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The Macroeconomic Projections of the German Government: A Comparison to an Independent Forecasting Institution

Abstract

This paper investigates the macroeconomic projections of the German government since the 1970s and compares it those of the Joint Economic Forecast, which is an in-dependent forecasting institution in Germany. Our results indicate that nominal GDP projections are upward biased for longer forecast horizons, which seems to be driven by a false assessment of the decline in Germany's trend growth and a systematic failure to correctly anticipate recessions. We show that the German government also deviates from the projections of the Joint Economic Forecast, which in fact worsened the forecast accuracy. Finally, we find evidence that these deviations are driven by political motives.

JEL-Codes: E300, E370, E390.

Keywords: macroeconomic forecasting, forecast accuracy, independent forecasting, political economic biases.

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1. Introduction

Macroeconomic projections are essential for fiscal policy planning and the reduction of uncertainty about future economic developments. Changes in the economic outlook have implications for a government's future revenues and expenditures and determine the scope for additional fiscal policy interventions. In the context of the European Union's Stability and Growth Pact macroeconomic projections play a key role in the European Commission's monitoring of the member countries' budgetary plans. According to the enhanced rules of the Pact, which became effective in 2013 with the so-called "Two-pack" regulations, fiscal planning must be based on realistic macroeconomic forecasts that do not suffer from optimistic political biases. To guarantee this, the Pact prescribes that macroeconomic forecasts should be independent from fiscal policy decision-making. Consequently, many countries installed Independent Fiscal Institutions in recent years with the aim of producing or endorsing macroeconomic forecasts for the budget preparation.

Biases in fiscal variables might appear for two reasons. On the one hand, a large part of the literature on political economy stresses the politically motivated overoptimism in both fiscal projections and underlying macroeconomic projections. Either the government directly influences the fiscal forecasts and puts some motivated markups on an unbiased prediction, or it has an incentive to bias its macroeconomic inputs to hide a direct influence on the fiscal variables. In any case the motive of the policymaker is to brighten its own future fiscal space. On the other hand, the forecasting literature discusses sources for biased macroeconomic projections, which not only apply to governments, but to forecasters in general. Either the forecaster's access to information is imperfect and he therefore only gradually adjusts his forecasts towards the true value of the target variable, or he is averse to specific negative outcomes, implying that he systematically overpredicts recessions.

This paper tries to disentangle the two sources for biased macroeconomic projections by investigating the GDP forecasts of the German government, which serve as a basis for its own budgetary projections. As the revisions of the Stability and Growth Pact were implemented into national legislation in 2018, our analysis focuses on the period from 1970 to 2017 when the government's macroeconomic forecasts were not endorsed by a legally installed third party. However, the forecasting process involved the projections of the so-called Joint Economic Forecast (in German: "Gemeinschaftsdiagnose"), which is a macroeconomic forecast for the German economy issued by independent research institutes shortly before the government's projections. According to statements of the government, the Joint Economic Forecast always served as a reference for the projections of the government. Based on this very special institutional set-up, we decompose the government's forecast error into the forecast error made by the Joint Economic Forecast and the deviation of the

government from the projections of the Joint Economic Forecast. Our results indicate that nominal GDP projections are upward biased for longer forecast horizons, which seems to be driven by a false assessment of the decline in Germany's trend growth and a systematic failure to correctly anticipate recessions. We show that the German government also deviates from the projections of the Joint Economic Forecast, which however does not improve its forecast performance but rather worsen the outcome. Finally, we find weak evidence that these deviations were driven by political motives.

Our paper also contributes to the literature about political influences on fiscal forecasting, which points to a significant correlation between fiscal forecast errors and GDP forecast errors. For the German case, Heinemann (2006) finds that the government's medium-term fiscal planning over the period 1968-2003 is biased towards overoptimism. Apart from political motives, he shows that the biased fiscal projections are also driven by the government's overoptimistic GDP projections, without however going deeper into the causes for the biased GDP forecasts. Büttner and Kauder (2010) confirm Heinemann's findings of a positive and significant correlation between tax revenue forecast errors and GDP forecast errors in a panel of 12 OECD countries. In their set-up, however, they are not able to investigate political economy motives for the GDP forecast errors, as they are not those of the institution that is responsible for the fiscal projections, but those of the German Council of Economic Expert (in German: "Sachverständigenrat zur Begutachtung der gesamtwirtschaftlichen Entwicklung"), and hence an institution which is not involved at all in the countries' processes of tax revenue projections. The same limitation applies to Jochimsen and Lehmann (2017), who extend the multi-country data set of Büttner and Kauder (2010) to 18 OECD countries over the period from 1996 to 2012 and who use the macroeconomic projections of the OECD to evaluate the link between tax revenue forecast errors and GDP forecast errors. While they find empirical evidence for political biases in the tax revenue forecasts, they are however unable to investigate whether the political biases either stem from the macroeconomic input or are produced as markups on an unbiased forecast. Finally, Büttner and Kauder (2015) investigate the biannual tax revenue forecasts of the German Working Party on Tax Revenue Forecasting (in German: "Arbeitskreis Steuerschätzung"), which includes both independent external experts and government representatives. Their empirical approach uses the deviations of the government's GDP forecasts from either the projections of the German Council of Economic Experts or from those of the OECD. Büttner and Kauder (2015) show that these deviations significantly correlate with the tax revenue forecast errors, which can either be interpreted as a source of insufficient information usage by the government or as a source of political bias. While Büttner and Kauder (2015) are silent on this issue, the focus of our analysis is on the determinants of the government's deviations from the projections of the Joint Economic Forecast. Compared to all other studies on fiscal forecasting in Germany, we test

whether the macroeconomic input to those fiscal forecasts are systematically biased, which is one channel that Heinemann (2006) brought forward.

The remainder of this paper is structured as follows. In the next section we describe the institutional set-up for budgetary and macroeconomic projections in Germany. Section 3 then develops a theoretical framework that provides a rationale for generating biased forecasts. The empirical part of the paper is presented in Section 4. Section 5 concludes.

2. Institutional Background

The macroeconomic forecasts, which serve as a basis for the German government's budget projections, are produced by the Federal Government itself. Under the lead responsibility of the Federal Ministry for Economic Affairs and Energy three macroeconomic projections per year are released for the German economy. The so-called *annual projection* is published in January as part of the Annual Economic Report. The spring and autumn projections serve as basis for the tax revenue estimates of the Working Party on Tax Revenue Forecasting, which form part of the government's medium-term financial projections.[2] Since 2010 these medium-term financial projections are presented to the German Stability Council who monitors whether Germany complies with the requirements of the German Debt Brake, the Fiscal Compact and the Stability and Growth Pact.

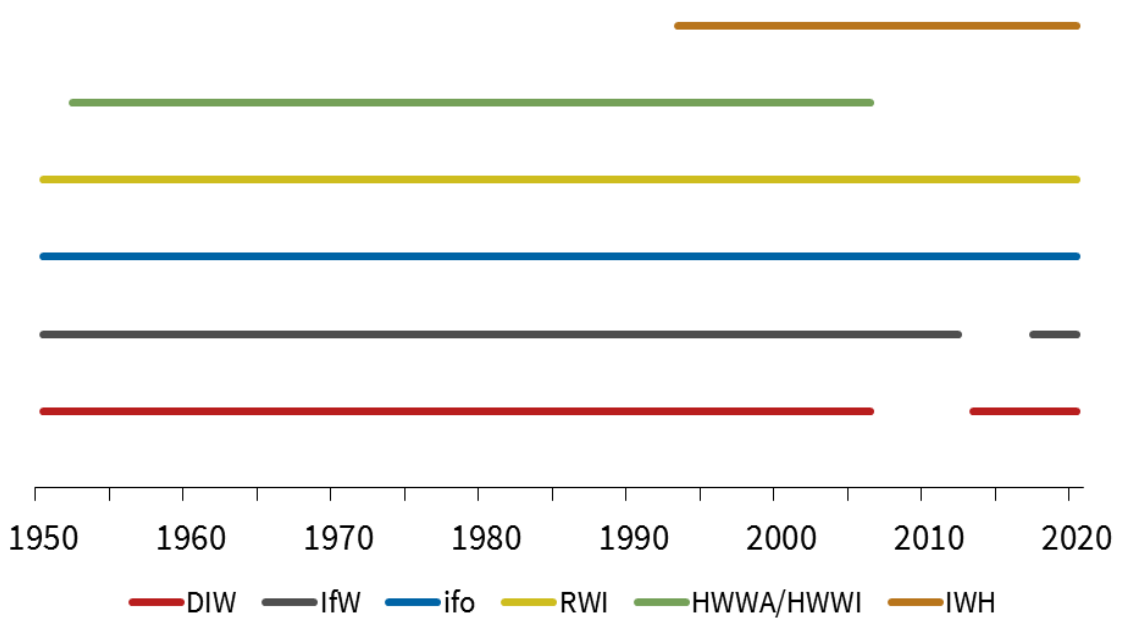
Shortly prior to the publication of the government's spring and autumn projections, the Joint Economic Forecast also produces a macroeconomic forecast for the German economy. The Joint Economic Forecast exists since 1950 and is a consensus forecast of a selected group of members of the Working Group of German Economic Research Institutes (in German: "Arbeitsgemeinschaft deutscher wirtschaftswissenschaftlicher Forschungsinstitute e. V."). It is based on a contract between the Ministry and the participating research institutes. In the first decades, the contracts for the spring and the autumn projections were awarded annually to those German economic research institutes that proved to have a focus on macroeconomic forecasting and that were independent from any political influence (see Figure 1). This procedure was fundamentally changed for the first time in 2007 when the Ministry introduced a bidding competition. Since then the number of contracts was limited,

[2] The Federal Ministry of Finance states: "The Working Party bases its estimates on key macroeconomic data supplied by the German federal government and co-ordinated between the various ministries under the aegis of the Federal Ministry of Economics and Technology [*former name of the Federal Ministry for Economic Affairs and Energy*]." It continues: "Ever since the Working Party has been in existence, the federal government has adopted the results for the tax revenue of the federation in the budget and, since 1968, in the medium-term financial planning." (https://www.bundesfinanzministerium.de/Content/EN/Standardartikel/Topics/Taxation/Articles/working-party-on-tax-revenue-estimates.html, accessed on 13 November 2018).

contracts were awarded for more than one year, and tenders are also accepted from consortia of independent national and international economic research institutes.[3]

Figure 1:

Participation at the Joint Economic Forecast



Notes: DIW: German Institute for Economic Research in Berlin, IfW: Kiel Institute for the World Economy, ifo: ifo Institute – Leibniz Institute for Economic Research at the University of Munich e. V., RWI: RWI Leibniz Institute for Economic Research, HWWA/HWWI: Hamburg Institute of International Economics, IWH: Leibniz Institute for Economic Research Halle. Between 1950 and 1970 also the agricultural research institute "Institut für landwirtschaftliche Marktforschung der Forschungsanstalt für Landwirtschaft" participated.

Unlike the German Council of Economic Experts, which was founded in 1963, the Joint Economic Forecast has had no legal anchoring until 2017. While paragraph 1 of the law setting up the German Council of Economic Experts (in German: "Gesetz über die Bildung eines

[3] 2007-2010: four contracts awarded to ifo (in cooperation with the KOF Swiss Economic Institute – ETH Zurich), IfW, IWH (in cooperation with the Macroeconomic Policy Institute IMK and the Austrian Institute of Economic Research WIFO) and RWI (in cooperation with the Institute for Advanced Studies in Vienna IHS); 2010-2013: four contracts awarded to ifo (in cooperation with KOF), IfW (in cooperation with the Centre for European Economic Research ZEW), IWH (in cooperation with Kiel Economics) and RWI (in cooperation with IHS); 2013-2016: four contracts awarded to DIW (in cooperation with WIFO), ifo (in cooperation with KOF), IWH (in cooperation with Kiel Economics) and RWI (in cooperation with IHS); 2016-2018/2020: five contracts awarded to DIW (in cooperation with WIFO), ifo (in cooperation with KOF), IfW, IWH and RWI (in cooperation with IHS).

Sachverständigenrates") defines the analysis of the current economic situation and its likely development as part of its legal mandate, the main task of the Joint Economic Forecast can only be deduced from the general specifications of the tender documents. Accordingly, "the Joint Economic Forecast delivers a reference for the spring and autumn projections of the Federal Government" (German Federal Ministry for Economic Affairs and Energy, 2013).

The legal position of the Joint Economic Forecast fundamentally changed in 2017 when the German Federal Government took a final step toward the national implementation of the Two-Pack Regulation No. 473/2013 of the European Parliament and the Council of the European Union. According to this regulation the soundness of national budgetary processes shall be enhanced with the obligation to be based on independent macroeconomic forecasts, i.e. on forecasts, which are either produced or endorsed by independent bodies. In June 2017 the German legislator adopted a law (in German: "Vorausschätzungsgesetz") that defines the process for the preparation of macroeconomic forecasts by the government and the process for their endorsement by an independent body. In September 2017, an ordinance (in German: "Vorausschätzungsverordnung") appointed the Joint Economic Forecast as an independent body tasked with assessing and confirming the forecast released by the Federal Government. The ordinance came into effect on 1 July 2018.

The consensus forecast of the Joint Economic Forecast is far more than a simple arithmetic average of the forecasts of the participating institutes. It is an own forecast that is prepared during a two-week meeting with extensive dialogue between the researchers (see Nierhaus, 2002, and Döhrn and Filusch, 2016). Before the meeting each institute produces and in most cases also releases an own macroeconomic forecast for the German economy and the world economy, which serves as a starting point for the dialogue. The Joint Economic Forecast is typically released in mid-April (the so-called *spring projection*) and at the end of September or the beginning of October (the so-called *autumn projection*). About one week after the release of the Joint Economic Forecast the Ministry publishes its own spring and autumn projections.

3. Theoretical Considerations

The target variable in macroeconomic projections typically is the annual growth rate of gross domestic product (GDP) Y_T for year T, which is assumed to be released at time T. Prior to the release at time $T-t$ a forecaster f produces his forecast $\hat{Y}^f_{T|T-t}$ for Y_T. After the release, f's forecast error $FE^f_{T|T-t} = \hat{Y}^f_{T|T-t} - Y_T$ can be computed. If the forecast is larger compared to the release of the target variable, the forecast error has a positive sign, indicating an overestimation. The opposite holds true for an underestimation.

Assume that f is rational and tries to generate an optimal forecast for a stationary target variable Y_T using all the information Ω_{T-t}^f available at time $T-t$. He then minimizes the expected mean squared forecast error

$$\mathcal{L}^f = E\left[\left(\hat{Y}_{T|T-t}^f - Y_T\right)^2 |\Omega_{T-t}^f\right].$$

The optimal forecast then reads as

$$\hat{Y}_{T|T-t}^f = E\left[Y_T|\Omega_{T-t}^f\right].$$

For a rational forecaster, the forecast error should have the following properties:

(i) $Var\left[FE_{T|T-t}^f\right] > Var\left[FE_{T|T-s}^f\right]$ or $abs\left[FE_{T|T-t}^f\right] > abs\left[FE_{T|T-s}^f\right]$ for all $t < s$, which implies that forecasts with a larger information set should have an informational advantage and thus a lower variance of the forecast error or a lower mean absolute forecast error;

(ii) $Corr\left[FE_{T|T-t}^f, Z_{T-t}\right] = 0$ for all $Z_{T-t} \in \Omega_{T-t}^f$, which implies that forecasts are informationally efficient and forecast errors cannot be predicted;

(iii) $E\left[FE_{T|T-t}^f\right] = 0$, which implies that the forecasts should be unbiased.

The focus of this paper is on the unbiasedness assumption. The forecasting literature provides several reasons for deviations from this assumption:

- the target series follows a non-stationary process (Section 3.1),
- the forecaster has an asymmetric loss function (Section 3.2),
- the forecaster has an incentive to deviate from the unbiased forecast because this behavior maximizes his utility (Section 3.3).

3.1. Biased Forecasts: gradual learning of changes in trend growth rates

According to Batchelor (2007) a major source of forecast bias is insufficient information of the forecaster about the underlying long-run trend growth rate of GDP. Building on the work of Muth (1960) he shows that in such a set-up it is rational for an error-minimizing forecaster to give some positive weight on past forecasts, implying that forecasts are only adjusted gradually in response to new observations in GDP growth. In contrast to the standard approach set out in the previous section it is assumed that the target variable follows a non-stationary process

$$Y_T = \bar{Y}_T + \eta_T,$$

where the permanent component $\bar{Y}_T$ is defined as a random walk

$$\bar{Y}_T = \bar{Y}_{T-1} + \varepsilon_T,$$

with $\varepsilon_T \sim N(0, \sigma_\varepsilon^2)$. The transitory component η_T is independent from $\bar{Y}_T$ and follows a white-noise process, i.e. $\eta_T \sim N(0, \sigma_\eta^2)$. The optimal forecasting model is an exponential smoothing (or an adaptive expectations) model

$$\hat{Y}^f_{T|T-1} = \lambda Y_{T-1} + (1-\lambda)\hat{Y}^f_{T-1|T-2},$$

in which past (and observable) realizations of the target variable Y_{T-1} and previous optimal forecasts for the target variable at time $T-1$, which were made prior to the release of Y_{T-1} at time $T-2$, $\hat{Y}^f_{T-1|T-2}$, determine the forecast. Muth (1960) shows the optimal smoothing parameter λ depends on the relative variance of permanent and transitory changes in the target variable:

$$\lambda = \sigma_\varepsilon^2 / (\sigma_\varepsilon^2 + \sigma_\eta^2).$$

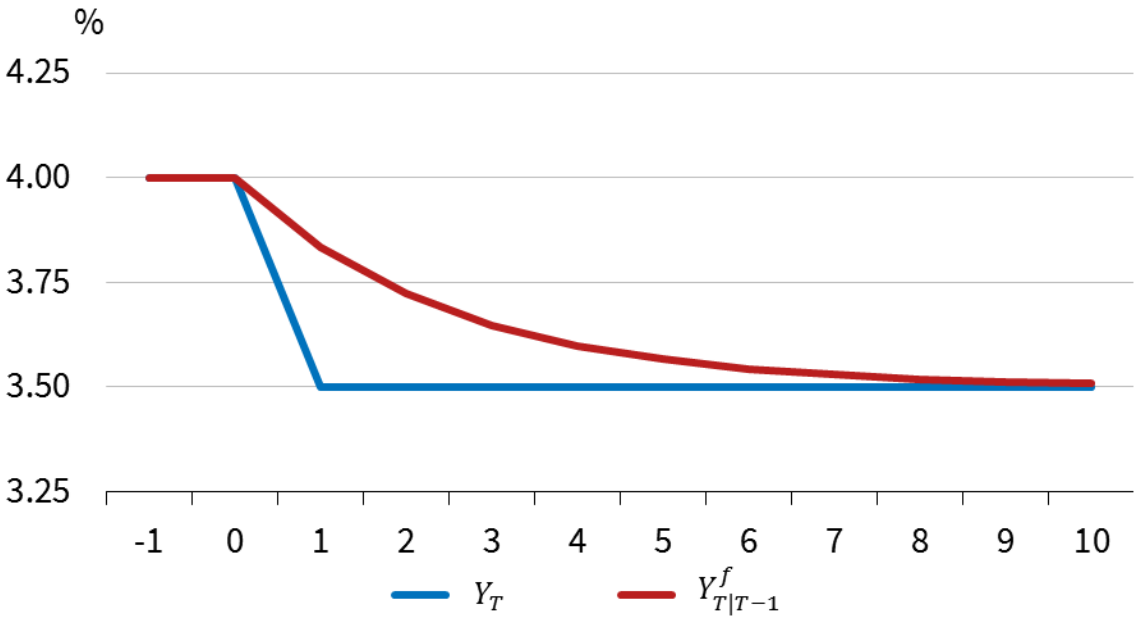
Thus, if Y_t follows a stationary white-noise process, i.e. $\sigma_\varepsilon^2 = 0$, then $\lambda = 0$, and the optimal forecast is the one of the previous period. If $\sigma_\varepsilon^2 > 0$ and $\sigma_\eta^2 \geq 0$, then $0 < \lambda \leq 1$ and the forecast is adjusted gradually to new observations of the target variable.

Figure 2 shows the adjustment of the forecasts for GDP, after its trend growth rate (i.e. the permanent component) has unexpectedly fallen by 0.5 percentage points (after a negative ε_T in $T = 1$). The smaller the value for λ (here: $\lambda = 1/3$), the longer the GDP forecast will be biased upward as forecasters only gradually learn that the lower growth rate of GDP, that is observed by forecasters, is of permanent and not only of temporary nature.

Figure 2

Forecast error evolution over time

GDP growth over the previous period



3.2. Biased Forecasts: state-dependency of forecasts

Another source of bias is an asymmetric loss function of the forecaster. Evidence suggests that forecasters are in particular over-optimistic when predicting recessions and economic crises, implying that any evaluation of the forecast performance depends on the state of the economy (see e.g. Loungani et al., 2013, and Higgins and Mishra, 2014). An explanation for this state-dependency can be found in the psychological literature where it is widely acknowledged that aversion to a certain outcome (i.e. recessions) biases human perception of the probability of that outcome (see e.g. Weber, 1994).

Building on work of Granger (1969), Christoffersen and Diebold (1997) assume that forecasters have a linex loss function

$$\mathcal{L}^f = E\left\{b\left[exp\left(a\left(Y_T - \hat{Y}^f_{T|T-t}\right)\right) - a\left(Y_T - \hat{Y}^f_{T|T-t}\right) - 1\right] | \Omega^f_{T-t}\right\},$$

which is approximately linear to the left of the origin and approximately exponential to the right, when $a > 0$, and conversely when $a < 0$. If the target variable itself follows a conditionally Gaussian process

$$Y_T = \mu_{T|T-1} + \varepsilon_T,$$

where $\mu_{T|T-1}$ is the mean in period T conditional on the information set available at $T-1$ and ε_T is an independent innovation with $\varepsilon_T \sim N(0, \sigma_\varepsilon^2)$, then the optimal one-step-ahead predictor is

$$\hat{Y}^f_{T|T-1} = \mu_{T|T-1} + \frac{a}{2}\sigma^2_\varepsilon.$$

Thus, as long as $a \neq 0$, the optimal forecast is biased and the forecast error becomes

$$FE^f_{T|T-t} = \hat{Y}^f_{T|T-t} - Y_T = \frac{a}{2}\sigma^2_\varepsilon - \varepsilon_T.^4$$

3.3. Biased Forecasts: political economy arguments

There is a large literature that tries to explain strategic behavior of political agents. Most of the articles on political economy stress the influence of politicians on ex-post observable fiscal variables such as deficits, revenues, or expenditures. However, there is growing literature that exclusively focuses on forecasts and the strategic behavior of politicians to influence these predictions ex-ante. Fiscal forecasts are based on projections of important macroeconomic variables. In the case of tax revenues, the literature clearly identifies that a large portion of tax revenue forecast errors can be attributed to false projections of nominal GDP (see, among others, Jonung and Larch, 2006, and Büttner and Kauder, 2010, for international studies or Büttner and Kauder, 2015 for the German case).

Politicians have an incentive to overestimate macroeconomic variables in order to polish their fiscal variable predictions. In the budgetary planning process more positive economic forecasts lead to overestimated tax revenues, generating a potential spending leeway for the politicians. Higher tax revenue forecasts therefore either lead to higher expenditures by keeping the ex-ante deficit constant or to a reduction of the ex-ante deficit by keeping expenditures at its former level (see Jochimsen and Lehmann, 2017). In the context of our stylized model we assume that the government has an incentive Π_{T-t} at time $T-t$ to systematically deviate from the optimal unbiased forecast and to produce over-optimistic forecasts ($\Pi_{T-t} > 0$). In this case the government's forecaster minimizes

$$\mathcal{L}^{GOV} = E\left[\left(\hat{Y}^{GOV}_{T|T-t} - Y_T - \Pi_{T-t}\right)^2 | \Omega^{GOV}_{T-t}\right],$$

and his optimal forecast reads

$$\hat{Y}^{GOV}_{T|T-t} = E\left[Y_T | \Omega^{GOV}_{T-t}\right] + \Pi_{T-t}.$$

Thus, the forecast is no longer unbiased, and the expected forecast error is given by

$$E\left[FE^{GOV}_{T|T-t}\right] = \Pi_{T-t}.$$

[4] If $a \to 0$, the bias approaches zero and the loss function becomes approximately quadratic. The latter is obtained from the first two terms of a Taylor series expansion of the exponential function.

This overestimation procedure is, however, not enforceable without any limits. At least some voters have to be myopic or, in the case of rational voters, the budget control must be rather weak to let the described mechanisms work. In the following we elaborate in more detail which political distortions might appear in governmental macroeconomic forecasts.

3.3.1. Political Business Cycles

As suggested by Nordhaus (1975), the aim of opportunistic governments is to maximize their reelection probability. In the sense of Alesina and Perotti (1994) and Persson and Tabellini (1999) the incumbent increases its chances of being reelected by boosting the economy in preparation of upcoming elections. This procedure should ensure to signal fiscal competence to the voter. Optimistic forecasts of macroeconomic variables make it easier to signal a rosier future in terms of larger expenditures, thus, leading to lower unemployment rates or more spending in voter-enhancing expenditure positions and therefore to an increase of the popularity of the ruling government (Hibbs, 1977; Franzese, 2002). Having this argumentation in mind, the incumbent has an incentive to produce more optimistic forecasts of macroeconomic aggregates for those years that are regularly labeled as election years. This strategy can only be pursued if voters are myopic. However, political business cycles can also occur in the case of rational voters, especially if information asymmetries between the government and the public exist (see Rogoff and Sibert, 1988).

3.3.2. Partisan Theory

Ideology is the main driver of party-politics, according to the partisan theory. The theory presumes that left-wing governments favor more redistributive policies compared to their right-wing counterparts, thus, left-wing governments are more inclined to run a more expansionary policy. According to Hibbs (1977), left-wing governments tend to run higher deficits since their constituency rather benefit from low unemployment than they are harmed by a higher inflation or larger debts. In order to hide the deficit or judge higher expenditures exante, left-wing governments tend to produce more optimistic macroeconomic projections. Such a behavior also eases budget negotiations in times when the budget is set up.

3.3.3. Political Fragmentation

The theoretical political economy literature names, in addition to political business cycles and partisan theory, another reason for loose fiscal policy: fragmentation of the policymaking process (see, for example, Ferejohn and Krehbiel, 1987; Roubini and Sachs, 1989; Volkerink and de Haan, 2001; Perotti and Kontopoulos, 2002). Following Perotti and Kontopoulos (2002), fragmentation is defined as the degree of the cost of one unit of public spending each politician internalizes. Basically, each coalition member of a government wants to satisfy its

constituency by allocating as much as possible of the budget to its supporters. The benefits from each spending proposal are earned by the politician's favorite interest group, whereas the costs are shared equally among all parties in the coalition. In the end, the total amount of costs is not fully internalized. This is why a coalition government faces a "common pool" problem.

As indicated, the traditional common pool problem is formulated for coalitions in government. Since governmental fragmentation is rather low in Germany, we consider the fragmentation of the parliament. Ferejohn and Krehbiel (1987) argue that the parliament might have a substantial influence on the budget draft. This influence depends crucially on factors such as the number of seats of the governing majority, the fragmentation of the opposition, the strength of the party whip, or the political culture. Volkerink and de Haan (2001) provide a comprehensive discussion on parliamentary fragmentation. But it is likely that the opposition will not unite against the government if the parliament is highly fragmented. Thus, we assume that this fragmentation channel is the most important one in the German setup.

Transferring the fragmentation idea from budget forecast to macroeconomic predictions, we simply have to go one step back in the drafting of the budget. More optimistic macroeconomic inputs lead to more optimistic budget forecasts and, thus, ease budget negotiations in parliament. We therefore conclude that macroeconomic aggregates are overestimated if the ruling government faces a more fragmented parliament.

3.3.4. Summarizing Potential Political Biases

The three channels of political influence on macroeconomic projections are summarized by the function Π_{T-t}:

$$\Pi_{T-t} = f(ELECT_{T-t}, PARTISAN_{T-t}, FRAG_{T-t}, BAL_{T-t}).$$

We assume that the arguments of the political bias are independent from each other. $ELECT$ is the variable measuring the presence of political business cycles. With $PARTISAN$ we model the influence of potential partisan effects. $FRAG$ is the variable that stands for the effect of parliamentary fragmentation. And last, we add the fiscal balance (BAL) as one could argue that the government has an incentive to brighten its macroeconomic forecasts whenever they face a higher budget deficit (see, for example, Goeminne et al., 2008); the opposite holds true for lower deficits or even surpluses.

Bringing all potential biases together, the forecast error of the Ministry is specified as follows:

$$FE^{GOV}_{T|T-t} = \beta \Pi_{T-t} + \epsilon_T.$$

Assuming a linear functional relationship yields:

$$FE^{GOV}_{T|T-t} = \beta_1 ELECT_{T-t} + \beta_2 PARTISAN_{T-t} + \beta_3 FRAG_{T-t} + \beta_4 BAL_{T-t} + \epsilon_T.$$

Taking this model for the forecast error as given, we can formulate the following hypotheses:

Hypothesis 1: The ruling government produces more optimistic forecasts in years of elections, i.e. $\beta_1 > 0$.

Hypothesis 2: Left-wing governments produce more optimistic macroeconomic forecasts compared to right-wing incumbents. If $PARTISAN$ is a variable that measures governmental ideology and coded in the way that low values represent right-wing governments, we hypothesize that $\beta_2 > 0$.

Hypothesis 3: Predictions for macroeconomic variables are overoptimistic if the ruling government faces a more fragmented parliament, i.e. $\beta_3 > 0$.

Hypothesis 4: The government faces an incentive to publish bloomy macroeconomic forecasts if it faces a negative fiscal balance (i.e. a budget deficit) instead of a fiscal surplus, thus, we hypothesize that $\beta_4 < 0$.

4. Empirical Results

In our setting we have two forecasters. While the Joint Economic Forecast (JEF) publishes its projections $\hat{Y}^{JEF}_{T|T-t}$ for Y_T at time $T-t$, the release of the government (GOV), $\hat{Y}^{GOV}_{T|T-(t-\tau)}$, is typically scheduled about $\tau = 1$ week after the release of the Joint Economic Forecast at time $T-(t-\tau)$. The forecast errors are defined as $FE^{JEF}_{T|T-t} = \hat{Y}^{JEF}_{T|T-t} - Y_T$ and $FE^{GOV}_{T|T-(t-\tau)} = \hat{Y}^{GOV}_{T|T-(t-\tau)} - Y_T$. Given the timely structure of the releases and the fact that the Joint Economic Forecast delivers a reference for the spring and autumn projections of the government, the government's forecast error $FE^{GOV}_{T|T-(t-\tau)}$ can be decomposed into the forecast error of the Joint Economic Forecast, $FE^{JEF}_{T|T-t}$, and the deviation of the government from the Joint Economic Forecast, $DEV^{GOV,JEF}_{T|T-(t-\tau),T-t}$:

$$FE^{GOV}_{T|T-(t-\tau)} = FE^{JEF}_{T|T-t} + DEV^{GOV,JEF}_{T|T-(t-\tau),T-t}, \text{ or}$$

$$\left(\hat{Y}^{GOV}_{T|T-(t-\tau)} - Y_T\right) = \left(\hat{Y}^{JEF}_{T|T-t} - Y_T\right) + \left(\hat{Y}^{GOV}_{T|T-(t-\tau)} - \hat{Y}^{JEF}_{T|T-t}\right).$$

In the next sections we take a deeper look at the properties of the two forecast errors, $FE^{GOV}_{T|T-(t-\tau)}$ and $FE^{JEF}_{T|T-t}$, and the deviation, $DEV^{GOV,JEF}_{T|T-(t-\tau),T-t}$. Using the annual growth rate of nominal GDP, Y_T, as the target variable, we run regressions for forecasts of the current and the next year as published in the spring and autumn projections of the government and the Joint Economic Forecast.

4.1. Data

4.1.1. Nominal GDP Forecasts

In contrast to most of the existing studies, which focus on the evaluation of forecasts for real GDP (for the German case see, among others, Döpke and Fritsche 2006a, 2006b and Heilemann and Stekler, 2013), we analyze the errors made in forecasts for nominal GDP. The reason is straightforward: nominal GDP is the main variable that enters national budget forecasts and it is made responsible for a large part of the forecast errors, for example, in tax revenues (Büttner and Kauder 2010, 2015).

Up to date there is no comprehensive source to download or access private or governmental macroeconomic forecasts for Germany. The nominal GDP[5] forecasts of the Joint Economic Forecast were extracted from the ifo Institute's German-speaking periodicals *ifo Wirtschaftskonjunktur* (until 2000) and *ifo Schnelldienst* (after 2000), where the complete document of the biannual Joint Economic Forecast is published. The nominal GDP forecasts of the government are more difficult to obtain since the Federal Ministry for Economic Affairs and Energy (the Ministry) does not publish a long history of its forecasts on its homepage. However, we can extract the nominal GDP forecasts from the biannual reports of the Working Party on Tax Revenue Forecasting. This institution is responsible for forecasting German tax revenues, which, according to Gebhardt (2001), is based on the Ministry's macroeconomic projections. The biannual reports are available on the homepage of the Federal Ministry of Finance.

Altogether, we can rely on forecasts that are produced two times a year, in spring and in autumn, for the period from 1970 to 2017. The data set is, however, not perfectly balanced as shown in Table 1. Especially the information for the governmental forecasts is fragmentary. Moreover, in its spring projections the Joint Economic Forecast only started in 1998 to produce forecasts for the following year $t + 1$. In the end, we can rely on four forecasting horizons (approximately 2, 8, 14 and 20 months ahead).

[5] We choose to use the labeling GDP for total output of the German economy over the whole observation period. To be accurate, in the years before 1991 total output was measured as gross national product (GNP) instead of gross domestic product.

Table 1: Availability of nominal GDP forecasts $\widehat{Y}^{f}_{T|T-t}$

Forecast	t	$f = GOV$	$f = JEF$
Spring (for next year)	20 months	1972−2017 (1974, 1976 and 1978 missing)	1998−2017
Autumn (for next year)	14 months	1971−2017 (1982 missing)	1971−2017
Spring (for current year)	8 months	1970−2017	1970−2017
Autumn (for current year)	2 months	1970−2017	1970−2017

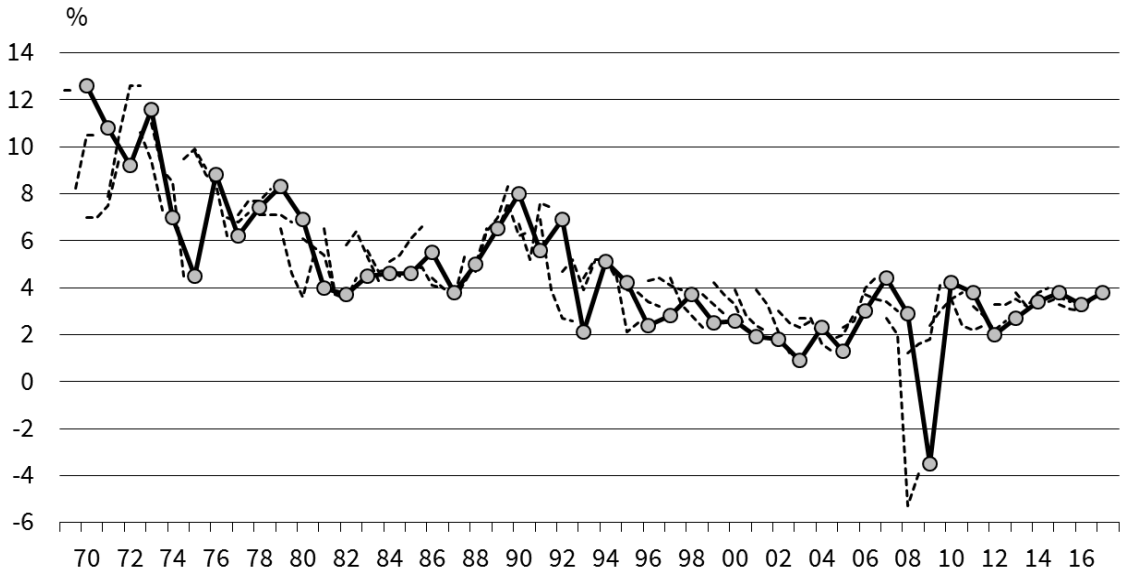
Source: ifo Wirtschaftskonjunktur, ifo Schnelldienst, Working Party on Tax Revenue Forecasting.

As is common in the forecasting literature the forecast errors are calculated for the first release of nominal GDP growth. Unfortunately, a real-time database for German GDP is not available for the years prior to 1991. However, each publication of the Working Party on Tax Revenue Forecasting and the Joint Economic Forecast does not only contain the forecasts for the current and the next year, but also last year's realizations of major macroeconomic variables. Since the first release of GDP is regularly published in January, we can use the spring publications to build a real-time series for nominal GDP. Figure 3 and Figure 4 show the nominal GDP forecasts of both, the government and the Joint Economic Forecasts, as well as the first release of the growth rate of nominal GDP.

Figure 3:

Nominal GDP forecasts of GOV and first releases

Percentage change over the previous year

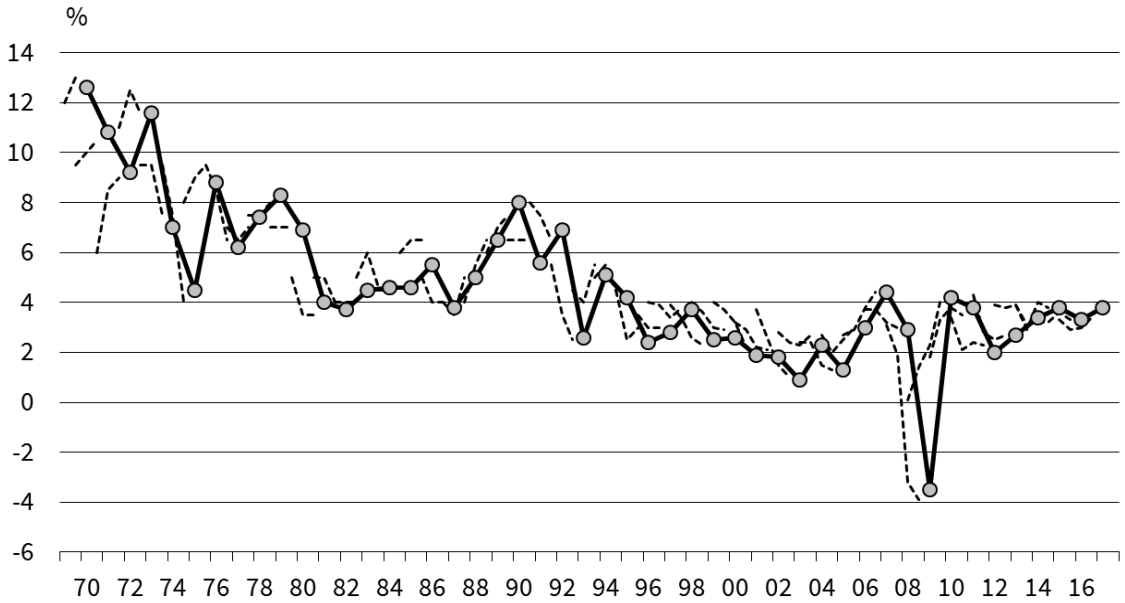


Source: Federal Ministry of Economic Affairs and Energy; Federal Statistical Office; Working Party on Tax Revenue Estimates.

Figure 4:

Nominal GDP forecasts of JEF and first releases

Percentage change over the previous year



Source: Federal Statistical Office; Joint Economic Forecast.

4.1.2. Political Economic Variables

A comprehensive source for political variables is the *Comparative Political Data Set 1960-2014* by Armingeon et al. (2016b). In this data set we find information about election years ($ELECT$), the ideology of the ruling government ($PARTISAN$) as well as parliamentary fragmentation ($FRAG$).

Election years are simply coded as a dummy variable. It takes a value of one if year t is an election year and zero otherwise. Our full sample spanning from 1970 to 2017 comprises 13 federal elections in Germany. However, the number of included election results varies with the data availability of the different forecast horizons.

Ideology is proxied by the so-called Schmidt-Index that measures cabinet composition and that takes values from one to five (see Armingeon et al., 2016a). A value of one indicates a right-wing (and center) hegemony in government, thus, 100% of all cabinet posts are held by parties classified as right-wing or center. The Schmidt-Index takes a value of two if less-or-equal-to 33,33% of all cabinet posts are held by social democratic or left-wing parties. A balance between left- and right-wing parties (left-wing cabinet posts between 33,33% and 66,67%) is classified as three. Since the Schmidt-Index is symmetric, the values four and five measure the opposite of one and two.

Fragmentation or legislative fractionalization is measured via the Rae-Index that is, simply-speaking, a Herfindahl-Hirschman-Index of a specific form (see Armingeon et al., 2016a). The basis of the Rae-Index is the share of seats every party holds in parliament. It takes values between zero and one, whereas zero is the minimum level of fractionalization (highest degree of concentration) and one stands for the highest level of fractionalization.

The last variable that is included in the set of political variables is the fiscal balance (BAL) of the general government as a percentage share of nominal GDP. Thus, we can either observe positive (surplus) or negative values (deficit). The data can be accessed from the Federal Statistical Office of Germany.

4.2. Analysis of the forecast error of the government

4.2.1. Informational advantage

We start our analysis by investigating the properties of the government's forecast errors. For testing the informational advantage, we calculate the mean absolute forecast error for each forecast horizon t:

$$MAFE_{t-\tau} = \frac{1}{n}\sum_{T=T_0}^{T_1} abs\left[FE^{GOV}_{T|T-(t-\tau)}\right].$$

The shorter the forecast horizons (the smaller t), the more information the government has and the more accurate forecasts it makes. Table 2 confirms that the accuracy of the government increases as the forecast horizon shortens. The average absolute forecast error gradually declines from 1.74 percentage points for the longest to 0.27 percentage points for the shortest forecast horizon.

Table 2: Informational advantage of the government's forecasts

t	20 months	14 months	8 months	2 months
$MAFE_{t-\tau}$	1.74	1.34	0.86	0.27
n	43	46	48	48

4.2.2. Unbiasedness

We investigate the unbiasedness of the government's forecast by regressing its forecast errors on a constant

$$FE^{GOV}_{T|T-(t-\tau)} = c + \epsilon_T,$$

and test whether this constant is different from zero in a statistical sense. Thus, a forecast is called unbiased if the average forecast error does not show any systematic deviation from zero. Table 3 shows that the nominal GDP forecasts of the government in the period from 1970 to 2017 were on average to optimistic, as the constant is positive for all forecast horizons. Except for the forecast with $t = 8$ months, the upward bias increases with the length of the forecast horizon. Both the biases for the longest and for the shortest forecast horizon are statistically different from zero.

Table 3: Tests on unbiasedness of the government's forecasts

t	20 months	14 months	8 months	2 months
c	0.68*	0.38	0.14	0.15***
	(0.35)	(0.26)	(0.24)	(0.05)
n	43	46	48	48
R^2_{adj}	0.00	0.00	0.00	0.00

Note: The dependent variable is the forecast error for nominal GDP of the German government. Standard errors robust to autocorrelation and heteroscedasticity are shown in parentheses. ***, **, * denote statistical significance at the 1%, 5% or 10% level.

4.3. Analysis of the forecast error of the Joint Economic Forecast

For a better understanding of the nature of the government's forecast bias, we first look at the projections of the Joint Economic Forecast, which serve as a reference for the government's projections. Thus, if already the Joint Economic Forecast exhibits systematic forecasts errors, it is likely that those biases drive the accuracy of the government's predictions.

4.3.1. Informational advantage

We begin with computing the mean absolute forecast error for each forecast horizon t. Table 4 confirms that the forecast error of the Joint Economic Forecast gets smaller in magnitude, the more the forecast horizon shrinks and the more information is available to the forecaster. Except for the shortest forecast horizon, the average absolute magnitudes of the errors of the Joint Economic Forecast are smaller than those of the government (compare Table 4 with Table 2). Thus, in general the government seems to be less accurate than the Joint Economic Forecast in terms of absolute forecast errors, even though it publishes its projections about one week after the Joint Economic Forecast and therefore in principle should have an informational advantage.

Table 4: Informational advantage of the JEF

t	20 months	14 months	8 months	2 months
$MAFE_t$	1.54	1.28	0.74	0.28
n	20	47	48	48

4.3.2. Unbiasedness

Concerning unbiasedness, the projections of the Joint Economic Forecast exhibit very similar properties to those of the government. Table 5 first shows that the average forecast error is positive, which points to an overestimation of nominal GDP growth of the Joint Economic Forecast and second that the upward bias is increasing with the forecast horizon. Contrary to the forecasts of the government only the projections with the longest horizon seem to be systematically over-optimistic.

Table 5: Tests on unbiasedness of the JEF

t	20 months	14 months	8 months	2 months
c	0.67*	0.36	0.17	0.04
	(0.36)	(0.24)	(0.16)	(0.05)
n	20	47	48	48
R^2_{adj}	0.00	0.00	0.00	0.00

Note: The dependent variable is the forecast error for nominal GDP of the Joint Economic Forecast. Standard errors robust to autocorrelation and heteroscedasticity are shown in parentheses. ***, **, * denote statistical significance at the 1%, 5% or 10% level.

This average effect presumes a symmetric loss function of the forecaster. If, however, forecasters are more averse to predict recessions, these periods should mainly account for the average effect. Thus, we add to the former regression a dummy that takes a value of one whenever the German economy was in a recession:

$$FE^{JEF}_{T|T-t} = c + \delta \cdot dum^{recession} + \epsilon_T.$$

According to the German Council of Economic Experts the recessions in our sample were observed in the years 1974/1975, 1980-1982, 1992/1993, 2001-2003 and 2008/2009. Table 6 shows that the bias in the projections of the Joint Economic Forecast is largely driven by wrong assessments on upcoming recessions. While for non-recessionary years the bias disappears, the recession dummy is positive and statistically different from zero for longer forecasting horizons.[6] As the forecast horizon decreases, also the recessionary bias does. Thus, the more information is available to the forecasters, the more able they are to detect a recession.

[6] This result is not driven by the Great Recession of the years 2008/2009. If we include two dummies, one indicating the Great Recession and the other measuring the remaining recessions, both coefficients are positive, statistically significant and large in their magnitude.

Table 6: Tests on unbiasedness of the JEF in recessions

t	20 months	14 months	8 months	2 months
c	-0.03	-0.22	-0.08	0.07
	(0.37)	(0.25)	(0.13)	(0.06)
δ	2.77**	2.28***	0.97***	-0.09
	(1.11)	(0.57)	(0.32)	(0.11)
n	20	47	48	48
R^2_{adj}	0.34	0.34	0.19	0.01

Note: The dependent variable is the forecast error for nominal GDP of the Joint Economic Forecast. Standard errors robust to autocorrelation and heteroscedasticity are shown in parentheses. ***, **, * denote statistical significance at the 1%, 5% or 10% level.

According to Batchelor (2007), another major source of systematic forecast errors is the forecaster's imperfect knowledge about changes in the underlying trend growth rate of GDP. Indeed, we observe that the annual growth rate of German nominal GDP has declined over time. While in the period 1970 to 1980 the annual average growth rate was 8.5%, it went down to 5.2% in the 1980s, to 4.3% in the decade after the German reunification and to 2.0% in the 2000s. The first time we saw an increase in the annual average growth rates in nominal GDP was in the period from 2010 to 2017 (3.4%). To see whether the projections of the Joint Economic Forecast were determined by past realizations of nominal GDP growth and hence by a gradual leaning of the forecasters about changes in trend growth, we regress the forecast for this year's nominal GDP growth, $\hat{Y}^{JEF}_{T|T-t}$, on its realization of the previous year, Y_{T-1}, and the previous forecast for that year, $\hat{Y}^{JEF}_{T-1|T-1-t}$:

$$\hat{Y}^{JEF}_{T|T-t} = \lambda Y_{T-1} + (1-\lambda)\hat{Y}^{JEF}_{T-1|T-1-t}.$$

The parameter λ measures the speed of the forecaster's response to new information about the target series, which is revealed by the release of Y_{T-1}. In the following, we assume that the forecasts have a similar horizon. Thus, we compare the one-year-ahead projections released either in spring ($t = 20$ months) or in autumn ($t = 14$ months) with their counterparts in the year before.

Table 7 shows that the Joint Economic Forecast puts a rather large weight of around 60% $(1-\lambda)$ on the previous forecast and therefore only slowly adjusts its projections to new information. Thus, the estimated upward bias for nominal GDP growth projections can also be

rationalized by a gradual learning of the forecasters, that the observable lower growth rates are of permanent and not only of temporary nature.

Table 7: Test on conservatism of the JEF

t	20 months	14 months
λ	0.38***	0.41***
	(0.06)	(0.08)
n	19	46
R^2_{adj}	0.65	0.72

Note: The dependent variable is the one year ahead forecast for nominal GDP of the Joint Economic Forecast. Standard errors robust to autocorrelation and heteroscedasticity are shown in parentheses. ***, **, * denote statistical significance at the 1%, 5% or 10% level.

4.4. Analysis of the government's deviation from the Joint Economic Forecast

In a next step we investigate the deviations of the government's projections from those of the Joint Economic Forecast, which may occur for two reasons. First, the government could observe new information within the week after the release of Joint Economic Forecast, which would justify an update of the forecast. Either the government observes a signal that sheds a more positive light on the German economy, leading to a more optimistic or less pessimistic forecast, or the opposite holds which leads to a less optimistic or more pessimistic forecast. On average, the informational advantage should reduce the government's forecast error. Second, the government might be motivated by political economy arguments and therefore produces on average more optimistic forecasts.

4.4.1. Magnitude and direction of the deviations

Before investigating whether these two motives provide any explanation for the deviations of the government's projections from those of the Joint Economic Forecast, we first look at the magnitude and the direction of these deviations. If the single deviation, which is defined as $DEV^{GOV,JEF}_{T|T-(t-\tau),T-t} = \hat{Y}^{GOV}_{T|T-(t-\tau)} - \hat{Y}^{JEF}_{T|T-t}$, is positive, the government's projection is more optimistic or less pessimistic than that of the Joint Economic Forecast. The opposite holds for negative deviations.

For testing the magnitude of the deviation, we calculate for each forecast horizon t the mean absolute deviation (MAD_t) over all observations n:

$$MAD_t = \frac{1}{n}\sum_{T=T_0}^{T_1} abs\left[DEV^{GOV,JEF}_{T|T-(t-\tau),T-t}\right].$$

Table 8 shows that the government indeed deviates from the nominal GDP projections of the Joint Economic Forecast. The mean absolute deviation increases from 0.26 percentage points for the shortest to 0.38 percentage points for the longest forecast horizon. The peak in the deviation is reached for a forecasting horizon of 14 months. Economically, these deviations are significant, as it amounts to about one-tenth of the volatility of nominal GDP growth (which is equal to 2.93 percentage points for the period between 1970 and 2017).

Table 8: Magnitude of government's deviations from JEF

t	20 months	14 months	8 months	2 months
MAD_t	0.38	0.47	0.36	0.26
n	20	45	46	47

For testing the direction of the deviation, we run the following regression:

$$DEV^{GOV,JEF}_{T|T-(t-\tau),T-t} = c + \epsilon_T.$$

Table 9 shows that for most of the forecast horizons we find no evidence that the government systematically deviates from the Joint Economic Forecast as the deviations are on average zero. The only exception is the projection with a horizon of 2 months, i.e. the one produced in autumn for the current year. In this case the nominal GDP projections of the government seem to be systematically more optimistic than those of the Joint Economic Forecast. However, with 0.10 percentage points the upward bias is rather small in economic terms.

Table 9: Test on systematic deviations of the government from JEF

t	20 months	14 months	8 months	2 months
c	0.06	0.01	-0.02	0.10*
	(0.12)	(0.09)	(0.09)	(0.05)
n	20	45	46	47
R^2_{adj}	0.00	0.00	0.00	0.00

Note: The dependent variable is the deviation of the government from the Joint Economic Forecast for nominal GDP. Standard errors robust to autocorrelation and heteroscedasticity are shown in parentheses. ***, **, * denote statistical significance at the 1%, 5% or 10% level.

4.4.2. Informational gain from deviation

The previous section showed that most of the on average quite large deviations are not biased in the one or the other direction. This result suggests that informational advantages could be the main motive behind the government's behavior, since process of new information coming in should be random. Thus, if the government effectively incorporates this new information, the deviation of the government from the projection of the Joint Economic Forecast should improve the government's forecast precision. To test this, we follow Frankel and Schreger (2016) and estimate the following regression:

$$FE^{GOV}_{T|T-(t-\tau)} = c + \gamma \cdot DEV^{GOV,JEF}_{T|T-(t-\tau),T-t} + \delta \cdot dum^{recession} + \epsilon_T.$$

If γ turns out to be negative, then the deviation of the government from the Joint Economic Forecast reduces the government's average forecast error. To see this, replace $DEV^{GOV,JEF}_{T|T-(t-\tau),T-t}$ by $FE^{GOV}_{T|T-(t-\tau)} - FE^{JEF}_{T|T-t}$, solve the resulting equation for $FE^{GOV}_{T|T-(t-\tau)}$ and compute its expected mean under the assumption of an unbiased Joint Economic Forecast:

$$E\left[FE^{GOV}_{T|T-(t-\tau)} | FE^{JEF}_{T|T-t} = 0\right] = \frac{c}{1-\gamma}.$$

If $\gamma < 0$, then $\frac{c}{1-\gamma} < c$.

Table 10 shows that for all forecast horizons except $t = 20$ months the government's deviations from the projections of the Joint Economic Forecast significantly increase the government's forecast error. Thus, if the government had not deviated, its forecasting performance would have been better on average. Or, to put it differently: if minimization of the forecast error really had been the government's objective, it should have better not deviated from

the Joint Economic Forecast, which on average produced more accurate projections than the government.

Table 10: Test on informational advantage of government

t	20 months	14 months	8 months	2 months
c	0.02	-0.19	-0.04	0.09*
	(0.37)	(0.28)	(0.13)	(0.05)
γ	-0.88	0.87***	1.15***	0.48***
	(0.96)	(0.26)	(0.23)	(0.11)
δ	2.98***	2.32***	0.93***	0.03
	(0.75)	(0.62)	(0.34)	(0.08)
n	20	45	46	47
R^2_{adj}	0.41	0.32	0.38	0.29

Note: The dependent variable is the forecast error of the government for nominal GDP. Standard errors robust to autocorrelation and heteroscedasticity are shown in parentheses. ***, **, * denote statistical significance at the 1%, 5% or 10% level.

4.4.3. Political motives of the deviation

The findings of the previous section suggest that the deviations might be triggered by political motives of the government. We test this hypothesis by running the following regression:

$$DEV^{GOV,JEF}_{T|T-(t-\tau),T-t} = \beta_1 \cdot ELECT_{T-(t-\tau)} + \beta_2 \cdot PARTISAN_{T-(t-\tau)} + \cdots$$

$$\cdots + \beta_3 \cdot FRAG_{T-(t-\tau)} + \beta_4 \cdot BAL_{T-j(t-\tau)} + \delta \cdot dum^{recession} + \epsilon_T.$$

Table 11 shows that in years of federal elections there seems to be only a systematic deviation of the government from the Joint Economic Forecast in the autumn forecasts for the next year (β_1). We suggest that this forecast horizon seems to be the most interesting for the government to set markups on the macroeconomic projections due to upcoming elections. Fourteen months, or in the case of Germany twelve months until the upcoming election, is enough time for the ruling government to convince voters of their own policy in a credible way. If it is assumed that voters are myopic, the spring forecasts for the next year might not be recognized. For both eight and two months ahead forecasts, the time might be too short to set markups on the forecast and thereby convincing the pool of voters in the run-up of the election.

We also find a strong positive correlation between the ideology of the ruling government and the deviation from the Joint Economic Forecast for the current year with a horizon of eight months (β_2). As hypothesized, left-wing governments tend to deviate even stronger compared to right-wing incumbents. Thus, if the deviation is positive, it gets even more positive under left-wing governments. We suggest that the eight month forecast horizon might be the best to set markups due to political ideological reasons. In spring, the Working Party on Tax Revenue Estimates formulates its revenue outlook for the current and the upcoming four years; these forecasts are also the basis for the medium-term financial planning of the German government. By setting markups on the macroeconomic projection for the current year, the government might immediately be able to push expenditures in the direction it wants to.

In addition to the effects initiated by upcoming elections or ideological motives, the deviation of the government from the Joint Economic Forecast significantly correlates with the fragmentation variable (β_3) for $t = 8$ months ahead predictions. The sign, however, deviates from what we hypothesized. Initially this result seems to be puzzling. But it becomes less so if we take a closer look at the fiscal forecasting literature (see Goeminne et al., 2008; Jochimsen and Lehmann, 2017), which gives three reasons for a higher degree of fractionalization leading to less optimistic or more pessimistic forecasts. First, the more parties are part of the parliament the higher is the representation of interest groups from the population. Thus, minor interest groups lose their power to influence policy. Second, large coalitions lead to an increase in struggles among the members, thus, increasing the power of the finance minister (see Jochimsen and Thomasius, 2014). If we assume that the minister has no incentive to produce biased forecasts, the forecast errors should decrease with a higher degree of fractionalization. Third, it is very likely that a member of a large-scale coalition today might also be part of the government in the next legislature. Being too optimistic on the economic development, and thus on the budget with higher deficits as an outcome, might not be attractive for a coalition member if the probability of staying in office is high.

Finally, the fiscal balance negatively correlates with the governments' deviations from the Joint Economic Forecast (β_4) for the two longest forecast horizons. Thus, the government faces an incentive to produce more bloomy economic outcomes in the longer run to brighten its own budget perspectives.

To sum up, the deviations of the German government from the nominal GDP projections of the Joint Economic Forecast correlate for some forecast horizons with of our political variables, which we interpret as evidence for political markups.[7] The result that political motives

[7] The results shown in Table 11 do not depend on the sample period. When we exclude the years prior to 1992 from our regressions the results are widely unchanged and do not change our conclusions.

are only significant for some forecast horizons can be explained with a government's objective function that varies with the forecast horizon. We conjecture that the incumbent favors diverse strategies for different forecast horizons. For the longer run it seems plausible that the government faces an incentive to signal a sustainable budget or a sound fiscal policy to the voter. Thus, the government can reduce its deficit ex-ante by setting markups on the macroeconomic projection. For short-term projections, the government wants to push the economy into its favorite direction to gain extra votes of the public as myopic voters may react to their favored short-term expenditures.

Table 11: Test for political motives underlying the deviation

t	20 months	14 months	8 months	2 months
β_1	-0.26	0.37*	-0.16	-0.04
	(0.31)	(0.19)	(0.23)	(0.12)
β_2	-0.04	0.09	0.12***	-0.02
	(0.05)	(0.08)	(0.04)	(0.04)
β_3	0.09	-0.41	-0.53***	0.18
	(0.31)	(0.31)	(0.16)	(0.13)
β_4	-0.17**	-0.06**	-0.03	0.02
	(0.06)	(0.03)	(0.03)	(0.02)
δ	-0.14	-0.63	-0.08	0.25*
	(0.20)	(0.46)	(0.21)	(0.15)
n	20	45	46	47
R^2_{adj}	0.21	0.10	0.07	0.05

Note: The dependent variable is the deviation of the government from the Joint Economic Forcast for nominal GDP. Standard errors robust to autocorrelation and heteroscedasticity are shown in parentheses. ***, **, * denote statistical significance at the 1%, 5% or 10% level.

5. Conclusion

Unbiased macroeconomic projections are an important instrument especially for realistic fiscal policy planning. The unbiasedness of a forecast, which comes along with the absence of political distortions, is mainly guaranteed by independent institutions. In the context of the European Union, the "Two-pack" regulations, that became effective in 2013, prescribe the member states to base their fiscal planning on such independent macroeconomic projections. Germany is a very special case as such an independent institution exists since 1950, which is called the Joint Economic Forecast and serves as input for the forecast of the German government. In this paper, we evaluate the accuracy of the German government's forecasts since the 1970s and decompose their forecast error into the error made by the Joint Economic Forecast and their deviations from this input.

Our results indicate that nominal GDP projections are upward biased for longer forecast horizons, which is mainly driven by two factors. First, the German government made false assessments of the decline in Germany's trend growth. And second, the forecast errors are driven by systematic failures in the anticipation of recessions. We also show that the German government also deviates from the projections of the Joint Economic Forecast, which however does not improve its forecast performance but rather worsen the outcome. Finally, we find evidence for political motives underlying these deviations.

We conclude from our results that the "Two-pack" regulations might guarantee independent macroeconomic forecasts. In case of Germany, the ex-post forecast errors of the government could have been reduced by relying on the Joint Economic Forecast. This let us suggest to further strengthen the role of the Joint Economic Forecast in Germany. If we generalize from the German case, the regulations are an appropriate tool to minimize the political biases inherent of macroeconomic projections. However, this statement has to hold for all European member states. Such investigations could be subject to future research activities. If once the number of forecasts is large enough, future articles could investigate whether the independent institutions are free of any biases and investigate the accuracy of those institutions.

References

Alesina, A. and Perotti, R. (1994): The political economy of growth: A critical survey of the recent literature, *The World Bank Economic Review*, **8** (3), 351-371.

Armingeon, K., Isler, C., Knöpfel, L., Weisstanner, D. and Engler, S. (2016a): *Codebook: Comparative Political Data Set 1960-2014*. Institute of Political Science, University of Berne.

Armingeon, K., Isler, C., Knöpfel, L., Weisstanner, D. and Engler, S. (2016b): *Comparative Political Data Set 1960-2014*. Institute of Political Science, University of Berne.

Batchelor, R. (2007): Bias in macroeconomic forecasts, *International Journal of Forecasting*, **23** (2), 189-203.

Büttner, T. and Kauder, B. (2010): Revenue forecasting practices: Differences across countries and consequences for forecasting performance, *Fiscal Studies*, **31** (3), 313-340.

Büttner, T. and Kauder, B. (2015): Political biases despite external expert participation? An empirical analysis of tax revenue forecasts in Germany, *Public Choice*, **164** (3), 287-307.

Christoffersen, P. F. and Diebold, F. X. (1997): Optimal prediction under asymmetric loss, *Econometric Theory*, **13** (6), 808-817.

Döhrn, R. and Filusch, B. (2016): Die Gemeinschaftsdiagnosen – Ursprung und Entwicklung, Probleme und Ergebnisse, RWI Materialien Nr. 107, Essen.

Döpke, J. and Fritsche, U. (2006a): Growth and inflation forecasts for Germany – A panel-based assessment of accuracy and efficiency, *Empirical Economics*, **31** (3), 777-798.

Döpke, J. and Fritsche, U. (2006b): When do forecasters disagree? An assessment of German growth and inflation forecast dispersion, *International Journal of Forecasting*, **22** (1), 125-135.

Ferejohn, J. and Krehbiel, K. (1987): The budget process and the size of the budget, *American Journal of Political Science*, **31** (2), 296-320.

Frankel, J. and Schreger, J. (2016): *Bias in Official Forecasts: Can Private Forecasts Help?* NBER Working Paper No. 22349.

Franzese, R. J. (2002): Electoral and partisan cycles in economic policies and outcomes, *Annual Review of Political Science*, **5** (1), 369-421.

Gebhardt, H. (2001): Methoden, Probleme und Ergebnisse der Steuerschätzung, *RWI-Mitteilungen*, **52** (2), 127-147.

German Federal Ministry for Economic Affairs and Energy (2013): Gemeinschaftsdiagnose 2013 – 2016: Die Teilnehmer stehen fest, Press release 7 June 2013.

Goeminne, S., Geys, B. and C. Smolders (2008): Political fragmentation and projected tax revenues: evidence from Flemish municipalities, *International Tax and Public Finance*, **15** (3), 297-315.

Granger, C. W. J. (1969): Prediction with a generalized cost of error function, *Journal of the Operational Research Society*, **20** (2), 199-207.

Heinemann, F. (2006): Planning or propaganda? An evaluation of Germany's medium-term budgetary planning, *FinanzArchiv / Public Finance Analysis*, **62** (4), 551-578.

Heilemann, U. and Stekler, H. O. (2013): Has the accuracy of macroeconomic forecasts for Germany improved? *German Economic Review*, **14** (2), 235-253.

Hibbs, D. A. (1977): Political parties and macroeconomic policy, *The American Political Science Review*, **71** (4), 1467-1487.

Higgins, M. L. and Mishra, S. (2014): State dependent asymmetric loss and the consensus forecast of real U.S. GDP growth, *Economic Modelling*, **38**, 627-632.

Jochimsen, B. and Lehmann, R. (2017): On the political economy of national tax revenue forecasts: evidence from OECD countries, *Public Choice*, **170** (3), 211-230.

Jochimsen, B. and Thomasius, S. (2014): The perfect finance minister: Whom to appoint as finance minister to balance the budget, *European Journal of Political Economy*, **34**, 390-408.

Jonung, L. and Larch, M. (2006): Improving fiscal policy in the EU: the case for independent forecasts, *Economic Policy*, **21** (47), 491-534.

Loungani, P, Stekler, H. and Tamirisa, N. (2013): Information rigidity in growth forecasts: Some cross-country evidence, *International Journal of Forecasting*, **29** (4), 605-621.

Muth, J. F. (1960): Optimal properties of exponentially weighted forecasts, *Journal of the American Statistical Association*, **55** (290), 299-306.

Nierhaus, W. (2002): Die Gemeinschaftsdiagnose der Wirtschaftsforschungsinstitute, *ifo Schnelldienst*, **55** (8), 40-42.

Nordhaus, W. D. (1975): The political business cycle, *The Review of Economic Studies*, **42** (2), 169-190.

Perotti, R. and Kontopoulos, Y. (2002): Fragmented fiscal policy, *Journal of Public Economics*, **86** (2), 191-222.

Persson, T. and Tabellini, G. (1999): *Political economics and macroeconomic policy*. In: Taylor, J. B. and Woodford, M. (ed.), Handbook of Macroeconomics, Volume 1, Part C, Chapter 22, 1397-1482, Elsevier North Holland.

Rogoff, K. and Sibert, A. (1988): Elections and macroeconomic policy cycles, *The Review of Economic Studies*, **55** (1), 1-16.

Roubini, N. and Sachs, J. D. (1989): Political and economic determinants of budget deficits in the industrial democracies, *European Economic Review*, **33** (5), 903-938.

Volkerink, B. and de Haan, J. (2001): Fragmented government effects on fiscal policy: New evidence, *Public Choice*, **109** (3), 221-242.

Weber, E. U. (1994): From subjective probabilities to decision weights: The effect of asymmetric loss functions on the evaluation of uncertain outcomes and events, *Psychological Bulletin*, **115** (2), 228-242.