

# Politics and Monetary Policy

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## Abstract

How and why do politicians' preferences about monetary policy differ from the interest rates set by independent central banks? Looking at the European Central Bank, the paper shows that politicians, on average, favor significantly lower interest rates. Three factors explain the different preferences. First, politicians put relatively less weight on inflation (and more on output) in their preferred monetary policy reaction function. Second, politicians' preferences are affected by political economy motives. Third, different preferences are also, and largely, due to different constituencies, as politicians primarily focus on national economic objectives rather than the euro area as a whole.

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*“[...] Central bank independence has been shown to be essential for controlling inflation. Sooner or later, the Fed will have to scale back its current unprecedented monetary accommodation. When the Federal Reserve judges it time to begin tightening monetary conditions, it must be allowed to do so without interference. [...] The democratic legitimacy of the Federal Reserve System is well established by its legal mandate and by the existing appointment process. Frequent communication with the public and testimony before Congress ensure Fed accountability.”*

Open Letter to US Congress and the US Executive Branch, signed by 386 economists, 20 July 2009

## **1. Introduction**

Over the last two decades, a large number of central banks has been granted independence for the conduct of monetary policy. Yet, as the above quote from a remarkable letter by 386 economists to US Congress in July 2009 illustrates, the case in favor of central bank independence is by no means a panacea. The ongoing financial crisis underlines the frequent controversy between governments and central banks about the trade-off between independence and accountability of monetary authorities, which re-surfaces in particular in periods of crisis and turmoil. And this controversy re-emerges regularly not just in the United States, but also in Europe and other parts of the world.

The case in favor of central bank independence has been made forcefully over the years, with much of the academic work building on the seminal insights by Kydland and Prescott (1977) and Barro and Gordon (1983) that governments are subject to an inflationary bias and that monetary policy is subject to a time inconsistency problem if run by elected politicians. Possible solutions to this problem have been suggested, for instance, by Rogoff (1985), Lohmann (1992) and Waller (1992), all of which focus on what type of central banker governments should appoint. In particular, by appointing a central banker who minimizes a loss function that puts less weight on output fluctuations than the government, the inflationary bias of discretionary policy can be reduced. Alternatively, a commitment technology can be devised, for instance, by appropriately designing the optimal contracts for central bankers, as suggested by Walsh (1995).

A characteristic of living democracies is that different opinions are expressed in the political debate. Having delegated monetary policy to an independent central bank, it is to be expected that the views of elected politicians are not always aligned with the monetary policy that is set by the central bank. Such differences in views might imply occasional disagreement about the preferred level of interest rates at a given point in time. Gerlach-Kristen (2009), for instance, develops a model whereby the monetary policy reaction function of more recession-averse agents implies

lower preferred interest rates and a higher weight on output relative to inflation than what would be the case for less recession-averse agents.

Furthermore, differences in preferences can arise due to political economy motives. Alesina and Tabellini (2007, 2008) show that the socially optimal delegation of tasks between politicians and bureaucrats does not necessarily coincide with the actual one. They show that the decision of incumbent politicians to delegate policy may stem from a motive to enhance their reelection chances. It entails that politicians tend to delegate tasks that expose them to risks, thus allowing them to shift blame in case of adverse outcomes, and to claim responsibility in the case of success (Kane 1980). This rationale may also apply to the conduct of monetary policy, which frequently has to be done in an environment of considerable uncertainty.

The political commentary on the ECB and its monetary policy is a point in case, and this paper attempts to quantify the importance of these issues. In particular, inferring from the political commentaries, it analyses to what extent the implied weights on inflation and output in the respectively preferred monetary policy reaction functions differ between the ECB and elected politicians. The second intention of the paper is to measure the importance of political economy motives, by studying whether politicians' preferences shift, for instance depending on their reelection chances. The paper also investigates whether these issues are particularly imminent in the case of a monetary union, where on the one hand the central bank has a different constituency than politicians, who may primarily target national constituencies and the performance of their domestic economies,<sup>1</sup> and on the other hand national governments might be subject to an additional inflation bias given that the costs of expansionary fiscal policies need to be borne union-wide, and therefore only partially at the national level (Neyapti and Ozgur 2007).

For that purpose, the paper collects an unprecedented database containing politicians' statements about the ECB's monetary policy over the first 9 years of EMU. These are statements commenting on the stance of monetary policy, and contain a full list of all comments made by the main government officials (head of government and all ministers) for each of the 12 initial EMU members (including Greece).

The paper first shows that politicians tend to favor lower interest rates on average, on the one hand because euro area politicians place a greater weight on employment and growth and a lower weight on price stability than the central bank, and on the other hand due to the differences in the constituencies of the ECB and the national governments, with comments being mostly motivated by national rather than euro area-wide factors.

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<sup>1</sup> A similar issue applies also at a national level, where politicians get elected in a local constituency, yet the central bank sets monetary policy for the economy as a whole.

Moreover, we find evidence that the preferences of politicians depend on political economy factors. More specifically, we find that the relative weight on growth in politicians' preferred reaction functions increases when the national economic performance is relatively weak, when there is a low level of trust in the ECB by the national electorate, and depending on the political orientation of governments (with left-wing parties placing relatively more emphasis on growth). Thus, these findings suggest that politicians' preferences about monetary policy indeed shift in accordance to political economy motives pursued by these politicians. Furthermore, we find that governments' preferences shift towards a larger weight on growth in the presence of high public debts or deficits, which is consistent with the above hypothesis that in monetary unions politicians have a stronger inflationary bias as the costs of their own actions are partly shared by all union members.

The final part of the paper derives euro area politicians' preferred interest rate paths since 1999 and compares these with actual euro area monetary policy rates. More precisely, we derive two paths for the politicians' preferred interest rates. The first one, or what we label the "fundamentals' implied" preferred rate, is the hypothetical interest rate preferred by politicians if their preferences were *solely* determined by a greater relative weight on output as identified in the first part of the analysis. There are periods, such as in 2001-03 and since 2006 when this hypothetical rate would have been lower than actual euro area interest rates. Yet there are also periods, such as in 2004-05, when this implied rate was higher than the actual policy rate. By contrast, through their public statements politicians in the euro area have almost always argued for lower interest rates, even in the period 2004-05 when ECB interest rates were already quite low. Accordingly, we calculate a second measure, for the "true preferred" rate as inferred from politicians' public statements. We find that this rate is on average around 40 basis points below the actual policy rates. The difference between the two measures for politicians' preferred interest rates illustrates that a large part of euro area governments' preference for lower interest rates stems from political economy motives, rather than from different weights on output and inflation.

Conceptually, the paper is related to two strands of the literature. One deals with the optimal allocation of policy tasks between bureaucrats and politicians. A sizeable principal-agent literature on public choice addresses this issue, typically modeling bureaucrats as having superior technical skills and politicians as being better in determining the optimal effort across a larger set of priorities (Alesina and Tabellini 2007, 2008; Dewatripont, Jewitt and Tirole 1999a,b; Besley and Coate 2003; Schultz 2008). This literature finds that it is optimal to delegate tasks to bureaucrats if those tasks entail a risk of time inconsistency and the bureaucrats can be trusted to be skilled and unbiased,

while it is preferable to allocate the tasks to politicians if policy flexibility is crucial, e.g. as preferences may change, or the compensation of losers is important.

At the same time, it has been argued that the actual allocation of policy tasks is often very different from the socially optimal one, in part because it is the politicians and not the citizens that take the decision on the allocation and because politicians have different objectives, focusing on reelection and rent seeking, from those of the voters. This literature, along the lines of Kane (1980), Epstein and O'Halloran (1999) and Blinder (1997), stresses the blame-shifting motive of politicians to delegate policy tasks to bureaucrats. The present paper is closely linked to this positive perspective, by trying to understand empirically why, on the one hand, while having delegated monetary policy to an independent central bank, on the other hand, politicians still extensively comment on the stance of monetary policy.

As to the empirical literature, several contributions have studied the relationship between politics and central banks. Most of this literature deals with the U.S. Congress and the Federal Reserve, and tests whether monetary factors have contributed to generating a political business cycle. The results are mixed: whereas some studies find this to be the case for the Fed's monetary policy between the 1970s and 1990s, others find little evidence.<sup>2</sup> A second strand of this literature uses a more direct approach, by measuring the public commentary about monetary policy, with much of the work building on the measurement methodology proposed by Havrilesky (1993). While most of this work focuses on the United States, some work has also studied the Bundesbank, the Czech National Bank, or even the early ECB.<sup>3</sup>

The present paper is distinct from this empirical literature along several dimensions. In particular, it tests for the determinants rather than for the effects of political commentaries, thereby building on the above-discussed theoretical work on the principal-agent problems in monetary policy. It tests whether there are differences in preferences between politicians and central banks, and whether these differences are furthermore affected by political economy factors. Finally, the empirical analysis of the paper adds the dimension of monetary union, which entails a difference in constituencies between politicians' national focus and the central bank's union-wide perspective.

The paper proceeds in section 2 by developing a conceptual framework that derives empirically testable hypotheses about differences in preferences between central banks and politicians, and possible shifts in politicians' preferences. Section 3 discusses the database underlying our analysis, presenting both the measurement of political commentaries and the various

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<sup>2</sup> Evidence for the hypothesis is provided in Alesina and Sachs (1988), Grier (1993), Abrams and Iossifov (2006) or Hellerstein (2007); in contrast, Wooley (1984) or Faust and Irons (1999) find little evidence.

<sup>3</sup> See Berger, de Haan and Eijffinger (2001) or Posen (1993) for the US, Maier, Sturm and de Haan (2002) for the Bundesbank, Gersl (2006) for the Czech National Bank and Maier and Bezoen (2004) for the ECB.

proxies for the political economy motives. Section 4 discusses the empirical results and implications, and Section 5 concludes.

## 2. Modeling politicians' preferences

In this section, we describe our basic model set-up for studying the preferences of politicians and the central bank. We derive from these the hypotheses for our empirical analysis.

### 2.1 The basic model: testing for different weights in the respective reaction functions

We start from the premise that the central bank is given an institutional mandate for price stability for the monetary union as a whole, rather than for individual economies. Our model entails that politicians in individual euro area countries may to some extent also have a euro area-wide perspective and would like to see interest rates move in response to euro area inflation and growth.<sup>4</sup> However, their constituency not being the entire monetary union, but the national state, we allow for the possibility that politicians not only take a union-wide perspective, but that their motives at least partly also have a national perspective. Politicians' preferred interest rates can therefore be expressed as:

$$(1) \quad i_t^P = \alpha^P + \beta^{P,EA} \pi_t^{EA} + \beta^{P,C} (\pi_t^C - \pi_t^{EA}) + \gamma^{P,EA} y_t^{EA} + \gamma^{P,C} (y_t^C - y_t^{EA}) + \varepsilon_t^P,$$

where  $i$  denotes interest rates,  $\pi$  consumer price inflation, and  $y$  GDP growth. Euro area variables are denoted with the superscript  $EA$ , country-specific variables with the superscript  $C$ . Superscript  $P$  is chosen for all variables or parameters that relate to a politician;  $i_t^P$ , for instance, denotes the interest rate preferred by a politician at time  $t$ , depending on the observed macroeconomic conditions. According to standard reasoning, the politicians' preferred interest rate should rise in response to higher inflation or higher output, leading to the following hypotheses:  $\beta^{P,EA} > 0$ ;  $\beta^{P,C} > 0$ ;  $\gamma^{P,EA} > 0$ ;  $\gamma^{P,C} > 0$ . The model encompasses a concern for euro area as well as for national economic conditions by splitting the inflation and growth series into a common euro area component, and the differential between national and euro area variables. This split implies that even a purely national concern of a politician can lead to a significant response of preferred interest rates to euro area developments. In particular, the more closely the business cycle of a country is aligned with the euro area cycle, the more important are euro area developments from a national perspective.

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<sup>4</sup> Politicians may have a broader set of objectives in mind, such as concerning unemployment. The model could easily be expanded in that direction, and in our empirical application, we will extend the model accordingly. The qualitative results, however, are not affected by such an extension.

The model is derived based on the reading of a large number of comments by politicians about the ECB's monetary policy. The appendix provides a selection of such statements which are contained in the database underlying our empirical analysis.<sup>5</sup> Although only a small selection, these statements clearly show that politicians care about inflation (e.g. statements 11 and 12), but also about growth and employment (statements 1 and 6). A second insight to be drawn from these statements is a concern about *current* economic conditions, and the request that the central bank react to these (most explicit in statement 14). Finally, there is evidence that while politicians care also about the economic performance of the euro area (e.g. statements 1 and 15), the bulk of comments relates to the performance of their national economies (e.g. statements 3, 4, 11 and 12).

Due to the independence of the ECB, the politician is not in a position to implement her preferred interest rate, though. Rather, she is confronted with the actual interest rate  $i^{act}$ , which is set by the ECB with a view to euro area variables only. We abstract from modeling the ECB's monetary policy rule, given that regardless of the precise specification of this rule, actual interest rates will in the end show some correlation with euro area inflation and growth, which can be described as:

$$(2) \quad i_t^{act} = \alpha^{act} + \beta^{act} \pi_t^{EA} + \gamma^{act} y_t^{EA} + \varepsilon_t^{act}$$

Although the actual implementation of monetary policy might follow a different process, e.g. by including forward-looking variables, we would nonetheless expect to find  $\beta^{act} > 0$  and  $\gamma^{act} > 0$ . Note that the actual interest rate is the result of the aggregation of the preferences of the individual committee members, and that we do not take a stand on the optimality of the actual interest rates. Our interest is solely of a positive nature, in how the politicians' preferred rates differ from those that get implemented by the central bank, without taking a normative view as to which rates are preferable from a social welfare perspective.

Given that actual interest rates are set by a different institution, they might differ (at least at times) from politicians' preferred rates. The gap between the two rates is described by the difference of (1) and (2):

$$(3) \quad i_t^{act} - i_t^P = (\alpha^{act} - \alpha^P) + (\beta^{act} - \beta^{P,EA}) \pi_t^{EA} - \beta^{P,C} (\pi_t^C - \pi_t^{EA}) \\ + (\gamma^{act} - \gamma^{P,EA}) y_t^{EA} - \gamma^{P,C} (y_t^C - y_t^{EA}) + \mu_t$$

This simple manipulation allows formulating a number of hypotheses:

1.  $H_0 : \beta^{act} - \beta^{P,EA} > 0$ : Would politicians like to put less emphasis on euro area inflation than the central bank?

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<sup>5</sup> We will return in the next section to a detailed explanation about the underlying methodology for the extraction of these statements; the point here being that the specification of equation (1) is indeed based on the content and intention of politicians' statements.

2.  $H_0 : \gamma^{act} - \gamma^{P,EA} < 0$ : Would politicians like to put more emphasis on euro area growth than the central bank?
3.  $H_0 : \beta^{P,C} > 0$  and
4.  $H_0 : \gamma^{P,C} > 0$ : To what extent does a different desired interest rate level result from a different constituency of the ECB (euro area) and the politician (national economies)?

Hypotheses 1 and 2 can be combined to provide a proxy for the relative weights on inflation and output: if *either* 1 *or* 2 were found in the data and the alternative hypothesis for 2 or 1 cannot be accepted, this would suggest that the central bank puts more relative weight on inflation than politicians.<sup>6</sup> Hypotheses 3 and 4 are specific for monetary unions, where the concern of the central bank relates to the entire union, while politicians need to be re-elected by their national constituencies.

Unfortunately, the politicians' preferred interest rate  $i_t^P$  is unobservable; at the same time, statements made by politicians provide an indication of where, in their views, interest rates should be heading at the current juncture. If the difference between the actual and the politicians' preferred interest rates,  $i_t^{act} - i_t^P$  is positive (negative), statements by politicians will argue for lower (higher) rates, such that the political commentary  $pc_t$  arguing for lower rates should map into the interest rate gap:  $pc_t = f(i_t^{act} - i_t^P)$ . Without knowing the precise functional form of this relationship, we can safely assume that for larger  $i_t^{act} - i_t^P$ , the commentaries expressing a preference to reduce rates should become more frequent. This allows specifying a proxy regression: Rather than estimating equation (3), it is possible to use

$$(4) \quad pc_t = a + b^1 \pi_t^{EA} + b^2 (\pi_t^C - \pi_t^{EA}) + c^1 y_t^{EA} + c^2 (y_t^C - y_t^{EA}) + \mu_t .$$

For this model, our hypotheses translate to:

1.  $H_0 : b^1 > 0$ ;
2.  $H_0 : c^1 < 0$ ;
3.  $H_0 : b^2 < 0$ ;

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<sup>6</sup> To be more precise, a higher relative weight in inflation implies  $\gamma^{act} / \beta^{act} < \gamma^{P,EA} / \beta^{P,EA}$ . This condition is satisfied if i)  $\beta^{act} > \beta^{P,EA}$  and  $\gamma^{act} < \gamma^{P,EA}$ , ii)  $\beta^{act} = \beta^{P,EA}$  and  $\gamma^{act} < \gamma^{P,EA}$ , or iii)  $\beta^{act} > \beta^{P,EA}$  and  $\gamma^{act} = \gamma^{P,EA}$ . It would even hold if  $\beta^{act} < \beta^{P,EA}$  and  $\gamma^{act} \ll \gamma^{P,EA}$ , although the latter condition cannot be tested for in our framework, as we only observe  $\beta^{act} - \beta^{P,EA}$  and  $\gamma^{act} - \gamma^{P,EA}$ . As the stylized model presented in this paper obviously lacks any micro-foundations, its interpretation in terms of preference parameters is not immediate. However, the same result can be obtained in a reasonably general range of micro-founded models. The model derived in Woodford (2003), Chapter 7, for instance, leads to a family of contemporaneous Taylor rules where the ratio of the parameters on the output gap and inflation increases with increasing weights on output stabilization in the social loss function.



$$4. H_0 : c^2 < 0 .$$

## 2.2 Preference shifters

While equation (4) allows us to identify whether preferences between the central bank and politicians are different on average, it could very well be that there are certain determinants that shift politicians' preferences.

To investigate this issue, we are interested whether there are periods of time or specific circumstances, described by a variable  $x_t$ , during which the preferences of politicians change, towards a larger relative weight on growth, or toward a stronger focus on national economic outcomes than otherwise. In that sense, the proxy regression (4) can be extended to

$$(5) \quad pc_t = a + b^1 \pi_t^{EA} + b^2 (\pi_t^C - \pi_t^{EA}) + b^3 \pi_t^{EA} x_t + b^4 (\pi_t^C - \pi_t^{EA}) x_t \\ + c^1 y_t^{EA} + c^2 (y_t^C - y_t^{EA}) + c^3 y_t^{EA} x_t + c^4 (y_t^C - y_t^{EA}) x_t + dx_t + \mu_t$$

The hypotheses can then be formulated as 1.  $H_0 : b^1 > 0$ ; 2.  $H_0 : c^1 < 0$ ; 3.  $H_0 : b^2 < 0$ ; 4.  $H_0 : c^2 < 0$  (as above) in the absence of  $x_t$ . For the interacted terms, we expect 5.  $H_0 : b^3 > 0$  (implying even less weight on euro area inflation); 6.  $H_0 : b^4 = ?$  (positive if politicians want less emphasis on inflation; negative in case of an increased emphasis on the national economy); 7.  $H_0 : c^3 < 0$  (more weight on euro area growth); and 8.  $H_0 : c^4 < 0$  (more weight on national growth).

## 2.3 Extracting politicians' preferred interest rates

While models (4) and (5) can be estimated using the observed data on public commentaries by politicians, they do not allow for an estimate of politicians' preferred interest rates. However, such an extraction is feasible once we impose an additional assumption, namely that politicians who comment in a neutral or supportive manner on the ECB's monetary policy stance are on average content with the actual interest rate. More formally, this assumption implies that

$$(6) \quad i_t^P \approx i_t^{act} \text{ if } pc_t = 0$$

Under this assumption, the preferred interest rate becomes observable. Hence, using all observations where politicians express a neutral stance on the ECB's monetary policy, it is possible to estimate the direct forms of the preference equations; in its extended version:

$$(7) \quad i_t^{act} = \alpha^P + \beta^{P,EA} \pi_t^{EA} + \beta^{P,C} (\pi_t^C - \pi_t^{EA}) + \beta^{P,EA,x} \pi_t^{EA} x_t + \beta^{P,C,x} (\pi_t^C - \pi_t^{EA}) x_t \\ + \gamma^{P,EA} y_t^{EA} + \gamma^{P,C} (y_t^C - y_t^{EA}) + \gamma^{P,EA,x} y_t^{EA} x_t + \gamma^{P,C,x} (y_t^C - y_t^{EA}) x_t + \delta x_t + \varepsilon_t^P$$

As before, the expected signs of the coefficients are 1.  $H_0 : \beta^{P,EA} > 0$ ; 2.  $H_0 : \gamma^{P,EA} > 0$ ; 3.  $H_0 : \beta^{P,C} > 0$ ; 4.  $H_0 : \gamma^{P,C} > 0$  the absence of  $x_t$ , and 5.  $H_0 : \beta^{P,EA,x} < 0$ ; 6.  $H_0 : \gamma^{P,EA,x} > 0$ ; 7.  $H_0 : \beta^{P,C,x} = ?$ ; 8.  $H_0 : \gamma^{P,C,x} > 0$  for the interacted terms.

The interpretation of the estimated coefficients is now straightforward, as they directly indicate, in basis points, for instance how much weight politicians would like to put on growth. Finally, under the assumption that the fundamental relationships remain identical for politicians with a neutral stance and those arguing for higher or lower rates, the estimated parameters from (7) can be used to estimate predicted values,  $\hat{i}_t^P$ , for the preferred rates for of those politicians who make non-neutral statements. The gap between the actual and the predicted preferred interest rates,  $i_t^{act} - \hat{i}_t^P$ , provides a meaningful metric to assess the magnitude of the different preferences. Before moving on to the estimation of these models, the subsequent section details how the corresponding variables have been constructed.

### 3. Measuring political commentaries and preference shifters

In this section, we describe the database underlying our empirical analysis, which consists mainly of two building blocks: first, the public statements by politicians, and second, proxies for preference shifters, i.e. instances when politicians could possibly put more relative weight on growth, or be inclined to increase their focus on national considerations, than otherwise. We will discuss each in turn.

#### 3.1 Measuring political commentaries

As mentioned in the introduction, it is a characteristic of living democracies that different opinions are expressed in the political debate, and this includes the possibility that politicians publicly state their preferences about monetary policy. This can happen in the context of direct consultations with the central bank, or through public comments about the central bank or its monetary policy, ranging from statements about past decisions to discussions of future central bank actions, or comments of a more general nature about the mandate of the central bank. Given the unobservability of the former, our objective in this paper is to extract all relevant public statements by elected politicians containing some commentary about the ECB's monetary policy.<sup>7</sup>

As discussed in Section 2, the case of the ECB is of particular interest, given the fact that the ECB conducts monetary policy with a view to achieve price stability in the euro area, whereas

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<sup>7</sup> Politicians might want to make such statements with the intent to affect the conduct of monetary policy, or to signal to their voters that they are abreast of the debate, and do their best to convey to the ECB what would be in the interest of their voters.

politicians naturally also have a concern for their national constituencies. This adds another dimensionality to the public commentaries. At the same time, the large number of governments that can potentially comment on monetary policy gives us substantially more variation in the macroeconomic and political conditions, thus facilitating the econometric identification problem.

To obtain politicians' statements, we used Factiva, a database that contains newspaper articles and newswire reports from 14,000 sources, and extracted all database entries containing a reference to the ECB and the word "minister" or the name of the head of government. From all hits obtained, we extracted those containing statements by euro area politicians about the ECB, carefully avoiding double counting.<sup>8</sup> In total, we cover the 11 initial euro area members plus Greece. We did not include commentaries by the more recent euro area members, as we cannot exclude the possibility that their entry into monetary union is so recent that their governments might still communicate in different terms with the ECB.

We distinguish between two types of statements, one referring directly to commentaries about future monetary policy decisions, and a second one of more indirect nature, containing statements about the ECB's mandate (e.g. about the relative weight on growth or the exchange rate in the conduct of monetary policy) and independence, about past interest rate decisions, or about exchange rates. Clearly, one can think of different and finer categorizations, or about separating the different statements contained in the second category. However, there are only relatively few such statements in the second category, such that we decided to keep the categorization as simple as possible, using the second type of statements only as robustness test. Hence, unless otherwise noted, the empirical tests presented below will use only statements about the future path of interest rates.

The final step consists of classifying each statement, depending on whether it implies a preference for lower interest rates, for higher interest rates, or is neutral:

$$C_{\tau}^P = \begin{cases} +1 & \textit{preference for lower rates} \\ 0 & \textit{neutral statement} \\ -1 & \textit{preference for higher rates} \end{cases}$$

A number of issues are worth noting about this data extraction exercise. First, the search was conducted only in English. We might therefore not have discovered all statements, if these were made and reported upon exclusively in other languages. However, due to the fact that Factiva

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<sup>8</sup> An example for our search commands is "minister and ECB or minister and European Central Bank". Other searches replace the word "minister" by the name of the head of government. Finally, for France we also searched for comments by the head of state, who typically engages actively in political discussions. Our data collection differs from the one proposed by Havrilesky (1993) in one important dimension: while Havrilesky was interested whether the Fed *responds* to political commentaries, we are interested in their *determinants*. For the former, it is useful to measure the amount of critical commentaries in the media (as in-depth and repeated reporting about the same statement by a politician can possibly increase the pressure on the central bank); for our purposes, however, it is important not to double-count statements.

contains also newswire reports, and due to the extensive coverage of this topic by newswires, this issue should not be very problematic. As a matter of fact, we extracted statements along the same lines in other languages for some years, with very few differences in results.

Second, we deliberately restricted our search to politicians that are in national government positions, thus excluding those in local governments or in the parliamentary opposition, as well as comments by lobby groups, trade unions or international institutions such as the IMF or the OECD. Including them would give a more comprehensive view of the political debate in a given country. For the purposes of this paper, we are however interested in the relationships between the central bank and the government, as the incumbent politicians can be made responsible for the economic performance of their constituency during their tenure, and thus face the time inconsistency problem in the most direct form. This links closely to the principal-agent literature discussed above.

Third, a key difficulty is clearly how to ensure that the classification of statements is done correctly. It is important to stress that this classification is based on our own judgment and reading of the reports and thus does not rule out a wrong classification in some cases. In line with the techniques of content analysis (e.g. Holsti 1969), we had different individuals classify the statements independently and discarded those that are not unanimous. However, a unanimous classification was generally achieved, given that in the vast majority of cases, the wording of statements was extremely clear. In particular the category of statements with a reference to the preferred future level of interest rates was uncontroversial. The appendix provides a number of statements contained in our database along with our classification, allowing the interested reader to cross-check our classification.

Fourth, our collection of statements is based on media reports. We can therefore not exclude an independent role of the media in the generation of these statements. Journalists could attempt to encourage politicians more to talk about their views on ECB monetary policy in certain macroeconomic environments. We will address this concern when testing for the robustness of our results.

The sample for the extraction of statements starts in January 1999, i.e. with the ECB taking over responsibility for euro area monetary policy, and ends in December 2007. In total, our database includes 767 statements. Table 1 provides the overall figures, and breakdowns by country, time period, and political affiliation of speakers. As expected, there is a strong asymmetry in the statements, with around 60% expressing a preference for lower rates, and only 5% for an increase in interest rates. Interestingly, these numbers vary only little with the political orientation of speakers. Preferences for higher interest rates are more often expressed by centre and centre-right as well as by neutral politicians (with 6%, 8% and 5% of their statements suggesting that rates could be

increased, as opposed to, e.g., 2% for centre-left politicians). However, the differences are relatively small.

Table 1

Table 1 furthermore shows interesting time variations. While the number of statements remained roughly unchanged for the first 4 years from 1999 to 2002 and the next 4 years until 2006 (with around 300 statements each), there has been a clear increase in 2007. For the last year of our sample alone, 135 statements have been recorded.

Another interesting insight from Table 1 is that there is considerable cross-country variation. In countries where inflation on average exceeded euro area inflation, governments are much more likely to express a preference for *higher* interest rates. Parts of the patterns do therefore seem to be driven by inflation differentials in EMU, suggesting that the analysis of a monetary union adds an interesting dimension to the determinants of public commentaries about central banks.

For the subsequent econometric analysis, we aggregate the extracted statements. Possible levels of aggregation could be the country level, or the political party level. We consider the latter more useful for our purposes (but will provide a robustness test for aggregation at the country level) for a number of reasons. For instance, in government coalitions, the various coalition parties might behave in different ways, e.g. depending on their individual voting support, or their political orientation. Additionally, we will test for the role of a number of determinants that are measured at the party level, thus giving us additional variation to exploit. Accordingly, we calculate the quarterly sum of our extracted statements for each political party  $z$  as  $pc_{z,t} = \sum_{P \in z, \tau \in t} C_{\tau}^P$ . Given our search criteria for the statements (which need to be made by a head of government or a ministers), this implies that all observations relate to parties in government. This aggregation yields nearly 300 quarter-political party observations, covering 36 quarters and 23 political parties plus a number of ministers without party affiliation. Given that the database does not contain an entry if there have been no statements by the ministers of a given party, and due to changes in government compositions, the dataset is not a balanced panel.

Figures 1-2 and Table 2

Figure 1 shows the evolution of the commentaries over time, indicating some periods with a large number of comments expressing a preference for lower interest rates, such as in the very beginning of EMU and in 2001-03. The interesting point of comparing Figures 1.A and 1.B is that the comments made in 2007 were less focused on future interest rate decisions, but more on the mandate, independence and exchange rate policy of the ECB. Moreover, a preference for lower

future interest rates was particularly frequently expressed in periods of monetary policy turning points, such as in mid 2001, 2003 and in late 2005.

Figure 2 breaks down the political commentary by country groups, distinguishing at any point in time between countries with high versus low inflation (Figure 2.A) and countries with high vs. low GDP growth (Figure 2.B). Overall, Figure 2 indicates that there is a significant relation between the extent to which a country's politicians express a preference for lower interest rates and the country's economic performance in terms of inflation and growth, providing a first piece of evidence in support of the hypotheses formulated in section 2.

Summary statistics for the political commentary variables are provided in Table 2, which again reveals the asymmetry of statements: there is a clear dominance of statements arguing for lower interest rates, whether looking at comments about future interest rate decisions alone, or taking all comments together. While these simple statistics clearly show that politicians favor lower interest rates on average, in what follows we will analyze in more depth why these different preferences arise.

### **3.2 Proxies for shifts in politicians' preferences**

In parts of the subsequent analysis, we are interested in whether government preferences on the weights attached to inflation and growth are determined by the environment in which politicians operate. The case of elections is probably the most evident, given the large literature on political business cycles (for an overview, see Drazen 2000); however, we are interested in the issue in a broader sense, and would therefore like to test further hypotheses. Accordingly, we have defined the following set of variables, for which Table 3 shows the cross-correlation:

Table 3

#### ***Pre-election period***

As is well established in the literature on political business cycles, incumbent governments have an incentive to boost the macroeconomic performance in the run-up to elections. Drazen (2000) develops a model with fiscal policy being under control of the incumbent politician and an independent central bank running monetary policy. The model shows that the politician has an incentive to pressure the central bank to accommodate fiscal shocks in the period before elections. Accordingly, we are interested whether politicians' preferences shift towards a larger emphasis on growth in the conduct of monetary policy. We test for this hypothesis by designing a dummy variable that is equal to one in the quarter of the election.

### ***Low voting support***

Incumbent governments care about the re-election prospects. An important piece of information for that purpose is contained in voting intention polls. While political parties might conduct such polls on their own, these results are for obvious reasons not available to us. Accordingly, we reverted to the results of voting intention polls that are conducted externally, and often provided publicly.<sup>9</sup> The variable used in our regression analysis is the rate at which voting support *declines* over time (i.e. we take the negative value of the quarterly growth rate to obtain a variable that is likely to increase with the propensity to call for lower rates). For government ministers without a party affiliation, we set this dummy variable to zero. We lag this variable by one quarter to avoid reverse causality (whereby voting support may be responsive to public commentaries about the ECB).

### ***Low public trust in ECB***

Similar to the election and voting support variables, a politician may have a greater incentive to comment critically on the ECB if the country's public has relatively little trust in the ECB. We use micro data from the EU Commission's Eurobarometer survey, which is conducted twice a year for about 1000 households in each euro area country, to measure a country's trust in the ECB. These survey participants are asked "Please tell me if you tend to trust or tend not to trust the European Central Bank." The possible answers are "I tend to trust", "I tend not to trust", or "I do not know". We derive the measure of low trust in the ECB as the share of respondents who state that they do not trust the ECB out of all respondents. We use a dummy that takes the value of one if the share of people not trusting the ECB in a particular country is above the sample mean in a given year, and zero otherwise. We lag this variable by one quarter to avoid reverse causality (whereby trust in the ECB is responsive to public commentaries about the ECB).

### ***Excessive deficit procedure***

Fiscal policy by euro area governments is constrained by the Stability and Growth Pact, which restricts the debts and deficits a government can incur. If the budget deficit breaches the threshold of 3% of GDP foreseen in Maastricht Treaty, the excessive deficit procedure (the so-called

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<sup>9</sup> The sources of these data are: Österreichisches Gallup-Institut (Austria), La Libre Belgique (Belgium), Centro de Investigaciones Sociológicas (Spain), Taloustutkimus (Finland), TNS Sofres (France), Infratest-Dimap (Germany), TNS mrbi (Ireland), sondaggi politicoelettorali.it (Italy), TNS Ilres/Tageblatt (Luxembourg), Politieke Barometer (the Netherlands) and Expresso/Euroexpansão (1999-2001); Expresso/Eurosondagem (2001-2008) (Portugal). We would like to thank Politieke Barometer, TNS mrbi, Österreichisches Gallup-Institut, Thomas Mathä, Linda Gonçalves Veiga and Francisco José Veiga for their invaluable help in retrieving these data. The Portuguese data are an update of those analysed in Veiga and Veiga (2004).

dissuasive arm of the Stability and Growth Pact) is triggered. If the deficit is indeed deemed excessive by the ECOFIN Council, recommendations are issued to the member states as to how the deficit can be contained, including a time frame for doing so. Non-compliance will trigger further steps in the procedures, including the possibility of sanctions.<sup>10</sup> As this substantially reduces the room for maneuver in fiscal policy, we conjecture that this externally imposed constraint could lead to an increased desire that monetary policy stimulates the economy by taking growth considerations into account more forcefully, given that stronger growth will have a dampening effect on budget deficits, thus making an abrogation of the excessive deficit procedure more likely. The corresponding variable in our regression is a dummy variable that is equal to one for all quarters where the government is subjected to such a procedure.

### ***Negative growth differential***

Shifts in the preferences of politicians might furthermore arise due to the macroeconomic performance of the individual country relative to the euro area average. The model developed in Alesina and Cukierman (1990), for instance, suggests that voters infer from actual economic outcomes about the preferences of the incumbent politician. Under the assumption of persistent preferences, voters will predict future policies and outcomes by looking at current economic conditions. A similar result is obtained in Rogoff and Sibert (1988), where the ability of a politician is private information, such that vote decisions relate to past policies and economic outcomes. In such a setting, the incumbent politician has an incentive to argue for a supportive monetary policy, or to shift the blame for a poor economic performance to the central bank. For instance, if growth is relatively low, this might twist politicians' incentives towards placing even more emphasis on growth. The variable "negative growth differential" attempts to measure this possibility by means of a dummy variable which is equal to one if national growth is lower than the euro area average. Note that the benchmark model already contains a variable measuring the growth differential between a country and the euro area, which is defined in a continuous way. The dummy variable for negative growth differentials does therefore test whether there is an asymmetry, whereby the effect of the growth differential (and all other variables) differs depending on whether the growth differential is positive or negative.

### ***Left-wing party***

The importance attached by politicians to price stability and high growth tends to differ depending on their political orientation. In particular, more left-wing parties tend to receive their

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<sup>10</sup> See e.g. [http://ec.europa.eu/economy\\_finance/sg\\_pact\\_fiscal\\_policy/index\\_en.htm?cs\\_mid=570](http://ec.europa.eu/economy_finance/sg_pact_fiscal_policy/index_en.htm?cs_mid=570).



voting support from workers and less wealthy individuals, who have much to lose from low growth (or high unemployment). In contrast, more conservative parties are typically supported by a wealthier clientele, which places more emphasis on low inflation (Hibbs 1977, Powell and Whitten 1993, Swank 1993). We are therefore interested to see whether changes in government lead to corresponding changes in preferences. Our variable to test for this effect is based on the Chapel Hill Party Dataset 2002.<sup>11</sup> This dataset contains a variable measuring the position of the party in 2002 in terms of its broad ideological stance. Based on the distribution of this variable for the political parties in our sample, we have constructed a dummy that takes the value of -1 for the one third of the parties at the right, 0 for the third in the middle, and 1 for the third of parties at the left of the political spectrum.

### ***High debt, high deficit***

In a monetary union, governments might be subject to an additional inflation bias, given that the costs of expansionary fiscal policies need to be borne union-wide, and therefore only partially at the national level. The model of Neyapti and Ozgur (2007), for instance, finds that inflation and budget deficits might be positively correlated with the degree of central bank independence in a monetary union. In line with this reasoning, we are interested whether the debt level or the deficit has a bearing on politicians' preferences, in the sense that higher debts or deficits imply less weight on inflation. To test for this effect, we construct two dummy variables, taking the value of one if the debt level (or the deficit) in a particular country, as measured according to the Maastricht criteria, is above the sample mean in a given year, and zero otherwise.

## **4. Estimates of politicians' preferences**

We now turn to analyzing the various regression models as outlined in Section 2. We will first ask whether politicians place different weights on price stability and growth than the central bank, and whether we can detect a focus of politicians on their respective national economic conditions. From there, we will go further and analyze whether there is any evidence for specific conditions under which preferences shift, before we will attempt to extract the politicians' preferred interest rates.

### **4.1 What weights on price stability and growth?**

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<sup>11</sup> See <http://www.unc.edu/~gwmarks/data.htm>.

To answer this question, we need to put equation (4) to an empirical test. As we have defined the political commentary variables at the level of the political party, the estimated version of equation (4) is

$$(4') \quad pc_{z,t} = a_z + b^1 \pi_t^{EA} + b^2 (\pi_{z,t}^C - \pi_t^{EA}) + c^1 y_t^{EA} + c^2 (y_{z,t}^C - y_t^{EA}) + \mu_{z,t}.$$

Where  $z$  denotes a political party, and  $\pi_{z,t}^C$  and  $y_{z,t}^C$  denote inflation and output growth in the party's home country. Note that we include party fixed effects to allow for the possibility that parties differ in their inclination to make public statements about the ECB. As a benchmark model, we apply a standard OLS estimator, calculated with robust standard errors.<sup>12</sup>

Table 4

Column (1) in Table 4 provides the results for equation (4'). A first indication for the presence of differences in preferences between the central bank and politicians is that while politicians do not attach different weights to *euro area* inflation, they do care significantly more about euro area growth ( $b^1$  is not statistically different from zero while  $c^1$  is negative and significant, although only at the 10% level), thus suggesting a larger relative weight on growth. Moreover, these differences in preferences are also revealed with regard to the role of *national* conditions. Politicians clearly would like to see more emphasis on the national inflation as well as the national growth rates ( $b^2$  and  $c^2$  are statistically different from zero, with the expected direction).

These results are highly robust to alternative specifications and estimators: the findings do not change qualitatively when *all* statements are analyzed, i.e. not only the ones with a direct indication as to the preferred future interest rates, but also including the ones on past decisions, the ECB's mandate, its independence, or exchange rates (model in column 2). While the coefficient on euro area growth becomes insignificant, the one on national growth differentials becomes larger in magnitude, at a higher level of significance. One interpretation of this finding is that politicians' statements about elements that are not directly related to euro area monetary policy decisions, such as the ECB's mandate or independence, may in fact be an indirect way of expressing a preference for a different monetary policy stance.<sup>13</sup>

Other robustness tests relate to alternative estimators and model specifications. Column 3 shows that, if the party fixed effects are excluded from the model, the estimates are very similar to

<sup>12</sup> The independent variables in this model are euro area inflation and GDP growth, as well as the difference between national and euro area variables. Inflation is taken from the OECD's Main Economic Indicators database, and defined as the year-on-year changes in consumer prices (all items). The source of the GDP data is the IMF's International Financial Statistics. GDP growth is defined as the year-on-year growth rate of GDP at constant prices. Other than party fixed effects, country fixed effects or even party leader fixed effects could be envisaged. We opted for the intermediate solution, but provide a robustness test for a model with quarter-country data and country fixed effects.

<sup>13</sup> The results are furthermore robust to excluding all statements made by national politicians who might be considered speaking in an official European Union function, such as the Chairman of the Eurogroup of Finance Ministers, or by governments that hold the rotating EU presidency.

those of the benchmark model, while statistical significance improves. Estimating an ordered probit model (column 4) yields qualitatively the same results as the OLS specification. Another important robustness test is shown in column 5. Given that the collection of statements is based on media reports, it could also be the case that media reporting rather than politicians' statements are responsive to macroeconomic conditions. For instance, one could imagine that journalists ask politicians more frequently about their views on ECB monetary policy in certain macroeconomic environments. Such a pattern could affect the number of statements that we collect. To test whether this effect is important, we re-estimated the model using a dummy variable as dependent variable, which counts the incidence of political commentary rather than the number of statements (i.e. is equal to 1 in case  $pc_t$  is positive, to -1 if it is negative, and 0 otherwise). The estimation has been in the context of an ordered probit model. Results are robust to this change, suggesting that even in the presence of a media bias, our interpretation should not be substantially affected.

As an alternative to aggregating the commentaries of politicians at the party level, an aggregation at the country level could also have been considered, given that up to this point, all explanatory variables are country-specific, rather than party-specific. Column 6 provides the results of such a robustness test. Of course, due to the aggregation at the country level, there are now considerably less observations in our sample; even more remarkable that all results go through. Finally, column 7 provides estimates using a negative binomial maximum-likelihood regression, with a somewhat different definition of the left-hand side variable. Given that there are so few statements indicating a preference for higher rates in the sample, we cannot exclude that politicians would only issue such statements in very extreme cases. Accordingly, this robustness test is based exclusively on statements arguing for lower rates.<sup>14</sup> Given that the resulting variable  $pc_t$  is now a non-negative count variable, it is possible to estimate a Poisson regression model. This model was rejected by the data due to extra-Poisson variation, such that column 6 provides results with the appropriate negative binomial model. All results are robust to this variation.

#### Table 5

A final robustness is contained in Table 5, which also includes a possible concern for unemployment, in addition to inflation and GDP growth. Table 5 shows that the estimates for inflation and growth are basically unaffected by the additional inclusion of unemployment. Country-specific unemployment differentials are generally not significant, with the exception of the model that does not include party-fixed effects. These findings suggest that our benchmark specification with inflation and growth may do a sufficiently accurate and good job in reflecting the

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<sup>14</sup> The number of observations does not change because each political party that has made a statement arguing for higher rates has, in the same quarter, also made neutral statements. Accordingly, these quarter-party observations get reclassified as neutral when dropping the statements arguing for higher rates, and stay in the sample.

central bank's and politicians' concerns, and we proceed in the remainder of the paper by using this benchmark specification.

Overall, the empirical results indicate that there are marked differences in the preferences of the central bank and of politicians in the euro area. Politicians attach a greater relative weight than the central bank both to the common euro area growth component as well as to the national idiosyncratic growth differential. Moreover, the highly significant negative coefficient on inflation differentials suggests that politicians' preferred interest rates include a larger weight on national inflation.

These findings have a bearing on the ECB's policy not to publish voting records for its monetary policy decisions. As has already been remarked by Issing (1999, pp. 512-513), "members of the Governing Council inevitably will be associated with their country of origin by the public. Publishing voting behavior would provide an observable variable, which may allow national politicians or interest groups to verify whether any pressure applied individually had had the intended result." Against the background of the current findings that politicians would like to see national considerations to be reflected in monetary policy decisions, the publication of voting records might indeed not be advisable.

#### 4.2 Is there evidence for the existence of preference shifters?

We now turn to the question to what extent the preferences of politicians are dependent on political economy factors. We use the various political economy factors discussed in Section 3, and estimate the following version of equation (5):

$$(5') \quad pc_{z,t} = a_z + b^1 \pi_t^{EA} + b^2 (\pi_{z,t}^C - \pi_t^{EA}) + b^3 \pi_t^{EA} x_{z,t} + b^4 (\pi_{z,t}^C - \pi_t^{EA}) x_{z,t} \\ + c^1 y_t^{EA} + c^2 (y_{z,t}^C - y_t^{EA}) + c^3 y_t^{EA} x_{z,t} + c^4 (y_{z,t}^C - y_t^{EA}) x_{z,t} + dx_{z,t} + \mu_{z,t}$$

Table 6 shows the corresponding results, with each column testing whether politicians' commentary is related to one specific political economy factor. In order to keep the results tractable, our preferred strategy is to include one political economy factor at a time, rather than several or all factors simultaneously. Recall from Table 3 that there is only a low degree of correlation across the different factors (with the exception of high debts and high deficits, which are correlated with each other, but also with the incidence of excessive deficit procedures and negative growth differentials).

Table 6

Table 6 contains first the non-interacted coefficients ( $b^1$ ,  $c^1$ ,  $b^2$  and  $c^2$ ). These indicate whether, in the absence of the political economy factors  $x_t$ , there are different preferences between politicians and the central bank. The second set of results relates to the interacted coefficients ( $b^3$ ,  $c^3$ ,  $b^4$  and  $c^4$ ). Statistical significance of these parameters suggests that the political economy

variables  $x_t$  act as preference shifters, i.e. they provide a comparison of the preferences of politicians in the absence and in the presence of  $x_t$ . Finally, table 6 also contains the p-values for tests for the joint hypotheses of the interacted and non-interacted coefficients ( $b^1+b^3$ ,  $c^1+c^3$ ,  $b^2+b^4$  and  $c^2+c^4$ ). The entries in bold imply that, in the presence of the political economy factors  $x_t$ , there are different preferences between politicians and the central bank.

Overall, there is some evidence for the presence of preference shifters, as the relative weight attached by politicians to inflation and growth changes with a number of the political economy variables. Looking at the weight on euro area inflation, this preference shift appears in the uprun to elections. In these cases, politicians would like to see less emphasis on inflation, implying a larger relative weight on growth considerations. A shift in preferences towards euro area growth is also observed when their country is under review by the EU for an excessive fiscal deficit.

Moreover, Table 6 also shows evidence that there is a shift towards national concerns in these periods: politicians would like the central bank to give greater importance to their national growth performance when their national constituency has relatively low trust in the ECB, when a left-wing government is in power or in periods of low national growth. In the latter cases, there is furthermore an effect on the weight politicians would like to see given to national inflation developments. The model presented in Section 3 does not lead to a clear prior as to the sign of this effect; there could be a desire for either more emphasis on national circumstances (which suggests a negative sign in the regression model), or for less emphasis on inflation (in which case a positive sign would result). Interestingly, both when a left-wing government is in power and in periods of low national growth politicians want to the central bank to pay more attention to national inflation and e.g. lower interest rates if national inflation is relative low.

An interesting pattern emerges with regard to the debt and deficit variables, where the non-interacted coefficients are mostly not statistically significant (in contrast to the results in columns 1 to 6). This suggests that with low debt levels, and low deficits, governments' preferences are not significantly different from those of the ECB. At the same time, based on the joint hypotheses tests, we find that there are differences in preferences between the ECB and those governments operating under high debts or deficits. As suggested by the literature (Neyapti and Ozgur 2007), there appears to be an inflation bias especially for such governments.

A final piece of evidence is the coefficient  $d$  on the political economy factor itself.<sup>15</sup> The fact that  $d=0$  in all cases indicates that most of the shifts in politicians' preferences can be related to

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<sup>15</sup> Note that for column 6, the model does not identify an effect for left-wing parties, given that a different intercept is estimated for every single party, due to the party fixed effect.

different preferences about economic conditions, rather than other factors not captured by our model.

#### Tables 7 and 8

While a few of the results are estimated at rather high levels of statistical significance, others are somewhat weaker. For instance, preference shifts due to low growth performance or excessive deficit procedures are estimated only at the 10% significance level, and the tests for preferences shifts in the uprun to elections yields one significant, but wrongly sided parameter. To test for the robustness of our conclusions, we re-estimate equation (5') once using *all* comments, i.e. including not only politicians' statements on interest rates, but also on the central bank's mandate, independence and the exchange rate, and once using only the statements arguing for lower rates, and correspondingly the negative binomial regression model. Tables 7 and 8 provide the results.

The findings with regard to low public trust in the ECB, the political orientation of speakers, and the debt and deficit levels are confirmed throughout. With regard to the excessive deficit procedure, results cannot be confirmed, as they turn out to be insignificant in both robustness tests. While results for the pre-election period are mixed, the effect of a negative growth differential turns out to be stronger than expected from the benchmark regressions.

Overall, these results suggest that there are political economy factors that make politicians shift their preferences towards growth, and away from price stability. This is in particular the case if the national economy performs poorly (when growth is low), when there is low public trust in the ECB, i.e. in times when a politician is less likely to face resistance by the electorate against critical comments about the ECB, and in the case of left-wing politicians being in government. There is some evidence pointing to a role of elections, as well as if politicians are facing additional external constraints that limit their freedom in implementing policies (when the government is placed in an excessive deficit procedure). Interestingly, no effect is apparent in the case of low voting support. However, the absence of such an effect could be due to the low frequency of our data. If politicians were to respond to decreasing voting support by changing their preferences about monetary policy temporarily, this need not be picked up with quarterly data. However, it is clear that there is no long-lasting effect. Finally, there is clear evidence that governments' preferences shift away from inflation and towards growth in particular in the presence of high public debts or deficits.

### 4.3 Modeling politicians' desired interest rates

Up to this point, all results referred to the proxy regression models (4) and (5). Unfortunately, these do not allow any inference on the level of politicians' desired interest rates. In this subsection, we will therefore use the assumption introduced in Section 2.3 that politicians who do *not* comment

on the ECB are on average content with the actual interest rate, or  $i_t^P \approx i_t^{act}$  if  $pc_t = 0$ . To estimate the resulting model (7), it is necessary to drop all observations where  $pc_t \neq 0$ , leaving us with 131 observations.<sup>16</sup> Due to the aggregation of the political commentary variable at the level of the political party, the estimated version is

$$(1') \quad i_t^{act} = \alpha_z^P + \beta^{P,EA} \pi_t^{EA} + \beta^{P,C} (\pi_{z,t}^C - \pi_t^{EA}) + \gamma^{P,EA} y_t^{EA} + \gamma^{P,C} (y_{z,t}^C - y_t^{EA}) + \varepsilon_{z,t}^P$$

Table 9 contains the relevant findings. As expected, politicians attach a positive weight both to growth and to inflation in their objective function, i.e. they would like to see interest rates rise when inflation and output pick up, and vice versa. The coefficients of this model are directly interpretable and the magnitudes are sizable: in response to an increase in euro area growth by one percentage point, politicians' preferred interest rates rise by 44 basis points, and in response to a 1 percentage increase in euro area inflation, the desired interest rate rises by 52 basis points. Additionally, in response to a 1 percentage increase in national inflation differentials, politicians would like to see ECB policy rates increase by 33 basis points.

Table 9

Having estimated the models for all political parties that issued neutral statements about the ECB's monetary policy, it is possible to also estimate the desired interest rates for those political parties that expressed their discontent with the current interest rates. Under the assumption that the parameter estimates reported in Table 9 are representative for all political parties, the desired policy rate can be expressed as  $i_{z,t}^P = \hat{\alpha}_z^P + \hat{\beta}^{P,EA} \pi_t^{EA} + \hat{\beta}^{P,C} (\pi_{z,t}^C - \pi_t^{EA}) + \hat{\gamma}^{P,EA} y_t^{EA} + \hat{\gamma}^{P,C} (y_{z,t}^C - y_t^{EA})$ , where parameters denoted with hats are the estimates of Table 9. This "fundamentals' implied" preferred rate, is the hypothetical interest rate preferred by politicians if their preferences were *solely* determined by different relative weights in the monetary policy reaction functions compared to the central bank.

To generate a summary measure of this implied rate, we take a simple, unweighted average across the implied rate of all political parties, in essence giving every political party the same weight. Figure 3 plots this rate (the solid black line) against the actual policy rate (the dashed line). It shows that there are periods, such as in 2001-03 and since 2006, i.e. mostly when growth in the euro area was weak, when this hypothetical rate would have been lower than actual euro area interest rates. Yet there also periods, such as in 2004-05, when governments – based on economic fundamentals alone – would have preferred tighter monetary policy, stemming from the stronger weight on growth in their objective function.

<sup>16</sup> The dependent variable of this model is the actual interest rates, which is calculated as the quarterly average of daily ECB policy rates. Source: ECB.

Figure 3

However, Figure 1 and the evidence discussed earlier on showed that since 1999 politicians in the euro area have almost always expressed a preference for lower interest rates, including in the period 2004-05 when actual interest rates were already quite low, and also lower than the politicians' implied rate. This suggests that the rate which is *actually* preferred by politicians is generated differently. To derive an estimate of politicians' preferred rate based on their public statements about the ECB's monetary policy, we need to find out by how many basis points a politician would like to lower interest rates for each statement. We do so by regressing the difference between the fundamentals' implied preferred rate obtained from equation (1') and the actual interest rate on the political commentary  $pc_t$ :  $(\hat{i}_t^{act} - i_t^{act}) = \alpha_0 + \beta_0 pc_t + \varepsilon_{0t}$ , using all 299 observations, which yields that one statement by a politician expressing a preference for lower interest rates reflects, on average, a desire to lower the ECB policy rate by 10 basis points, i.e.  $\beta_0 = -0.08$ . Based on this relationship we can then derive the "preferred rate" as

$$(8) \quad i_t^{preferred} = i_t^{act} + \hat{\beta}_0 pc_t$$

Figure 3 also plots this derived preferred rate (the gray solid line), using the country with the largest value of  $pc_t$  in every quarter. The difference between the two measures— i.e. the rate implied by fundamentals and the preferred rate based on politicians' public statements – as shown in Figure 3, varies substantially over time. The difference is quite substantial in the early period 1999-2000, and then becomes quite small in 2002-03. The largest gap existed in 2003-05, being at times as high as 120 basis points. Overall, these differences illustrate and underline that a large part of euro area governments' commentaries expressing a preference for lower interest rates does not stem from their different relative weight on growth, but arises due to political economy motives.

## 5. Conclusions

The existence of an inflationary bias has been understood by economists for several decades by now, and has been reflected in a large number of central banks being granted independence over time. At the same time, however, this implies that politicians will not necessarily see their preferred interest rates being implemented by an independent central bank. Accordingly, occasional differences in the views about the monetary policy stance should be expected, and are indeed observed. In the light of the current debate about the independence of central banks in the aftermath of the economic and financial crisis, it is important to understand how different politicians' preferences are from the monetary policy that is conducted by an independent central bank.



This paper has provided an attempt to quantify this issue with regard to monetary policy in the euro area. In particular, it has analyzed i) to what extent the ECB puts more relative emphasis on price stability than politicians, ii) whether politicians' preferences shift in response to political economy motives, and iii) to what extent these issues are particularly imminent in the case of a monetary union, where the conduct of monetary policy is not only delegated to an independent central bank, but also to a central bank that has a different constituency than the politicians.

The evidence provided in this paper is based on a novel and unprecedented database containing politicians' statements about the ECB's monetary policy over the first 9 years of EMU. It covers statements that express a preference about the ECB's monetary policy stance made by the main government officials (head of government and all ministers) for each of the 12 initial EMU members (including Greece).

The paper has shown that politicians tend to favor lower interest rates on average. The differences in preferred interest rates arise, on the one hand, because the ECB puts more relative weight on inflation than politicians would. On the other hand, the differences in the constituencies of the ECB and the national governments account for the bulk of the different views about preferred interest rates.

Moreover, we have found evidence that politicians' preferences shift in response to political economy motives. More specifically, we have shown that there is a preference towards growth in periods when the national economic performance is relatively weak, when the public has generally little trust in the ECB, and depending on the political orientation of governments, with left-wing politicians placing relatively more emphasis on growth. Furthermore, governments' preferences shift towards a larger weight on growth in particular in the presence of high public debts or deficits. This is consistent with the hypothesis that in monetary unions politicians have a stronger inflationary bias as the costs of their own actions are partly shared by all union members.

The evidence provided in this paper suggests that the independence of central banks is vital, given that preferences by politicians shift in response to political economy motives. The case for independence is probably even stronger in a monetary union, where the constituencies of politicians and the central bank differ. The findings of this study also provide support to the ECB's policy not to publish voting records for its monetary policy decisions.

## References

- Abrams, Burton A., and Plamen Iossifov, "Does the Fed Contribute to a Political Business Cycle?" *Public Choice* 129 (2006), 249-262.
- Alesina, Alberto, and Alex Cukierman, "The Politics of Ambiguity," *Quarterly Journal of Economics* 105 (1990), 829-850.
- Alesina, Alberto, and Jeffrey Sachs, "Political Parties and the Business Cycle in the United States," *Journal of Money, Credit and Banking* 20 (1988), 63-81.
- Alesina, Alberto, and Guido Tabellini, "Bureaucrats or Politicians? Part I: A Single Policy Task," *American Economic Review* 97 (2007), 169-179.
- Alesina, Alberto, and Guido Tabellini, "Bureaucrats or Politicians? Part II: Multiple Tasks," *Journal of Public Economics* 92 (2008), 426-447.
- Barro, Robert J., and David B. Gordon, "Rules, Discretion and Reputation in a Model of Monetary Policy," *Journal of Monetary Economics* 12 (1983), 101-121.
- Berger, Helge, Jakob de Haan, and Sylvester Eijffinger, "Central Bank Independence: An Update of Theory and Evidence," *Journal of Economic Surveys* 15 (2001), 3-40.
- Besley, Timothy, and Stephen Coate, "Elected Versus Appointed Regulators: Theory and Evidence," *Journal of the European Economic Association* 1 (2003), 1176-1206.
- Blinder, Alan, "Is Government too Political?" *Foreign Affairs* 76 (1997), 115-126.
- Drazen, Alan, "The Political Business Cycle after 25 Years", in Ben Bernanke and Kenneth Rogoff (eds.), *NBER Macroeconomics Annual 2000* (Chicago: The University of Chicago Press, 2000, 75-117).
- Dewatripont, Mathias, Ian Jewitt, and Jean Tirole, "The Economics of Career Concerns, Part I: Comparing Information Structures. *Review of Economic Studies* 66 (1999a), 183-198.
- Dewatripont, Mathias, Ian Jewitt, and Jean Tirole, "The Economics of Career Concerns, Part II: Application to Missions and Accountability of Government Agencies. *Review of Economic Studies* 66 (1999b), 199-217.
- Epstein, David, and Sharyn O' Halloran, "*Delegating Powers*" (Cambridge, UK: Cambridge University Press, 1999).
- Faust, Jon, and John S. Irons, "Money, Politics and the Post-War Business Cycle," *Journal of Monetary Economics* 43 (1999), 61-89.
- Gerlach-Kristen, Petra, "Outsiders at the Bank of England's MPC", *Journal of Money, Credit and Banking* 41 (2009), 1099-1115.
- Gersl, Adam, "Political Pressure on Central Banks: The Case of the Czech National Bank," *Czech Journal of Economics and Finance* 56 (2005), 18-39.
- Grier, Kevin B., "Congressional Influence on U.S. Monetary Policy: An Empirical Test," *Journal of Monetary Economics* 28 (1991), 201-220.
- Havrilesky, Thomas M., "*The Pressures on American Monetary Policy* (Boston, MA: Kluwer Academic Publishers, 1993).
- Hellerstein, Rebecca, "Is There a Dead Spot? Evidence on FOMC Decisions Before Elections," *Journal of Money, Credit and Banking* 39 (2007), 1411-1427.
- Hibbs, Douglas A., "Political Parties and Macroeconomic Policy," *American Political Science Review* 65 (1977), 131-143.
- Holsti, Ole R., "*Content Analysis for Social Sciences and Humanities* (Reading: Addison-Wesley, 1969).
- Issing, Otmar, "The Eurosystem: Transparent and Accountable or 'Willem in Euroland'," *Journal of Common Market Studies* 37 (1999), 503-519.
- Kane, Edward, "Politics and Fed Policymaking. The More Things Change the More they Remain the Same," *Journal of Monetary Economics* 6 (1980), 1999-2011.
- Kydland, Finn E., and Edward C. Prescott, "Rules Rather than Discretion: The Inconsistency of Optimal Plans," *Journal of Political Economy* 85 (1977), 473-492.

- Lohmann, Susanne, "Optimal Commitment in Monetary Policy: Credibility Versus Flexibility," *American Economic Review* 82 (1992), 273-286.
- Maier, Philipp, Jan-Egbert Sturm, and Jakob de Haan, "Political Pressure on the Bundesbank: An Empirical Investigation Using the Havrilesky Approach," *Journal of Macroeconomics* 24 (2002), 103–123.
- Maier, Philipp, and Saskia Bezoen, "Bashing and Supporting Central Banks: the Bundesbank and the European Central Bank. *European Journal of Political Economy* 20 (2004), 923-39.
- Neyapti, Bilin, and Secin Ozgur, "The Effects of Fiscal and Monetary Discipline on Budgetary Outcomes," *Contemporary Economic Policy* 25 (2007), 146-155.
- Persson, Torsten and Guido Tabellini, "*Political Economics. Explaining Economic Policy*," (Cambridge, MA : The MIT Press, 2000).
- Posen, Adam, "Why Central Bank Independence Does Not Cause Low Inflation: There Is No Institutional Fix for Politics," in: Richard O'Brien (Ed.), *Finance and the International Economy* 7 (Oxford: Oxford University Press, 1993, 40–65).
- Powell, G. Bingham, and Guy Whitten, "A Cross-National Analysis of Economic Voting: Taking Account of the Political Context," *American Journal of Political Science* 37 (1993), 391-414.
- Rogoff, Kenneth, "The Optimal Degree of Commitment to an Intermediate Monetary Target," *Quarterly Journal of Economics* 100 (1985), 1169-1189.
- Rogoff, Kenneth, and Anne Sibert, „Elections and Macroeconomic Cycles," *Review of Economic Studies* 55 (1988), 1-16.
- Schultz, Christian, "Information, Polarization and Delegation in Democracy," *Journal of Public Economics*, 91 (2008), 1078-1091.
- Swank, Otto, "Popularity Functions Based on Partisan Theory," *Public Choice* 75 (1993), 339-356.
- Veiga, Francisco José, and Linda Gonçalves Veiga, "The Determinants of Vote Intentions in Portugal," *Public Choice* 118 (2004), 341-364.
- Waller, Christopher J., "The Choice of a Conservative Central Banker in a Multisector Economy," *American Economic Review* 82 (1992), 1006-1012.
- Walsh, Carl E., "Optimal Contracts for Central Bankers," *American Economic Review* 85 (1995), 150-167.
- Woodford, Michael, "*Interest and Prices. Foundations of a Theory of Monetary Policy*," (Princeton: Princeton University Press, 2003).
- Wooley, John Turner, "*Monetary Politics. The Federal Reserve and Politics of Monetary Policy*" (Cambridge UK: Cambridge University Press, 1984).

## Appendix: Selected statements and their coding

[1] **February 01, 1999:** “German Finance Minister Oskar Lafontaine again hinted Monday at the desirability of an ECB rate cut to stimulate growth and employment in the euro-zone.” Source: Market News International

*Coded:  $C_t=1$ , comment on future interest rate decisions*

[2] **February 18, 1999:** “Finnish Prime Minister Paavo Lipponen on Thursday warned fellow Social Democrats in power across the European Union not to put pressure on the European Central Bank over interest rates.” No command relationship should be aimed for because that would drive the central bank into the corner and weaken its credibility," Lipponen said.” Source: Reuters News

*Coded:  $C_t=0$ , comment on future interest rate decisions*

[3] **October 28, 1999:** “Spain's finance minister, Rodrigo Rato, said Thursday the European Central Bank's policy of low interest rates is less suited to Spain than to the core euro-zone economies.” Source: Dow Jones International News

*Coded:  $C_t=-1$ , comment on past interest rate decisions*

[4] **November 04, 1999:** “The European Central Bank's 50-basis-point rate raise on Thursday suits Finland, Finance Minister Sauli Niinisto told Reuters.” Source: Reuters News

*Coded:  $C_t=-1$ , comment on past interest rate decisions*

[5] **May 23, 2000:** “Portuguese Prime Minister Antonio Guterres said Tuesday the European Central Bank may hike interest rates at its regular meeting Thursday, though he stressed he thought such action "unnecessary".” Source: Dow Jones International News

*Coded:  $C_t=1$ , comment on future interest rate decisions*

[6] **November 08, 2002:** “German Economics and Labour Minister Wolfgang Clement said on Friday the European Central Bank and German trade unions should do their share to work towards growth and higher employment.” Source: Reuters News

*Coded:  $C_t=1$ , comment on future interest rate decisions*

[7] **January 13, 2004:** “Belgian Finance Minister Didier Reynders said on Tuesday it would be necessary for the European Central Bank to change interest rates if the euro exchange rate reaches about \$1.30.” Source: Reuters News

*Coded:  $C_t=1$ , comment on future interest rate decisions*

[8] **June 08, 2004:** “If the European Central Bank does not lower rates, a new political committee should be set up to help guide its decision making, Italian Prime Minister Silvio Berlusconi said on Tuesday.” Source: Reuters News

*Coded:  $C_t=1$ , comment on future interest rate decisions and on independence*

[9] **November 25, 2005:** “Dutch finance minister Gerrit Zalm said that he would see an interest rate hike by the European Central Bank as a 'positive sign', Dutch news agency ANP reported.” Source: AFX Asia

*Coded:  $C_t=-1$ , comment on future interest rate decisions*

[10] **November 30, 2005:** “Portuguese Finance Minister Fernando Teixeira dos Santos said Wednesday an interest rate hike by the European Central Bank, largely expected at the central bank's governing council meeting Thursday, was not justified.” Source: Agence France Presse

*Coded:  $C_t=1$ , comment on future interest rate decisions*

**[11] May 24, 2006:** “Spanish Economy Minister Pedro Solbes on Tuesday agreed with the assessment of the Organization for Economic Cooperation and Development (OECD) that interest rates in the euro area are too low for Spain where strong domestic demand is fuelling inflation and causing the current account deficit to balloon.” Source: El Pais - English Edition

*Coded:  $C_t=-1$ , comment on past interest rate decisions*

**[12] October 20, 2006:** “German Economics Minister Michael Glos said Friday that the European Central Bank is in no hurry to raise interest rates from a German perspective, pointing to the country's low inflation rates.” Source: Dow Jones International News

*Coded:  $C_t=1$ , comment on future interest rate decisions*

**[13] January 31, 2007:** “Finance Minister Brian Cowen has warned the French to stop interfering with the European Central Bank and let it get on with raising interest rates.” Source: Irish Independent

*Coded:  $C_t=-1$ , comment on future interest rate decisions*

**[14] February 27, 2007:** “Austrian Chancellor Alfred Gusenbauer said the European Central Bank (ECB) might have to adapt its interest rate policy to match the current economic situation.” Source: Reuters News

*Coded:  $C_t=1$ , comment on future interest rate decisions*

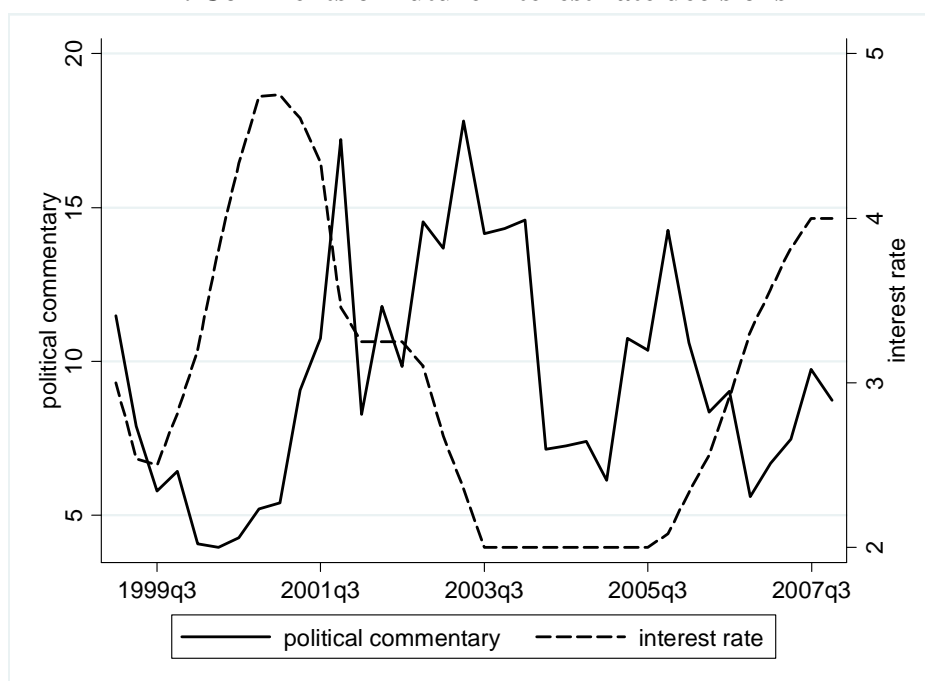
**[15] June 13, 2007:** “Rate hikes by the European Central Bank (ECB) in the last 18 months have been good for the euro zone, Finnish Finance Minister Jyrki Katainen said while expressing support for the ECB's continued independence.” Source: Reuters News

*Coded:  $C_t=-1$ , comment on past interest rate decisions*

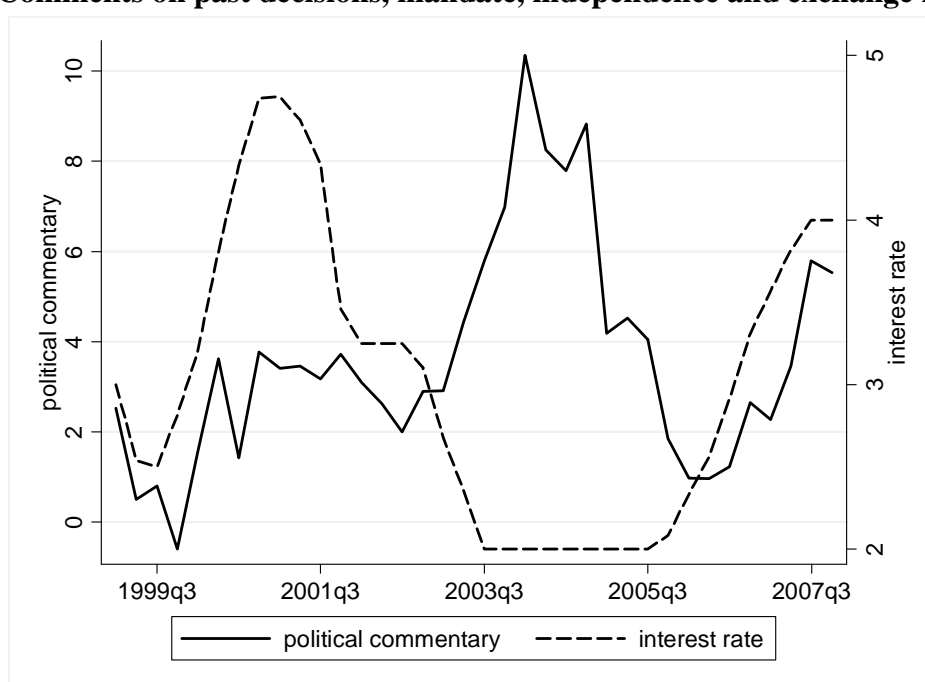
**[16] August 21, 2007:** “The European Central Bank should take account of the eurozone's subdued inflation in its future monetary policy decisions, French Prime Minister Francois Fillon declared in a newspaper interview published Tuesday.” Source: Market News International

*Coded:  $C_t=1$ , comment on future interest rate decisions*

**Figure 1: Political commentary on euro area monetary policy**  
**A. Comments on future interest rate decisions**



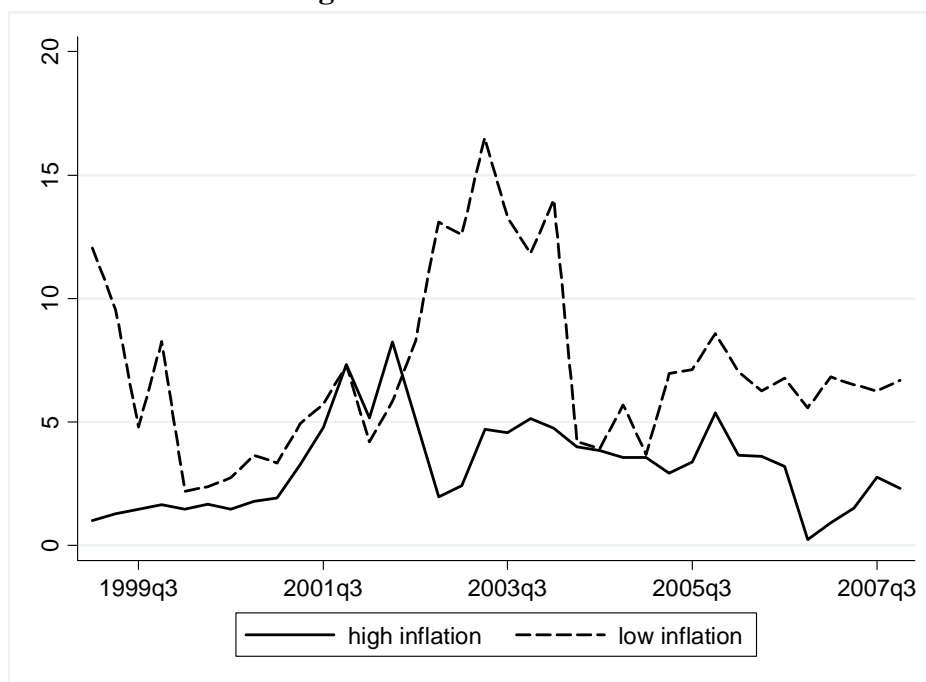
**B. Comments on past decisions, mandate, independence and exchange rates**



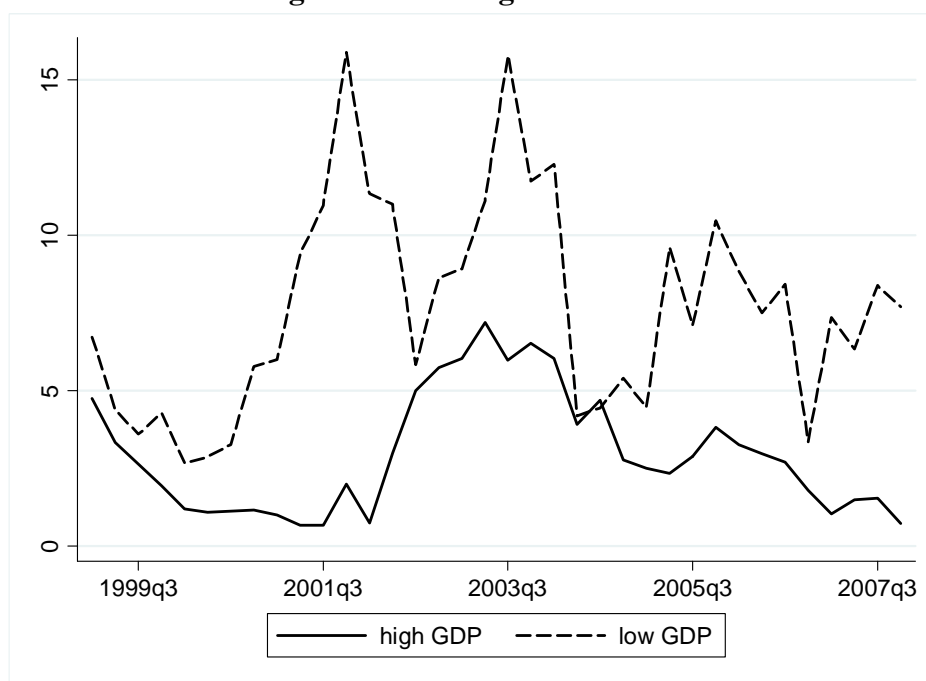
Notes: The figures show the aggregate political commentary (dark line, using the left-hand scale) by all political parties in the sample, relating to statements on future interest rate decisions (Panel A) and on past decisions, mandate, independence and exchange rates (Panel B). The light line (using the right-hand scale) provides the average actual monetary policy interest rate in each quarter. For presentational purpose, the political commentary series are smoothed using a 6-quarter moving average.

**Figure 2: Political commentary on euro area monetary policy – by country groups**

**A. High vs low inflation countries**

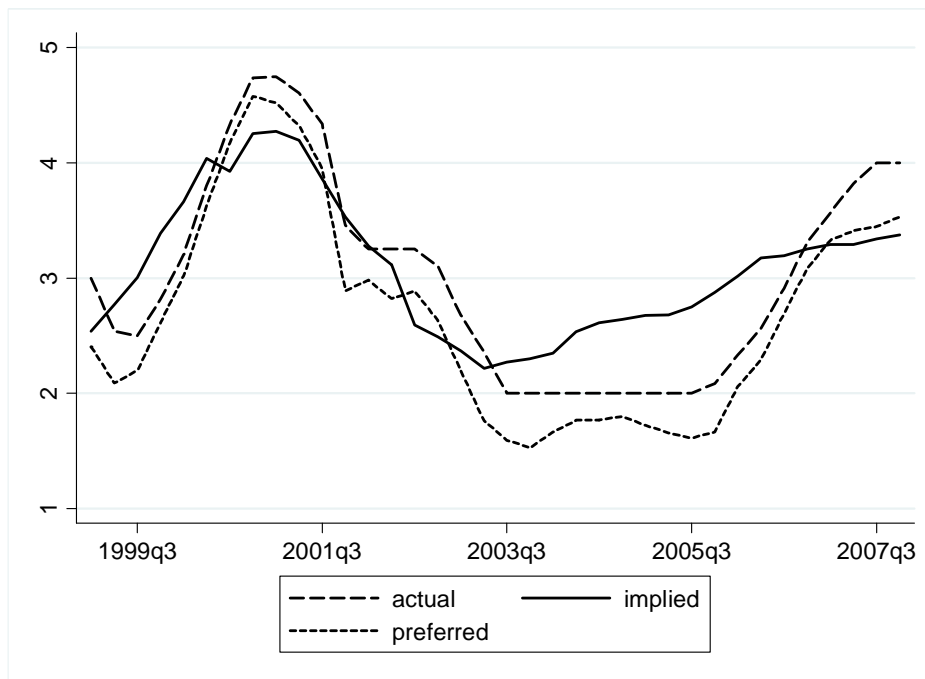


**B. High vs low GDP growth countries**



Notes: See Figure 1, only that this figure shows the aggregate political commentary related to future interest rate decisions, separately for different country groupings. The figure distinguishes political commentaries at any point in time between countries with high versus low inflation (Figure 2.A) and countries with high vs. low GDP growth (Figure 2.B). Countries with positive inflation (GDP growth) differentials relative to the euro area have been classified into the “high” category, those with negative differentials into the “low” category. For presentational purpose, the series are smoothed using a 6-quarter moving average.

**Figure 3: Euro area politicians' preferred interest rates**



Notes: The figure is based on the estimation of politicians' preferred interest rates. It shows the unweighted average of politicians' fundamentals implied interest rate – based on macroeconomic fundamentals alone, called “implied”, using the parameters estimated for equation (1') – and the politicians' true preferred interest rate (referred to as “preferred”) - based on the 299 observations and the estimates of equation (8), compared to the actual ECB interest rate path since 1999.



**Table 1: Summary statistics for statements by euro area government officials**

			Comments on future interest rate decisions				Comments on past decisions, mandate, independence, exchange rates				Total
			Lower rates	Neutral	Higher rates	Total	Lower rates	Neutral	Higher rates	Total	
<b>Political Party</b>	AN	Italy	10	0	0	10	8	0	0	8	18
	CDU/CSU	Germany	5	1	1	7	1	18	1	20	27
	CSV	Luxembourg	11	8	0	19	3	15	1	19	38
	DS	Italy	4	0	1	5	1	8	1	10	15
	Fianna Fáil	Ireland	2	1	2	5	0	2	2	4	9
	Forza Italia	Italy	8	0	0	8	16	2	0	18	26
	FPÖ	Austria	9	2	0	11	2	4	0	6	17
	KOK	Finland	0	0	0	0	0	5	3	8	8
	MR	Belgium	40	4	0	44	13	11	0	24	68
	ND	Greece	3	4	0	7	0	4	0	4	11
	ÖVP	Austria	19	0	0	19	4	11	0	15	34
	PASOK	Greece	1	1	0	2	1	2	0	3	5
	PP	Spain	3	1	4	8	0	4	3	7	15
	PS	France	24	3	0	27	12	16	0	28	55
	PS	Portugal	5	0	0	5	2	1	0	3	8
	PvdA	Netherlands	0	1	0	1	0	2	0	2	3
	SDP	Finland	1	3	0	4	2	7	0	9	13
	SPD	Germany	85	6	1	92	28	42	3	73	165
	SPÖ	Austria	0	0	0	0	1	0	0	1	1
	UDF	France	0	0	0	0	2	0	0	2	2
	UMP	France	39	2	0	41	41	15	0	56	97
	VLD	Belgium	2	0	0	2	0	0	0	0	2
	VVD	Netherlands	1	3	3	7	0	10	3	13	20
		No party affiliation		45	11	4	60	15	30	5	50
<b>Country</b>		Austria	28	2	0	30	7	15	0	22	52
		Belgium	42	4	0	46	13	11	0	24	70
		Spain	22	7	8	37	5	18	5	28	65
		Finland	1	3	0	4	2	12	3	17	21
		France	83	7	0	90	60	39	0	99	189
		Germany	92	8	2	102	30	60	4	94	196
		Greece	4	5	0	9	1	6	0	7	16
		Ireland	2	1	2	5	0	2	2	4	9
		Italy	24	2	1	27	29	17	4	50	77
		Luxembourg	11	8	0	19	3	15	1	19	38
		Netherlands	1	4	3	8	0	12	3	15	23
	Portugal	7	0	0	7	2	2	0	4	11	
<b>Time period</b>		1999 - 2002	122	19	7	148	49	88	12	149	297
		2003 - 2006	162	21	7	190	81	56	8	145	335
		2007	33	11	2	46	22	65	2	89	135
<b>Political orientation</b>		None	27	6	0	33	10	16	3	29	62
		Centre Left	120	14	2	136	47	78	4	129	265
		Centre	106	21	9	136	70	88	10	168	304
		Centre Right	55	8	5	68	23	23	5	51	119
		Right	9	2	0	11	2	4	0	6	17
<b>Total</b>			317	51	16	384	152	209	22	383	767

Note: The table shows the number of statements by euro area government officials containing some comment on the ECB's future interest rate decisions, or on past decisions, the ECB's mandate, its independence, or the euro exchange rate. Data refer to the entire sample period 1999 to 2007. The split of political parties in political orientation is based on their affiliation to one of the parties in the European parliament.

**Table 2: Summary statistics for regression variables**

<b>Variable</b>	<b>Observations</b>	<b>Mean</b>	<b>Standard deviation</b>	<b>Minimum</b>	<b>Maximum</b>
<i>Political commentary relating to:</i>					
Future interest rate decisions	299	1.007	1.683	-1	11
Past decisions, mandate, independence, exchange rates	299	0.435	1.107	-2	9
All comments	299	1.334	2.116	-2	13
<i>Macroeconomic performance</i>					
Euro area inflation	299	2.109	0.406	0.866	2.944
Euro area GDP growth	299	2.446	1.159	0.449	4.921
Euro area unemployment	299	8.321	0.545	7.266	9.534
Inflation differential	299	0.089	0.806	-2.424	3.228
GDP growth differential	299	0.378	2.799	-11.662	17.625
Unemployment differential	299	-0.581	2.339	-6.400	3.066
<i>Political economy variables</i>					
Pre-election period	299	0.070	0.256	0	1
Low voting support	299	0.086	6.611	-33.168	21.127
Low public trust in ECB	299	0.652	0.477	0	1
Excessive deficit procedure	299	0.224	0.418	0	1
Negative growth differential	299	0.492	0.501	0	1
Left-wing party	299	-0.067	0.796	-1	1
High debt	299	0.569	0.496	0	1
High deficit	299	0.659	0.475	0	1

Note: The table shows summary statistics for all variables used in the regression analysis. For a detailed description, see Section 3.

**Table 3: Correlation across political economy variables**

	Pre-election period	Low voting support	Low trust in ECB	Excessive deficit procedure	Negative growth differential	Left-wing party	High debt	High deficit
Pre-election period	1.0000							
Low voting support	0.0263	1.0000						
Low trust in ECB	-0.0191	-0.0328	1.0000					
Excessive deficit procedure	-0.1163	0.0392	0.1230	1.0000				
Negative growth differential	-0.0870	-0.0094	-0.1386	0.1454	1.0000			
Left-wing party	-0.0263	0.0301	0.1595	0.1260	0.0575	1.0000		
High debt	0.0016	-0.0135	0.1153	0.4357	0.3164	-0.0479	1.0000	
High deficit	-0.0507	0.0786	0.0077	0.3867	0.3831	0.1792	0.4415	1.0000

Note: The table shows the correlation coefficients across the political economy variables used as possible shifters of politicians' preferences. For a detailed description, see Section 3.

**Table 4: Testing for preference differences**

		Benchmark	All comments	No fixed effects	Ordered probit	Incidence of comments	Country level data	Negative binomial
Hypothesis		(1)	(2)	(3)	(4)	(5)	(6)	(7)
<b>Euro area macro variables:</b>								
$\pi_t^{EA}$	$b^1 > 0$	-0.526 ( 0.341 )	-0.507 ( 0.380 )	-0.373 ( 0.328 )	-0.309 ( 0.201 )	-0.157 ( 0.195 )	-0.439 ( 0.389 )	-0.460* ( 0.240 )
$y_t^{EA}$	$c^1 < 0$	-0.143* ( 0.083 )	-0.099 ( 0.100 )	-0.173** ( 0.069 )	-0.151** ( 0.064 )	-0.211*** ( 0.081 )	-0.211** ( 0.095 )	-0.186*** ( 0.064 )
<b>Country-specific macro differences:</b>								
$\pi_t^C - \pi_t^{EA}$	$b^2 < 0$	-0.444*** ( 0.164 )	-0.512*** ( 0.194 )	-0.482*** ( 0.108 )	-0.386*** ( 0.149 )	-0.326* ( 0.174 )	-0.320* ( 0.164 )	-0.476*** ( 0.173 )
$y_t^C - y_t^{EA}$	$c^2 < 0$	-0.073* ( 0.039 )	-0.105** ( 0.049 )	-0.091*** ( 0.030 )	-0.043* ( 0.026 )	-0.023 ( 0.024 )	-0.053* ( 0.028 )	-0.161** ( 0.078 )
Fixed effects		Party	Party	None	Party	Party	Country	Party
Observations		299	299	299	299	299	252	299
R-squared		0.27	0.32	0.12	0.14	0.24	0.26	

Notes: The table shows the estimates for the determinants of political commentary based on equation (4'):

$$(4') \quad pc_{z,t} = a_z + b^1 \pi_t^{EA} + b^2 (\pi_{z,t}^C - \pi_t^{EA}) + c^1 y_t^{EA} + c^2 (y_{z,t}^C - y_t^{EA}) + \mu_{z,t},$$

where  $pc_{z,t}$  denotes political commentary by political party  $z$ ,  $\pi$  consumer price inflation, and  $y$  GDP growth. Euro area variables are denoted with the superscript  $EA$ , country-specific variables with the superscript  $C$ . \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Numbers in brackets denote standard errors.

**Table 5: Testing for preference differences – addition of unemployment**

		Benchmark	All comments	No fixed effects	Ordered probit	Incidence of comments	Country level data	Negative binomial
Hypothesis		(1)	(2)	(3)	(4)	(5)	(6)	(7)
<b>Euro area macro variables:</b>								
$\pi_t^{EA}$	$b^1 > 0$	-0.520 ( 0.357 )	-0.562 ( 0.414 )	-0.380 ( 0.333 )	-0.247 ( 0.218 )	-0.050 ( 0.210 )	-0.507 ( 0.427 )	-0.384 ( 0.253 )
$y_t^{EA}$	$c^1 < 0$	-0.141* ( 0.084 )	-0.123 ( 0.100 )	-0.179** ( 0.076 )	-0.123* ( 0.072 )	-0.165* ( 0.092 )	-0.243** ( 0.107 )	-0.145** ( 0.070 )
$u_t^{EA}$	$d^1 > 0$	0.010 ( 0.237 )	-0.115 ( 0.296 )	-0.032 ( 0.227 )	0.129 ( 0.168 )	0.215 ( 0.174 )	-0.147 ( 0.326 )	0.194 ( 0.196 )
<b>Country-specific macro differences:</b>								
$\pi_t^C - \pi_t^{EA}$	$b^2 < 0$	-0.445*** ( 0.163 )	-0.508*** ( 0.192 )	-0.483*** ( 0.109 )	-0.393*** ( 0.148 )	-0.328* ( 0.174 )	-0.316* ( 0.163 )	-0.502*** ( 0.170 )
$y_t^C - y_t^{EA}$	$c^2 < 0$	-0.072* ( 0.039 )	-0.103** ( 0.048 )	-0.086*** ( 0.030 )	-0.044* ( 0.027 )	-0.025 ( 0.025 )	-0.054* ( 0.029 )	-0.177** ( 0.079 )
$u_t^C - u_t^{EA}$	$d^2 > 0$	-0.018 ( 0.114 )	-0.040 ( 0.127 )	0.053* ( 0.030 )	-0.012 ( 0.086 )	0.040 ( 0.098 )	-0.039 ( 0.101 )	-0.012 ( 0.098 )
Fixed effects		Party	Party	None	Party	Party	Country	Party
Observations		299	299	299	299	299	252	299
R-squared		0.27	0.32	0.12	0.14	0.24	0.26	

Notes: The table shows the estimates for the determinants of political commentary based on an extended version of equation (4<sup>'</sup>):

$$(4'') \quad pc_{z,t} = a_z + b^1 \pi_t^{EA} + b^2 (\pi_{z,t}^C - \pi_t^{EA}) + c^1 y_t^{EA} + c^2 (y_{z,t}^C - y_t^{EA}) + d^1 u_t^{EA} + d^2 (u_{z,t}^C - u_t^{EA}) + \mu_{z,t},$$

where  $pc_{z,t}$  denotes political commentary by political party  $z$ ,  $\pi$  consumer price inflation,  $y$  GDP growth and  $u$  the unemployment rate. Euro area variables are denoted with the superscript  $EA$ , country-specific variables with the superscript  $C$ . \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Numbers in brackets denote standard errors.

**Table 6: Shifts in politicians' preferences – benchmark model**

		Pre-election period	Low voting support	Low public trust in ECB	Excessive deficit procedure	Negative growth differential	Left-wing party	High debt	High deficit
Hypothesis	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	
<b>Euro area macro variables:</b>									
$\pi_t^{EA}$	$b^1 > 0$	-0.609 (0.386)	-0.534 (0.333)	-0.271 (0.201)	-0.525 (0.368)	-0.284 (0.347)	-0.706** (0.346)	-0.488 (0.504)	-0.207 (0.262)
$y_t^{EA}$	$c^1 < 0$	-0.132 (0.090)	-0.151* (0.080)	-0.296*** (0.110)	-0.086 (0.079)	-0.169* (0.091)	-0.204** (0.090)	-0.062 (0.106)	-0.130 (0.109)
<b>Country-specific macro differences:</b>									
$\pi_t^C - \pi_t^{EA}$	$b^2 < 0$	-0.468*** (0.173)	-0.435*** (0.164)	-0.291 (0.199)	-0.495*** (0.177)	-0.258* (0.154)	-0.396** (0.177)	-0.262 (0.166)	-0.329* (0.182)
$y_t^C - y_t^{EA}$	$c^2 < 0$	-0.087* (0.052)	-0.109** (0.052)	-0.003 (0.019)	-0.069* (0.038)	0.062* (0.037)	-0.192** (0.088)	-0.031 (0.029)	-0.047 (0.048)
<b>Political economy variables &amp; interaction terms:</b>									
$\pi_t^{EA} * x_t$	$b^3 > 0$	1.132** (0.534)	-0.016 (0.076)	-0.728 (0.613)	-0.094 (0.825)	-0.350 (0.633)	-0.482 (0.450)	-0.228 (0.603)	-0.554 (0.564)
$y_t^{EA} * x_t$	$c^3 < 0$	-0.332 (0.249)	0.001 (0.012)	0.028 (0.163)	-0.518* (0.310)	-0.062 (0.159)	-0.118 (0.105)	-0.266 (0.183)	-0.042 (0.180)
$(\pi_t^C - \pi_t^{EA}) * x$	$b^4 = ?$	0.290 (0.207)	-0.005 (0.016)	-0.093 (0.292)	0.016 (0.537)	-0.507* (0.269)	-0.382** (0.180)	-0.425 (0.349)	-0.252 (0.210)
$(y_t^C - y_t^{EA}) * x_t$	$c^4 < 0$	0.139** (0.065)	0.005 (0.004)	-0.449** (0.181)	-0.175 (0.268)	-0.235* (0.125)	-0.194** (0.086)	-0.360 (0.219)	-0.078 (0.090)
$x_t$	$d = 0$	-1.874 (1.143)	0.035 (0.174)	1.511 (1.553)	1.061 (2.172)	1.553 (1.487)	-- ( -- )	0.906 (1.649)	1.643 (1.377)
<b>Test of joint hypotheses (p-value):</b>									
	$b^1 + b^3 > 0$	<b>0.081</b>	0.941	0.952	0.807	0.879	0.939	0.982	0.935
	$c^1 + c^3 < 0$	<b>0.021</b>	<b>0.031</b>	<b>0.016</b>	<b>0.024</b>	<b>0.044</b>	<b>0.033</b>	<b>0.015</b>	<b>0.099</b>
	$b^2 + b^4 < 0$	0.211	<b>0.004</b>	<b>0.053</b>	0.178	<b>0.003</b>	<b>0.006</b>	<b>0.014</b>	<b>0.004</b>
	$c^2 + c^4 < 0$	0.942	<b>0.019</b>	<b>0.007</b>	0.180	<b>0.060</b>	<b>0.013</b>	<b>0.036</b>	<b>0.052</b>
Party fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	299	299	299	299	299	299	299	299	299
R-squared	0.27	0.27	0.31	0.28	0.31	0.30	0.29	0.28	

Notes: The table shows the estimates for possible shifts in politicians' preferences based on equation (5')

$$(5') \quad pc_{z,t} = a_z + b^1 \pi_t^{EA} + b^2 (\pi_{z,t}^C - \pi_t^{EA}) + b^3 \pi_t^{EA} x_{z,t} + b^4 (\pi_{z,t}^C - \pi_t^{EA}) x_{z,t} + c^1 y_t^{EA} + c^2 (y_{z,t}^C - y_t^{EA}) + c^3 y_t^{EA} x_{z,t} + c^4 (y_{z,t}^C - y_t^{EA}) x_{z,t} + dx_{z,t} + \mu_{z,t}$$

where  $pc_{z,t}$  denotes political commentary by political party  $z$ ,  $\pi$  consumer price inflation,  $y$  GDP growth and  $x$  the political economy proxy for preference shifts. Euro area variables are denoted with the superscript  $EA$ , country-specific variables with the superscript  $C$ . \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Numbers in brackets denote standard errors.

**Table 7: Shifts in politicians' preferences – robustness: all comments**

		Pre-election period	Low voting support	Low public trust in ECB	Excessive deficit procedure	Negative growth differential	Left-wing party	High debt	High deficit
Hypothesis	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	
<b>Euro area macro variables:</b>									
$\pi_t^{EA}$	$b^1 > 0$	-0.518 (0.433)	-0.527 (0.383)	-0.301 (0.249)	-0.432 (0.397)	-0.140 (0.441)	-0.709* (0.386)	-0.369 (0.530)	-0.016 (0.340)
$y_t^{EA}$	$c^1 < 0$	-0.085 (0.111)	-0.111 (0.092)	-0.286** (0.118)	-0.056 (0.098)	-0.190* (0.105)	-0.172 (0.108)	-0.112 (0.122)	-0.049 (0.142)
<b>Country-specific macro differences:</b>									
$\pi_t^C - \pi_t^{EA}$	$b^2 < 0$	-0.528** (0.207)	-0.495*** (0.188)	-0.314 (0.219)	-0.501** (0.211)	-0.149 (0.180)	-0.454** (0.207)	-0.136 (0.191)	-0.311 (0.232)
$y_t^C - y_t^{EA}$	$c^2 < 0$	-0.129* (0.068)	-0.160** (0.065)	-0.007 (0.019)	-0.093** (0.046)	0.058* (0.035)	-0.260** (0.102)	-0.040 (0.034)	-0.074 (0.056)
<b>Political economy variables &amp; interaction terms:</b>									
$\pi_t^{EA} * x_t$	$b^3 > 0$	0.610 (0.546)	0.002 (0.122)	-0.774 (0.686)	-0.966 (1.633)	-0.597 (0.726)	-0.752 (0.477)	-0.593 (0.748)	-0.816 (0.652)
$y_t^{EA} * x_t$	$c^3 < 0$	-0.376 (0.240)	-0.004 (0.017)	0.010 (0.183)	-0.427 (0.333)	0.052 (0.179)	-0.140 (0.115)	-0.049 (0.213)	-0.082 (0.220)
$(\pi_t^C - \pi_t^{EA}) * x_t$	$b^4 = ?$	0.258 (0.201)	-0.014 (0.022)	-0.113 (0.330)	-0.345 (0.642)	-0.924*** (0.326)	-0.383* (0.202)	-0.864** (0.403)	-0.361 (0.288)
$(y_t^C - y_t^{EA}) * x_t$	$c^4 < 0$	0.179** (0.082)	0.008 (0.006)	-0.631*** (0.195)	-0.525 (0.358)	-0.268* (0.141)	-0.241** (0.099)	-0.462* (0.259)	-0.095 (0.116)
$x_t$	$d = 0$	-0.746 (1.219)	0.012 (0.281)	1.717 (1.710)	2.453 (3.818)	1.997 (1.673)	-- ( -- )	1.425 (1.945)	2.163 (1.560)
<b>Test of joint hypotheses (p-value):</b>									
	$b^1 + b^3 > 0$	0.390	0.911	0.949	0.813	0.894	0.963	0.966	0.931
	$c^1 + c^3 < 0$	<b>0.011</b>	0.102	<b>0.028</b>	<b>0.070</b>	0.193	<b>0.059</b>	0.182	0.205
	$b^2 + b^4 < 0$	<b>0.097</b>	<b>0.004</b>	<b>0.061</b>	<b>0.086</b>	<b>0.001</b>	<b>0.009</b>	<b>0.003</b>	<b>0.005</b>
	$c^2 + c^4 < 0$	0.947	<b>0.007</b>	<b>0.001</b>	<b>0.042</b>	<b>0.051</b>	<b>0.006</b>	<b>0.025</b>	<b>0.054</b>
Party fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	299	299	299	299	299	299	299	299	299
R-squared	0.32	0.32	0.37	0.33	0.37	0.35	0.35	0.35	0.33

Notes: The table shows the estimates for possible shifts in politicians' preferences based on equation (5')

$$(5') \quad pc_{z,t} = a_z + b^1 \pi_t^{EA} + b^2 (\pi_{z,t}^C - \pi_t^{EA}) + b^3 \pi_t^{EA} x_{z,t} + b^4 (\pi_{z,t}^C - \pi_t^{EA}) x_{z,t} + c^1 y_t^{EA} + c^2 (y_{z,t}^C - y_t^{EA}) + c^3 y_t^{EA} x_{z,t} + c^4 (y_{z,t}^C - y_t^{EA}) x_{z,t} + dx_{z,t} + \mu_{z,t}$$

where  $pc_{z,t}$  denotes political commentary by political party  $z$  – which is in this case includes also statements on the mandate and independence of the central bank –  $\pi$  consumer price inflation,  $y$  GDP growth and  $x$  the political economy proxy for preference shifts. Euro area variables are denoted with the superscript  $EA$ , country-specific variables with the superscript  $C$ . \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Numbers in brackets denote standard errors.

**Table 8: Shifts in politicians' preferences – robustness: negative binomial regression using only calls for lower rates**

		Pre-election period	Low voting support	Low public trust in ECB	Excessive deficit procedure	Negative growth differential	Left-wing party	High debt	High deficit
Hypothesis	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	
<b>Euro area macro variables:</b>									
$\pi_t^{EA}$	$b^1 > 0$	-0.507 (0.347)	-0.487 (0.339)	-0.119 (0.355)	-0.473 (0.273)	-0.200 (0.390)	-0.511** (0.222)	-0.373 (0.366)	0.074 (0.470)
$y_t^{EA}$	$c^1 < 0$	-0.170** (0.067)	-0.187*** (0.064)	-0.390*** (0.133)	-0.153** (0.069)	-0.277*** (0.107)	-0.187*** (0.061)	-0.122 (0.106)	-0.189* (0.104)
<b>Country-specific macro differences:</b>									
$\pi_t^C - \pi_t^{EA}$	$b^2 < 0$	-0.509*** (0.176)	-0.467*** (0.176)	-0.465** (0.236)	-0.513*** (0.176)	-0.418* (0.220)	-0.428** (0.176)	-0.487** (0.220)	-0.414 (0.292)
$y_t^C - y_t^{EA}$	$c^2 < 0$	-0.169** (0.081)	-0.164** (0.074)	0.023 (0.073)	-0.156* (0.083)	0.135 (0.109)	-0.172** (0.072)	-0.082 (0.094)	-0.133 (0.151)
<b>Political economy variables &amp; interaction terms:</b>									
$\pi_t^{EA} * x_t$	$b^3 > 0$	1.927** (0.961)	0.007 (0.038)	-0.485 (0.435)	0.310 (0.625)	-0.326 (0.483)	-0.198 (0.264)	-0.213 (0.452)	-0.664 (0.527)
$y_t^{EA} * x_t$	$c^3 < 0$	-0.461* (0.265)	0.002 (0.008)	0.165 (0.154)	-0.225 (0.164)	0.081 (0.135)	0.001 (0.076)	-0.122 (0.142)	0.005 (0.143)
$(\pi_t^C - \pi_t^{EA}) * x$	$b^4 = ?$	0.190 (0.359)	0.005 (0.014)	0.015 (0.279)	0.044 (0.338)	-0.235 (0.267)	-0.397* (0.203)	0.018 (0.264)	-0.096 (0.298)
$(y_t^C - y_t^{EA}) * x_t$	$c^4 < 0$	0.268* (0.156)	0.007 (0.007)	-0.391*** (0.112)	0.025 (0.207)	-0.370* (0.191)	-0.169** (0.077)	-0.183 (0.150)	-0.062 (0.169)
$x_t$	$d = 0$	-3.562* (1.994)	-0.013 (0.085)	0.671 (0.914)	-0.301 (1.352)	1.021 (1.102)	-- ( -- )	0.662 (0.998)	1.473 (1.225)
<b>Test of joint hypotheses (p-value):</b>									
	$b^1 + b^3 > 0$	<b>0.058</b>	0.979	0.989	0.613	0.975	0.989	0.984	0.992
	$c^1 + c^3 < 0$	<b>0.007</b>	<b>0.002</b>	<b>0.002</b>	<b>0.006</b>	<b>0.009</b>	<b>0.026</b>	<b>0.004</b>	<b>0.018</b>
	$b^2 + b^4 < 0$	0.186	<b>0.004</b>	<b>0.016</b>	<b>0.079</b>	<b>0.001</b>	<b>0.002</b>	<b>0.011</b>	<b>0.005</b>
	$c^2 + c^4 < 0$	0.818	<b>0.016</b>	<b>0.000</b>	0.245	<b>0.022</b>	<b>0.003</b>	<b>0.011</b>	<b>0.005</b>
Party fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	299	299	299	299	299	299	299	299	299

Notes: The table shows the estimates for possible shifts in politicians' preferences based on equation (5<sup>'</sup>):

$$(5') \quad pc_{z,t} = a_z + b^1 \pi_t^{EA} + b^2 (\pi_{z,t}^C - \pi_t^{EA}) + b^3 \pi_t^{EA} x_{z,t} + b^4 (\pi_{z,t}^C - \pi_t^{EA}) x_{z,t} + c^1 y_t^{EA} + c^2 (y_{z,t}^C - y_t^{EA}) + c^3 y_t^{EA} x_{z,t} + c^4 (y_{z,t}^C - y_t^{EA}) x_{z,t} + dx_{z,t} + \mu_{z,t}$$

where  $pc_{z,t}$  denotes political commentary by political party  $z$ , this time only counting statements expressing a preference for lower interest rates,  $\pi$  consumer price inflation,  $y$

GDP growth and  $x$  the political economy proxy for preference shifts. Euro area variables are denoted with the superscript  $EA$ , country-specific variables with the superscript

$C$ . \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Numbers in brackets denote standard errors. Estimated using a negative

binomial maximum-likelihood regression, given that  $pc_{z,t}$  now is a nonnegative count variable. A standard Poisson regression was rejected, given that the data has extra-

Poisson variation.



**Table 9: Modeling Desired Interest Rates**

Hypothesis		(1)	
<b>Euro area macro variables:</b>			
$\pi_t^{EA}$	$\beta^{P,EA} > 0$	0.518***	( 0.132 )
$y_t^{EA}$	$\gamma^{P,EA} > 0$	0.437***	( 0.062 )
<b>Country-specific macro differences:</b>			
$\pi_t^C - \pi_t^{EA}$	$\beta^{P,C} > 0$	0.327***	( 0.119 )
$y_t^C - y_t^{EA}$	$\gamma^{P,C} > 0$	-0.007	( 0.020 )
Party fixed effects		Yes	
Observations		131	
R-squared		0.610	

Notes: The table shows results of estimating equation (1')

$$i_t^{act} = \alpha_z^P + \beta^{P,EA} \pi_t^{EA} + \beta^{P,C} (\pi_{z,t}^C - \pi_t^{EA}) + \gamma^{P,EA} y_t^{EA} + \gamma^{P,C} (y_{z,t}^C - y_t^{EA}) + \varepsilon_{z,t}^P.$$

For a definition of variables, see Section 3. \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Numbers in brackets denote standard errors.