typically for the central government sector, what might be important for highly fiscally decentralized countries like Germany and Spain.

After the extensive data search, nevertheless, we constraint ourselves in this study to a subset of variables that is available for the four countries under consideration and it is broadly homogeneous for all of them. Specifically, the variables included in our analysis cover the period 1995Q1-2013Q4 and are the following for each one of the considered cases (Germany, France, Italy and Spain): (i) quarterly seasonally-adjusted real government consumption, g^R; (ii) deflator of quarterly seasonally-adjusted government consumption, g^D; (iii) proxy to public employment in national accounts, N^R (quarterly seasonally-adjusted "non-market services"); (iv)

[9] See e.g. Ramey (2011) and the references quoted therein.

wages per public employee in national accounts, W^P (quarterly seasonally-adjusted "non-market services"); (v) Central government consumption expenditure, G^{RP} (monthly nominal, non-seasonally adjusted); (vi) Combined index of HICP Health (prices) and HICP Education (prices), p^P (monthly, non-seasonally adjusted); (vii) Annual planned government consumption from the Stability Programmes in real (g^{Rf}) and nominal (g^{Df}) terms.

3.3. The information flow

The flow of incoming information is described in Figure 1. Annual targets taken from the Stability Programmes (SPs) are assumed to be known only in the second quarter of the year. This is to us a fair representation of actual publication dates. Indeed, as of 2010 they have been published by governments in April, in the framework of the so-called European Semester. Before then, SPs were published typically at the very beginning of each year, but were followed in Spring by European Commission's (EC) validation in the form of a report. In the latter case we assume that plans were internalized by economics agents only after the publication of EC's report. As regards variables published at the monthly frequency, in turn, are typically known shortly after the month ends, while quarterly national accounts' data are published with a delay of 90 days.

3.4. Related literature

As mentioned above, the literature on fiscal forecasting offers only limited help to frame our paper. On the one hand, the articles more conceptually-related to ours quoted in the Introduction focus on the analysis of the determinants of ex post budgetary deviations (i.e. the difference between actual values and governments' forecasts), without entering into the vagaries of the elaboration of the fiscal forecast. On the other hand, the papers on short-term fiscal forecasting, also mentioned above, tend to concentrate on the impact of backward-looking fiscal information on the fiscal projection, and do not internalize the forward-looking targets. Within the literature on short-term macro forecasting few studies deal with the individual components of GDP. Indeed, GDP is typically forecast from an aggregate point of view (see Camacho and Pérez-Quirós, 2010, or Bandura et al., 2010, and the references quoted therein). Exceptions are Baffigi et al. (2004), that follow a demand-side approach, Hahn and Skudelny (2008), that follow a supply-side approach, or Foroni and Marcellino (2013), that look at both sides of GDP. In these papers, nevertheless, *g* and the relevant supply-side counterparts tend to be forecast by means of univariate methods, or considered to be a residual variable difficult to model. Finally, another set of papers consider the elaboration of optimal government forecasts with a view to orient the

ex ante design of policies (see, for early contributions Johansen, 1972, Granger, 1973, Johansen and Hersoug, 1975).

3.5. Some stylized facts

In figures 2 and 4 we present real and price government consumption figures at the annual frequency against the corresponding targets for the four countries under study and the period 2006-2013. For g^R (Figure 2) it is apparent that in most of the cases ex post data (the dotted line) were above initial targets (the solid lines). It happens for Spain in all the years and for France in all but 2006, while for Germany and Italy this is the case in all years with the exception of 2010-2012. Thus, overall, one may say that governments spent more than they initially were committed to, i.e presented a pro-spending bias. At the same time, though, over time observed values followed the apparent change in policy in Spain and Italy, countries that moved from positive registers of g^R over 2006-2009/2010 to (strongly) negative rates of change in 2010-2013. Despite missing the initial targets, it seems that the change in policies had a persistent effect on the conduction of actual policies in those countries.

Interestingly, the overall picture for g^D (Figure 4) is broadly the opposite. Governments predicted higher public wages and purchases' prices than recorded ex post. This means that in terms of nominal government expenditure consumption the pro-spending bias was somewhat mitigated, leading in some cases to data being in line with initial targets. These observations do not need to be contradictory among them. In times of fiscal stress governments have incentives to report higher GDP real growth than expected, i.e. to present a conservative bias in their economic forecast, which may be partially achieved by having more g^R, a component that weights some 20% of the total. At the same time, governments also have incentives to meet their fiscal targets, especially in the framework of a euro-wide public debt crisis.

On may ask the question of whether despite the fact that g^R targets infra estimated actual values, it could be the case that in a framework of peer pressure to put public finances under control, some policy actions were taken to change an initially spending-loose course of action, once in the public debt-crisis period. This is what we try to answer with the material included in figures 3 and 5. In those figures we present forecasts for g^R and g^D computed on the basis of a purely backward-looking model, a second order autoregressive model, AR(2), that completely disregards any forward-looking elements of policy not incorporated in the inertia of the series themselves. We present forecasts done at the time of the first quarter of each year. Focusing on Spain and Italy, the two countries under more close EU-wide peer pressure, it is clear from figures 3 and 5 that both g^R and g^D tend to present lower growth rates than forecast with the

AR(2) in Q1 of each year. This is in line with the change of policy regime (from positive to negative growth rates) taking place over time and the backward-looking model only capturing it with some delay.

4. The model

The heterogeneity in the data sources conditions the selection of the modeling approach. As briefly discussed above, to enrich the dataset available for forecasting we have to resort to monthly/quarterly indicators of the real component of *g*, the deflator component or a mixture of both (nominal). With this in mind we decided to pose a factor model with two factors, one for the real part and one for the price part. The details are as follows. The model is a factor model, written in a general state-space form as

$$\begin{aligned} Y_t &= H \times h_t^l + w_t \\ h_t &= F \times h_{t-1}^l + v_t \end{aligned} \tag{2}$$

where $H = (H_1, H_2)$, $h_t = (h_{1t}, h_{2t})$. The different vectors and matrices are described in detail in Appendix A [*to be added*]. Just to provide the most important intuitions we describe here the main equations. The vector of observed variables (all demeaned and logged) is

$$Y_t^l = \left(\Delta g_t^R, \Delta g_t^D, \Delta_4 N_t^R, \Delta_4 W_t^P, \Delta_4 G_t^{RP}, \Delta_4 p_t^P, \Delta g_t^{Rf}, \Delta g_t^{Df}\right) \tag{3}$$

The variables are decomposed into two common driving factors, the real (ρ_t) and the price (π_t) factors and an idiosyncratic component that follows an AR(2) structure with uncorrelated irregulars. The use of two factor is crucial for the integration of nominal variables in the model, and also for the joint use of real and price indicators. In (3), real government consumption, Δg_t^R, and public employment, $\Delta_4 N_t^R$, are linear functions of the real factor, while $\Delta g_t^D, \Delta_4 W_t^P$ and Δp_t^P depend only on the price factor π_t, like for example

$$\Delta p_t^P = \theta \left(\frac{1}{4}\pi_t + \frac{2}{4}\pi_{t-1} + \pi_{t-3} + \frac{3}{4}\pi_{t-4} + \frac{2}{4}\pi_{t-5} + \frac{1}{4}\pi_{t-6} \right)$$

Yet, the nominal government consumption indicator, expressed in year-on-year growth rates, is a function of both the real and the price factors such that:

$$\Delta G_t^{RP} = \delta_1 \left(\frac{1}{4}\rho_t + \frac{2}{4}\rho_{t-1} + \rho_{t-3} + \frac{3}{4}\rho_{t-4} + \frac{2}{4}\rho_{t-5} + \frac{1}{4}\rho_{t-6} \right) + \ldots$$
$$\delta_2 \left(\frac{1}{4}\pi_t + \frac{2}{4}\pi_{t-1} + \pi_{t-3} + \frac{3}{4}\pi_{t-4} + \frac{2}{4}\pi_{t-5} + \frac{1}{4}\pi_{t-6} \right)$$

Finally, the annual targets Δg_t^{Rf} and Δg_t^{Df} are combinations of cummulated quarterly observed values. The assumption is that, once demeaned, ex ante plans are equal to ex post data up to a random disturbance, i.e.

$$\Delta g_t^{Rf} = \Delta g_t^{R} + \lambda_t^{Rf} \tag{3a}$$

$$\Delta g_t^{Df} = \Delta g_t^{D} + \lambda_t^{Df} \tag{3b}$$

Thus, once both the observed and the target real/price government consumption variables have been computed as deviations from their own means, the historical discrepancies estimated between ex ante targets and ex post observed data amount to the moments of the λ_t^{Df} and λ_t^{Rf} random errors. Alternative models will differ in the way they approach (1), (3a) and (3b) above, i.e. in the way the targets enter the models.

5. Empirical exercises

5.1. Some general considerations

First, the empirical exercises that follow are of a pseudo real-time nature. This means that we implement courterfactual exercises assuming that the data available today for a past year/quarter/month was available at that time, i.e. we disregard the potential impact of data revisions in shaping the real-time decisions of policy makers. This approach is dictated by the lack of availability of consistent real-time data for our dataset.

Second, we use an AR(2) model as a naïve alternative to our factor models. This means that as a minimum we are going to check that the proposed models beat this alternative. It is worth mentioning that it is a well-established fact in the relevant forecasting literature that autoregresive models are hard-to-beat alternatives.

Third, we take two standard measures of forecasting performance. The standard Mean Squared Error, to compare the predictability of the relevant variables across countries, as well as the ratio of RMSEs of models to the AR(2) alternative. In any case, it is widely recognized in the

literature that the ratio of RMSEs, being a deterministic criterion, can be misleading in some cases because the differences among alternatives may not be significant from a statistical point of view. That is why the Diebold and Mariano test is employed, to test for the null hypothesis of no difference in the accuracy of two competing forecasts.

Fourth, as mentioned above, we are interested in three basic experiments, that can be described by playing with (3a) and (3b). One in which $\Delta g_t^{Rf} = \Delta g_t^R$, for $t< T$, being T the current year (the same for the deflator equation). From a real-time point of view this is a quite relevant case. By assuming that governments met their commitments in the past ("Perfect Past", i.e. as assuming that $\Psi_T = 0_{1\times T}$ in equation 1) the model will make relation (3a) and (3b) almost identities, only different because the time series of g_t^{Rf} used to estimate the model will have at each time one observation more than g_t^R, namely the one corresponding to the target for the current year T ("Imperfect Future") (that is we label this case *PP_IF*). The second case is one in which Ψ_T is made of the genuine difference between ex post actual values and ex ante government targets, and thus the estimation of the parameters in (3a) and (3b) should reflect the different historical accuracy/credibility of each government (*IP_IF* case). The third case is one in which equations (3a) and (3b) are excluded from the model, and thus the forward-looking information provided by the government targets is not taken into consideration (*NoT* case, i.e. "No Target").

Fifth, all the comparisons are going to be made on the basis of rolling forecasting exercise over the forecasting window 2006Q1 to 2013Q4.

5.2. Results

The main results of the paper are shown in tables 1 and 2, on the one hand, and figures 6, 7 and 8, on the other.

In Table 1 we present the forecast accuracy statistics: MSE, ratio of RMSE and DM. The following results are worth highlighting: (i) according to the MSEs, as regards 1-quarter-ahead forecasts, *g* is the least predictable for the country with the more marked policy change, i.e. Spain; (ii) overall the inclusion of targets is not very helpful to infer the current situation of ongoing plans, as judged by the 1-quarter-ahead forecasting capabilities of the different models; indeed, the *NoT* alternative is not beaten by the *PP_IF* and *IP_IF* ones; (iii) the consideration of the short-term information provided by the selected indicators is useful to infer short-term developments, as clear from the better forecasting performance of the NoT, PP_IF and IP_IF

alternatives versus the AR(2), that only uses information on the dynamics of government consumption (real and deflator).

Table 2, in turn, presents the results of the forecasts for the whole year, computed from each quarter on a recursive basis. There are also marked differences among MSEs between countries, in particular, both the real government consumption and the deflator are more easily predicted in Germany and France, and to a lesser extent Italy for g_t^R, than in the case of Spain. The fact that the variables of interest are more easily predicted makes the naïve forecasting alternative (the AR(2)) hard to beat in those countries. On the contrary, in particular for the case of Spain, and g_t^R, the three modeling alternatives (*IP_IF*, *PP_IF* and *NoT*) beat the AR(2). This initial result reflects the differences among countries in the policy stance. Indeed, in the case of Spain there was a change in policy (from fiscal expansion to fiscal consolidation) that gives some explanatory role to the short-term information and the targets, while in the cases of, in particular, Germany and France, the strong inertia of *g* policies is enough to anticipate future developments. Thus, the main result of Table 2 is that policy targets add information beyond the inertia of *g* and the one contained in the observed implementation of current plans. In particular, policy targets tie the annual forecast, what is valuable at times of policy changes (of particular interest is the case of Spain).

This result is reinforced by Figure 6 in which we dissect forecasts of g_t^R by forecast origin, showing forecast errors in this case, making clear how targets are useful especially at the beginning of the year, when little information is known about actual policies. Focusing on the case of Spain again, the *PP_IF* alternative performs better at forecast origins in Q1 and Q2, given that the information content on annual changes of observed data quarterly data is quite low, a fact that is clear when inspecting the *NoT* lines in particular in Q1 and for the years 2009-2012. As regards the *IP_IF* model projections, they lie in between the other two alternatives. As the government starts implementing the *g* plans (at least partially) in the successive quarters, the deviation displayed by the *IP_IF* and *NoT* alternatives get reduced, while at the same time *PP_IF* forecasts become less adaptative as they pose a significant weight on annual policy targets. At the end of the year, when the forecast horizon is Q4, the *PP_IF* forecast almost coincides with the target (for all the countries), even though, according to our timing convention only Q3 figures for g_t^R and the quarterly indicators are known so that the information set is far for being complete.

The latter point appears to be clearer in figures 7 and 8, where we look at the same information from the angle of iterative forecasts, i.e. we show how models learn and adapt throughout the

year to new incoming information. The *NoT* and *IP_IF* alternatives tend to approach the final outcome on a monotonous way, more quickly in the second case as the target convey useful information on the direction of change of g_t^R. On the other hand, as regards *PP_IF*, the learning process is even faster at the beginning of the year in the cases in the years in which the target is informative, but then as the quarters goes by, it ends up inheriting the "policy bias" of the target.

6. Conclusions

We show that ex ante government targets may convey useful information about ex post policy developments in certain circumstances, in particular when policy changes drastically, and even when past credibility is low, and when there is limited information about the implementation of plans (e.g. at the beginning of a fiscal year). Our approach complements a well-established branch of the literature that finds politically-motivated biases in policy targets.

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Table 1. Unveiling ongoing *g* plans: one-quarter-ahead forecasts

Germany

Real government consumption	MSE	Ratio of RMSE to AR(2)	Diebold-Mariano AR(2)	IP_IF_2f	PP_IF_2f
IP_IF_2f	0.41	0.96	-0.44		
PP_IF_2f	2.30	2.27	1.91	1.95	
NoT_2f	0.36	0.90	-1.76	-0.77	-1.99

Deflator of government consumption	MSE	Ratio of RMSE to AR(2)	Diebold-Mariano AR(2)	IP_IF_2f	PP_IF_2f
IP_IF_2f	0.19	1.00	-0.31		
PP_IF_2f	0.93	0.69	2.13	2.19	
NoT_2f	0.21	2.16	0.51	0.53	-2.06

Nominal government consumption	MSE	Ratio of RMSE to AR(2)	Diebold-Mariano AR(2)	IP_IF_2f	PP_IF_2f
IP_IF_2f	0.66	0.96	-0.31		
PP_IF_2f	1.57	1.49	1.93	2.40	
NoT_2f	0.57	0.90	-1.75	-0.69	-2.34

France

Real government consumption	MSE	Ratio of RMSE to AR(2)	Diebold-Mariano AR(2)	IP_IF_2f	PP_IF_2f
IP_IF_2f	0.04	1.01	0.09		
PP_IF_2f	2.06	6.94	2.02	2.02	
NoT_2f	0.04	0.99	-0.67	-0.15	-2.02

Deflator of government consumption	MSE	Ratio of RMSE to AR(2)	Diebold-Mariano AR(2)	IP_IF_2f	PP_IF_2f
IP_IF_2f	0.02	1.00	1.79		
PP_IF_2f	0.28	0.76	3.16	3.05	
NoT_2f	0.01	4.58	-1.11	-2.38	-3.18

Nominal government consumption	MSE	Ratio of RMSE to AR(2)	Diebold-Mariano AR(2)	IP_IF_2f	PP_IF_2f
IP_IF_2f	0.05	0.95	-0.50		
PP_IF_2f	2.02	6.18	2.06	2.07	
NoT_2f	0.05	0.96	-1.05	0.20	-2.07

Italy

Real government consumption	MSE	Ratio of RMSE to AR(2)	Diebold-Mariano AR(2)	IP_IF_2f	PP_IF_2f
IP_IF_2f	0.27	1.04	0.82		
PP_IF_2f	3.66	3.83	1.95	1.94	
NoT_2f	0.23	0.96	-1.93	-1.58	-1.97

Deflator of government consumption	MSE	Ratio of RMSE to AR(2)	Diebold-Mariano AR(2)	IP_IF_2f	PP_IF_2f
IP_IF_2f	7.26	1.00	1.65		
PP_IF_2f	15.08	1.05	1.31	1.06	
NoT_2f	3.19	2.09	-0.34	-2.18	-1.39

Nominal government consumption	MSE	Ratio of RMSE to AR(2)	Diebold-Mariano AR(2)	IP_IF_2f	PP_IF_2f
IP_IF_2f	7.79	1.38	1.54		
PP_IF_2f	22.67	2.36	1.80	1.65	
NoT_2f	3.62	0.94	-0.61	-2.13	-1.90

Spain

Real government consumption	MSE	Ratio of RMSE to AR(2)	Diebold-Mariano AR(2)	IP_IF_2f	PP_IF_2f
IP_IF_2f	2.18	0.88	-1.90		
PP_IF_2f	10.20	1.89	1.69	1.82	
NoT_2f	2.36	0.91	-1.62	0.83	-1.79

Deflator of government consumption	MSE	Ratio of RMSE to AR(2)	Diebold-Mariano AR(2)	IP_IF_2f	PP_IF_2f
IP_IF_2f	2.26	1.00	-0.41		
PP_IF_2f	6.24	0.80	1.78	1.75	
NoT_2f	2.20	1.62	-0.66	-0.32	-1.75

Nominal government consumption	MSE	Ratio of RMSE to AR(2)	Diebold-Mariano AR(2)	IP_IF_2f	PP_IF_2f
IP_IF_2f	5.20	0.96	-0.57		
PP_IF_2f	9.41	1.29	1.54	1.88	
NoT_2f	4.88	0.93	-1.42	-0.58	-1.94

Table 2. The role of policy targets and incoming-data in the anticipation of the yearly outcome of real government consumption

Germany

Real government consumption	MSE	Ratio of RMSE to AR(2)	Diebold-Mariano AR(2)	IP_IF_2f	PP_IF_2f
IP_IF_2f	0.32	0.93	-0.49		
PP_IF_2f	0.71	1.39	3.58	3.25	
NoT_2f	0.32	0.93	-1.27	-0.01	-3.59

Deflator of government consumption	MSE	Ratio of RMSE to AR(2)	Diebold-Mariano AR(2)	IP_IF_2f	PP_IF_2f
IP_IF_2f	0.16	0.90	-0.58		
PP_IF_2f	0.14	0.86	-0.68	-0.31	
NoT_2f	0.25	1.14	2.19	1.21	1.17

Nominal government consumption	MSE	Ratio of RMSE to AR(2)	Diebold-Mariano AR(2)	IP_IF_2f	PP_IF_2f
IP_IF_2f	0.33	0.75	-1.00		
PP_IF_2f	0.49	0.92	-0.47	1.98	
NoT_2f	0.52	0.95	-0.87	0.83	0.17

France

Real government consumption	MSE	Ratio of RMSE to AR(2)	Diebold-Mariano AR(2)	IP_IF_2f	PP_IF_2f
IP_IF_2f	0.08	1.11	0.50		
PP_IF_2f	0.48	2.74	3.41	3.83	
NoT_2f	0.06	0.98	-1.21	-0.61	-3.42

Deflator of government consumption	MSE	Ratio of RMSE to AR(2)	Diebold-Mariano AR(2)	IP_IF_2f	PP_IF_2f
IP_IF_2f	0.05	1.04	0.39		
PP_IF_2f	0.12	1.63	2.24	2.71	
NoT_2f	0.04	0.91	-0.91	-2.19	-2.97

Nominal government consumption	MSE	Ratio of RMSE to AR(2)	Diebold-Mariano AR(2)	IP_IF_2f	PP_IF_2f
IP_IF_2f	0.11	0.94	-0.32		
PP_IF_2f	0.45	1.87	2.56	3.44	
NoT_2f	0.11	0.93	-0.90	-0.08	-2.98

Italy

Real government consumption	MSE	Ratio of RMSE to AR(2)	Diebold-Mariano AR(2)	IP_IF_2f	PP_IF_2f
IP_IF_2f	0.54	1.00	0.00		
PP_IF_2f	1.01	1.37	1.89	1.81	
NoT_2f	0.48	0.95	-2.11	-0.44	-2.20

Deflator of government consumption	MSE	Ratio of RMSE to AR(2)	Diebold-Mariano AR(2)	IP_IF_2f	PP_IF_2f
IP_IF_2f	4.77	2.03	1.45		
PP_IF_2f	1.46	1.13	0.44	-1.35	
NoT_2f	1.68	1.21	1.24	-1.47	0.28

Nominal government consumption	MSE	Ratio of RMSE to AR(2)	Diebold-Mariano AR(2)	IP_IF_2f	PP_IF_2f
IP_IF_2f	5.71	1.51	1.18		
PP_IF_2f	3.07	1.11	0.57	-0.96	
NoT_2f	2.83	1.06	0.64	-1.26	-0.24

Spain

Real government consumption	MSE	Ratio of RMSE to AR(2)	Diebold-Mariano AR(2)	IP_IF_2f	PP_IF_2f
IP_IF_2f	1.18	0.62	-2.05		
PP_IF_2f	1.23	0.64	-1.47	0.12	
NoT_2f	2.23	0.86	-2.11	1.84	1.10

Deflator of government consumption	MSE	Ratio of RMSE to AR(2)	Diebold-Mariano AR(2)	IP_IF_2f	PP_IF_2f
IP_IF_2f	0.88	0.69	-1.96		
PP_IF_2f	1.51	0.90	-0.53	2.14	
NoT_2f	2.23	1.10	0.53	1.29	0.59

Nominal government consumption	MSE	Ratio of RMSE to AR(2)	Diebold-Mariano AR(2)	IP_IF_2f	PP_IF_2f
IP_IF_2f	2.62	0.61	-1.91		
PP_IF_2f	2.34	0.58	-1.63	-0.42	
NoT_2f	6.00	0.92	-0.97	1.94	1.63

Figure 1. Timing of data publication.

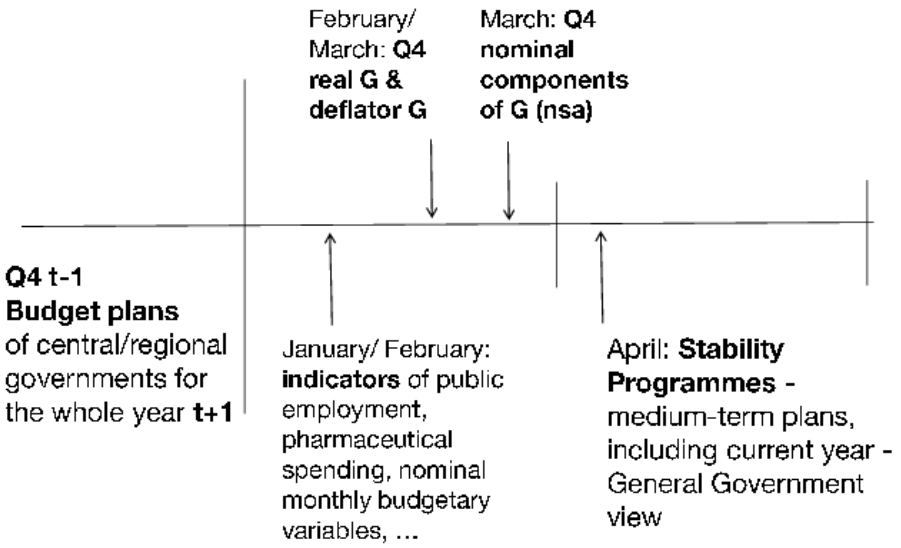


Figure 2. Bias in real government consumption targets.

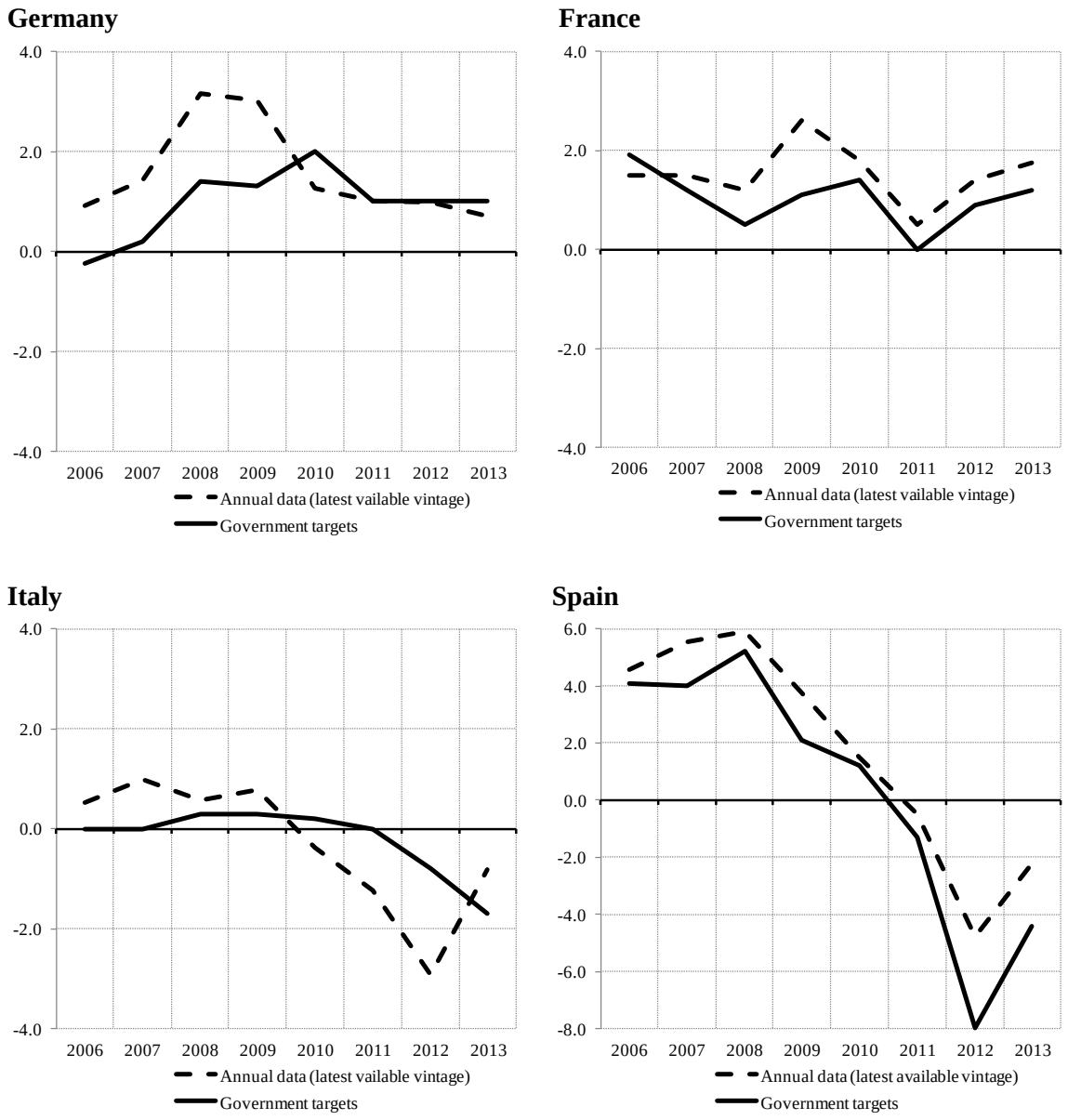
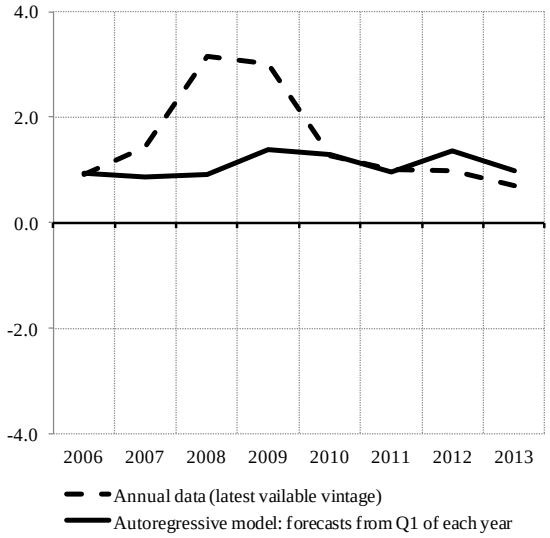
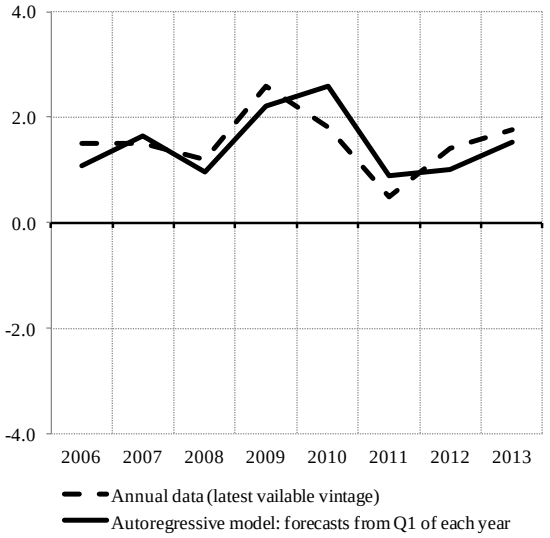


Figure 3. The predictability of real government consumption: the figure presents forecast produced with the model $g_t = \alpha + \rho_1 g_{t-1} + \rho_2 g_{t-2} + \zeta_t$ estimated with the information available in the first quarter of each year.

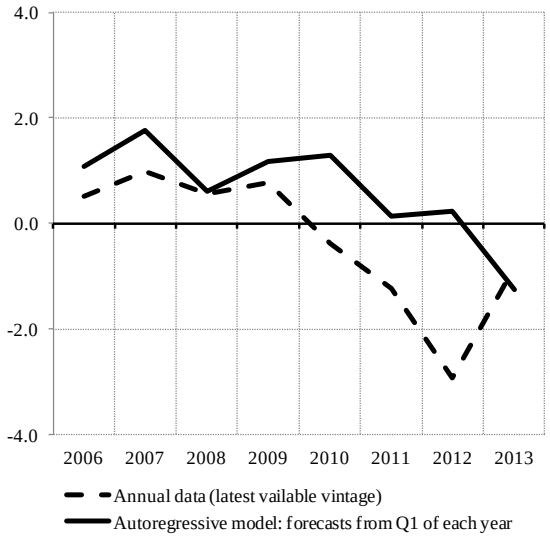
Germany



France



Italy



Spain

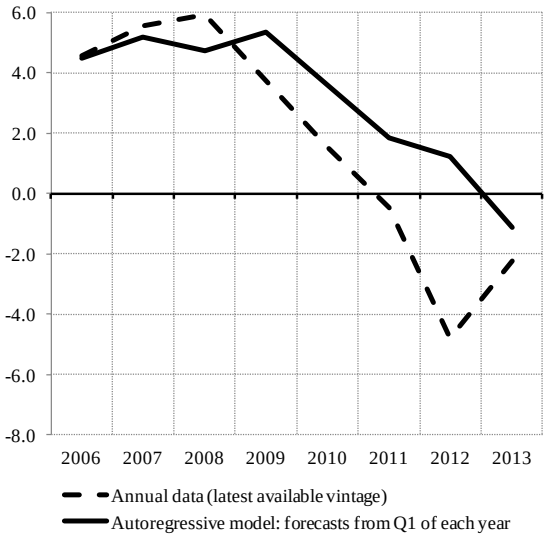
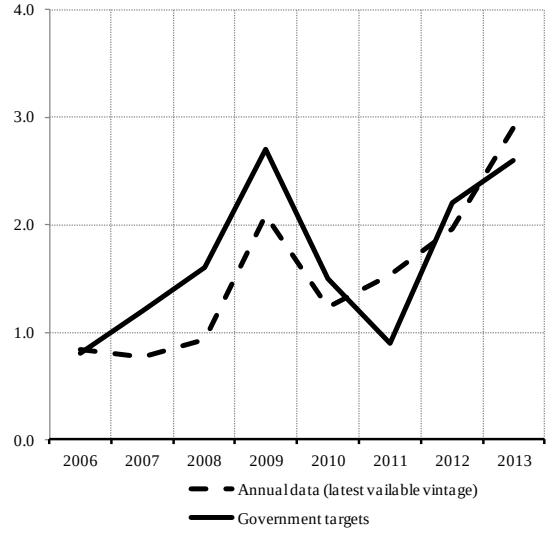
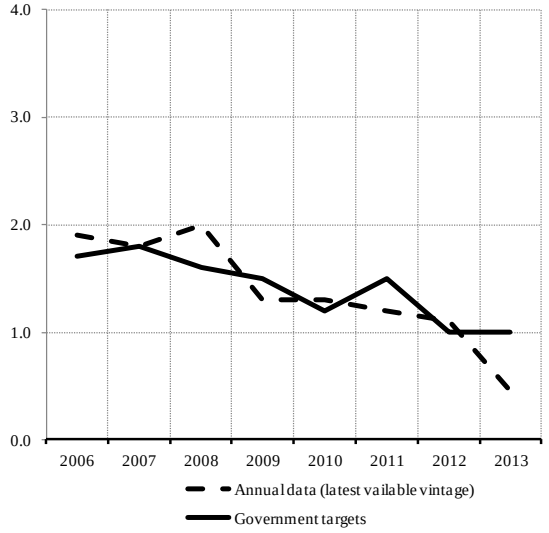


Figure 4. Bias in the price component of government consumption targets.

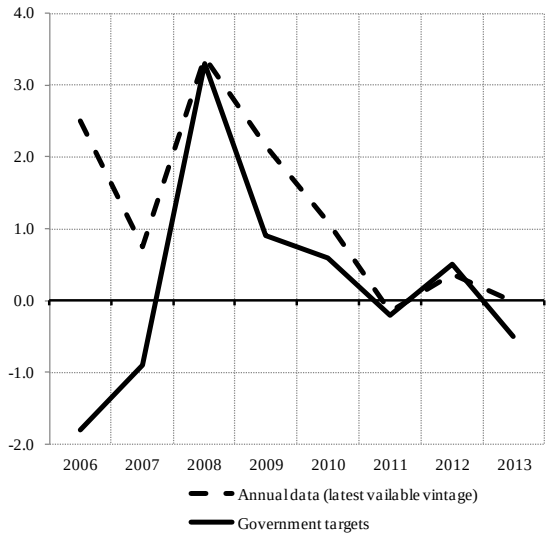
Germany



France



Italy



Spain

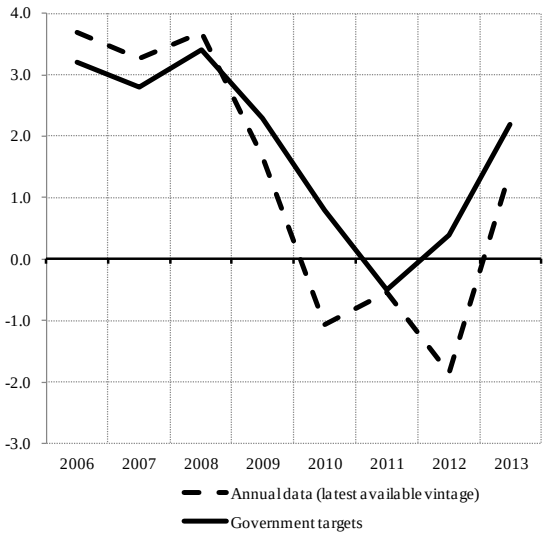
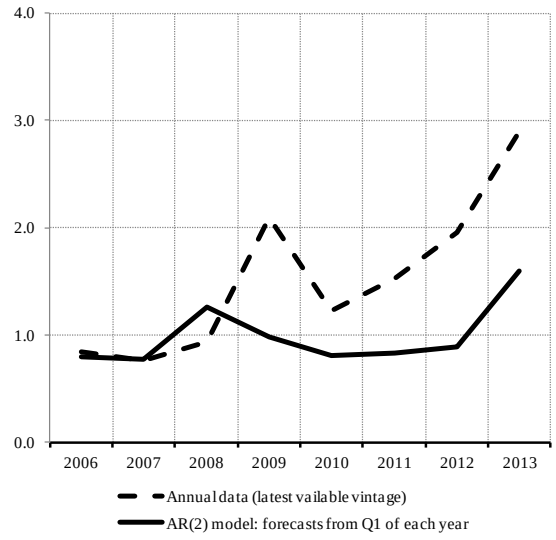
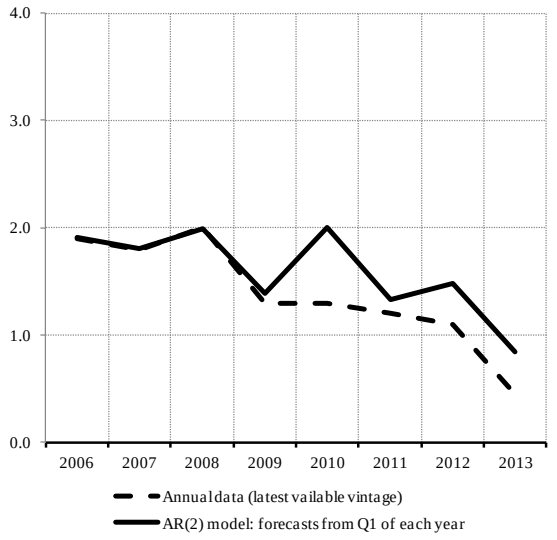


Figure 5. The predictability of the price component of government consumption: the figure presents forecast produced with the model $g_t = \alpha + \rho_1 g_{t-1} + \rho_2 g_{t-2} + \zeta_t$ estimated with the information available in the first quarter of each year.

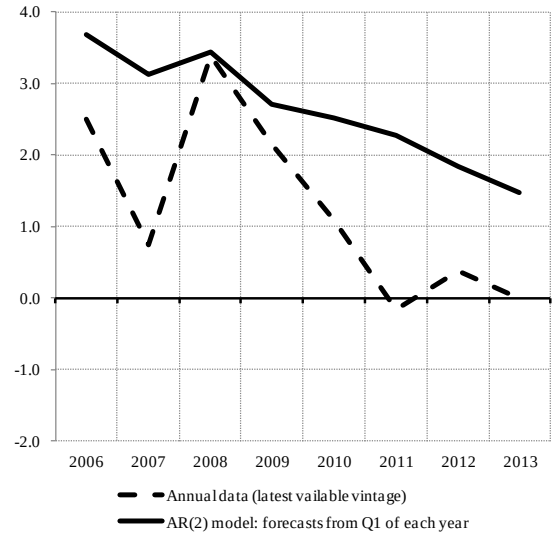
Germany



France



Italy



Spain

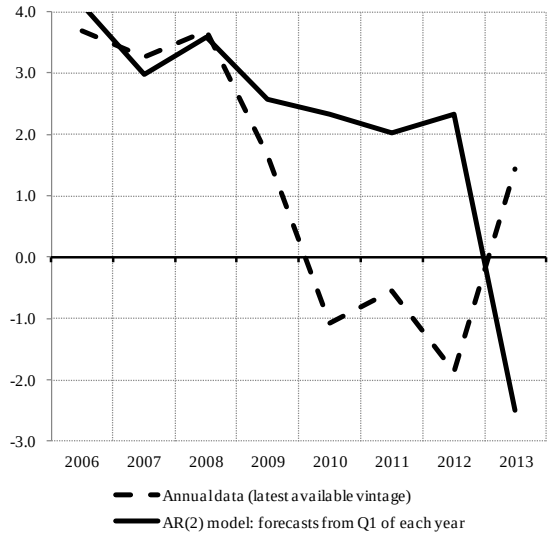
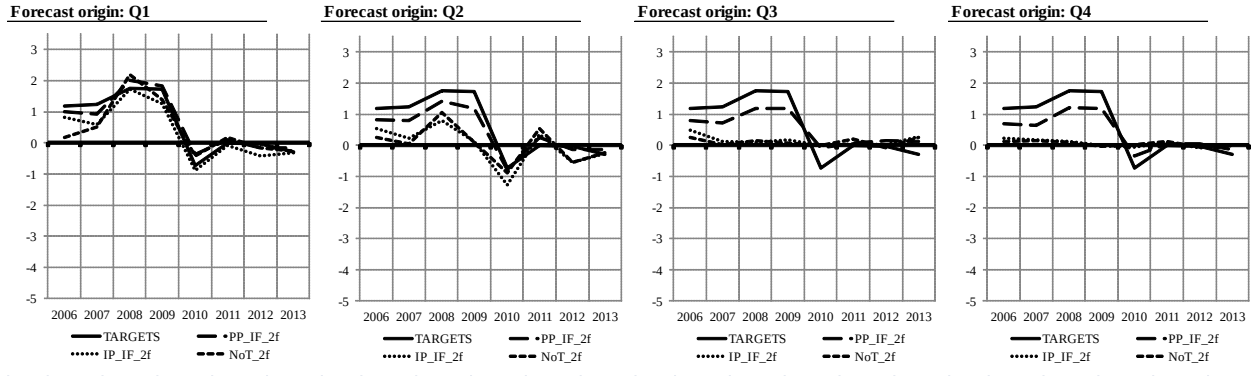
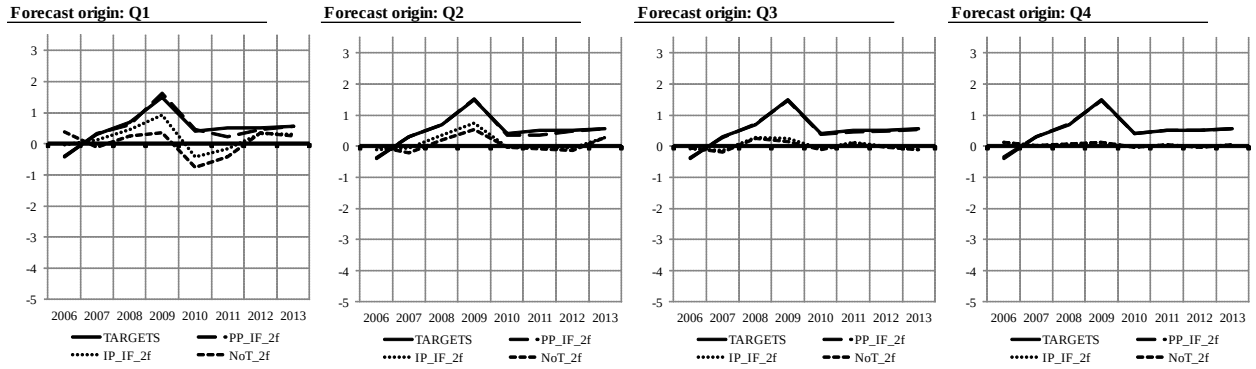


Figure 6. The role of the budgetary target in model projections of real government consumption: the figure presents forecast errors committed by each model from each forecast origin (Q1, Q2, Q3, Q4)

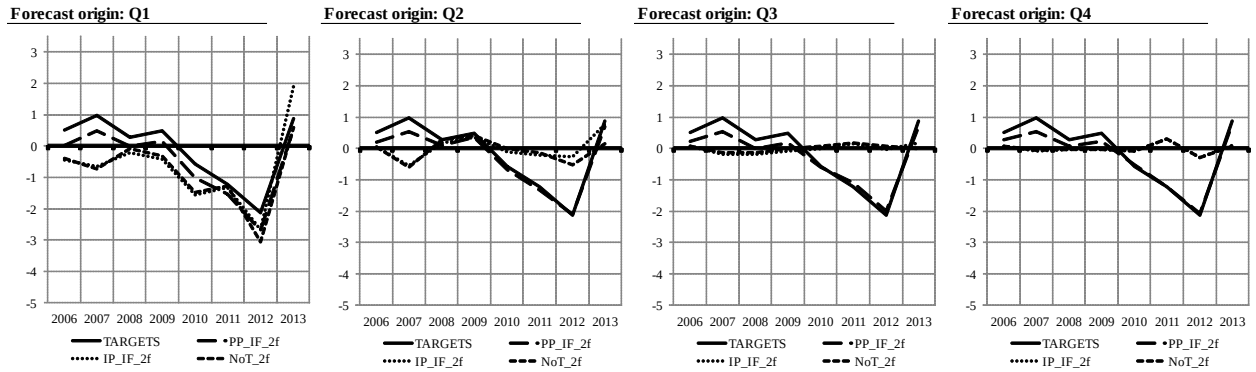
Germany



France



Italy



Spain

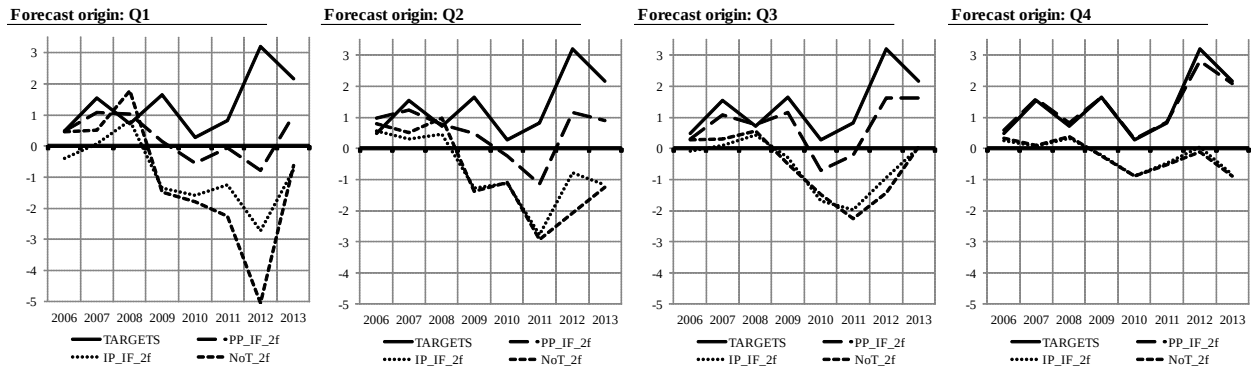
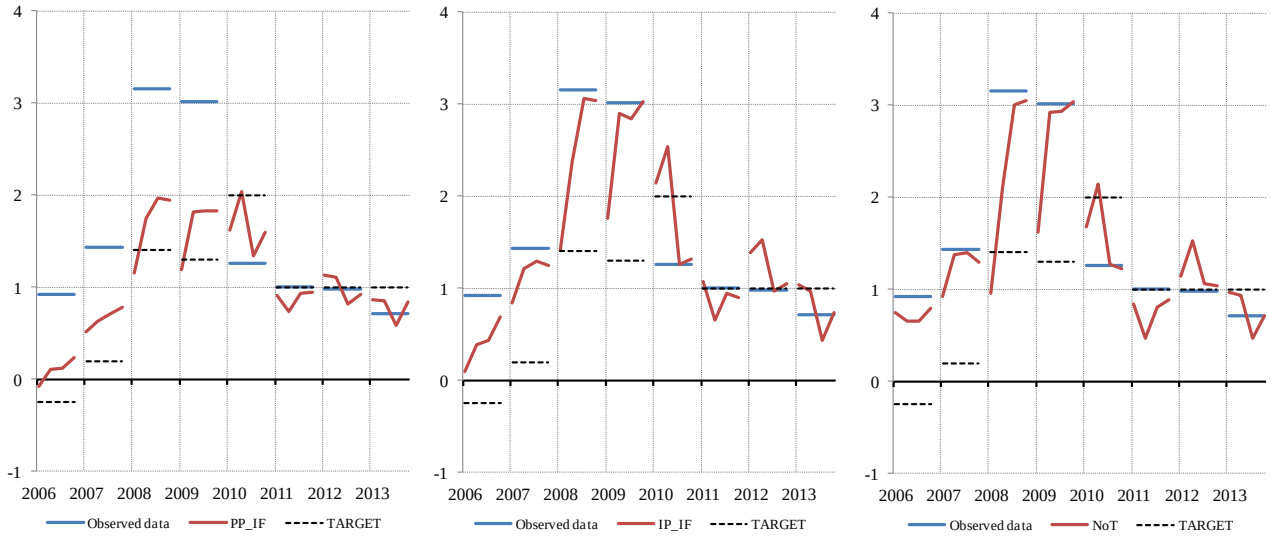


Figure 7. The evolution of the iterative real government consumption forecasts during the year ("learning").

Germany



France

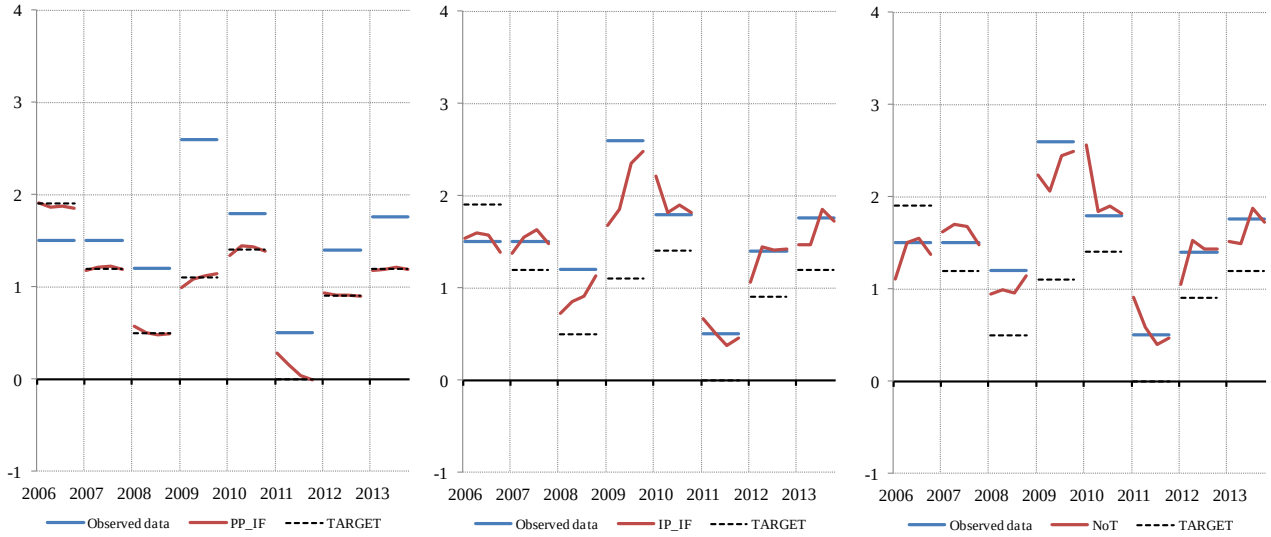
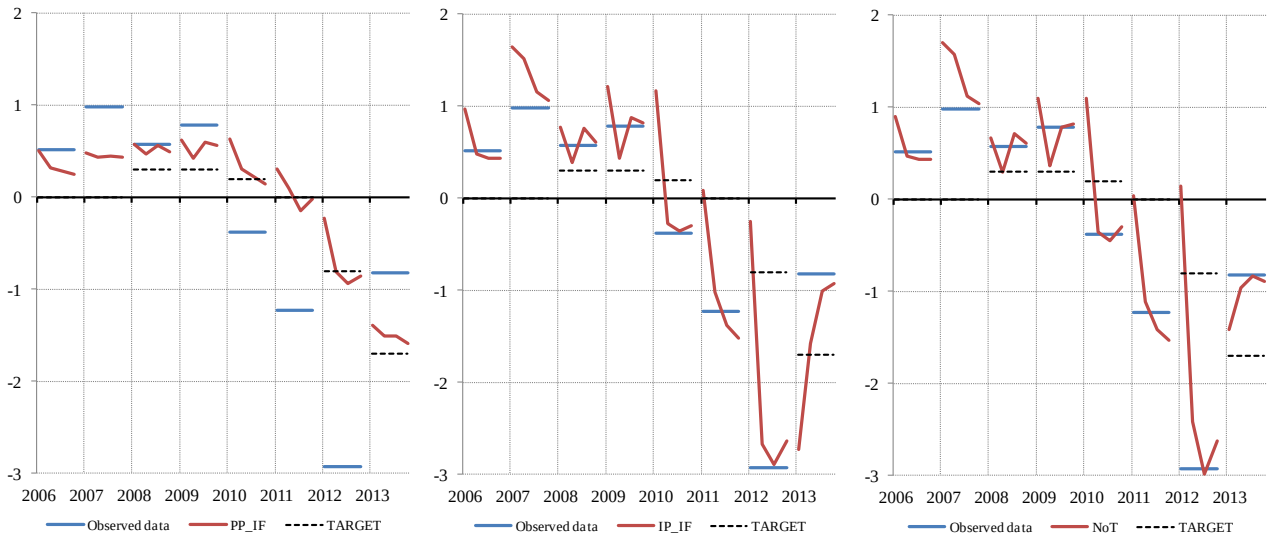


Figure 7 (contn'd). The evolution of the iterative real government consumption forecasts during the year ("learning").

Italy



Spain