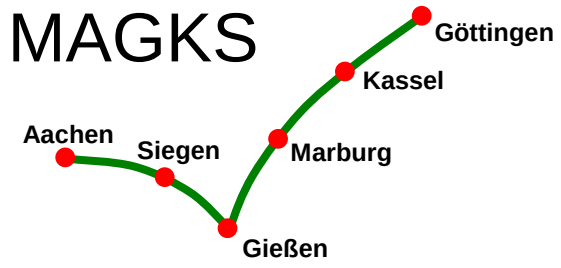

Joint Discussion Paper Series in Economics

by the Universities of

Aachen · Gießen · Göttingen
Kassel · Marburg · Siegen

ISSN 1867-3678

No. 03-2011

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This paper can be downloaded from
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This version: 03 February 2012

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* Thanks to Edith Neuenkirch, Florian Neumeier, Britta Niehof, Matthias Uhl, participants of the 26th Annual Congress of the European Economic Association in Oslo, the Verein für Socialpolitik Annual Congress 2011 in Frankfurt, and the Money, Macro, and Finance Research Group 43rd Annual International Conference in Birmingham for their helpful comments on earlier versions of the paper. The usual disclaimer applies.

Do Federal Reserve Presidents Pursue Regional or National Interests? New Evidence Based on Speeches

Abstract

In this paper, we analyse the determinants of speeches by Federal Reserve (Fed) officials over the period January 1998 to September 2009. Econometrically, we use a probit model with regional and national macroeconomic variables to explain the content of these speeches. Our results are, first, that Fed Governors and presidents follow a Taylor rule when expressing their opinions: a rise in expected inflation (unemployment) makes a hawkish speech more (less) likely. Second, the content of speeches by Fed presidents in their home district is affected by both regional and national macroeconomic variables, whereas speeches outside their home district are influenced solely by national information. Third, the influence of regional variables increases during the financial crisis. Fourth, speeches by nonvoting presidents are more focused on regional economic development than are those by voting presidents. Finally, voting presidents and Governors are less backward-looking in their wording than are nonvoting presidents.

JEL: D72, E52, E58

Keywords: Central Bank Communication, Disagreement, Federal Reserve, Monetary Policy, Regional Representation, Speeches

1. Introduction

U.S. monetary policy is set by the Federal Open Market Committee (FOMC), which consists of 19 members. Seven of these are the members of the Board of Governors (BOG) and have voting rights at every FOMC meeting. The other 12 are the presidents of the regional Federal Reserve (Fed) Banks and share the remaining five votes: the president of the New York Fed votes on a continuous base; the other presidents rotate the remaining four voting seats on an annual basis.[1]

By law, all members of the FOMC are committed to the Fed's goals: maximum employment, stable prices, and moderate long-term interest rates. However, in practice, it is questionable whether presidents focus solely on national interests. For instance, Meade and Sheets (2005) show that policymakers take into account developments in regional unemployment when *voting* on monetary policy. An FOMC member representing a district where unemployment is 1 percentage point above the national average will dissent in regard to tighter policy 2.4 percentage points less frequently than an FOMC member from a district where unemployment is at the national average. Gildea (1992) provides evidence that presidents are more concerned about developments in the regions they represent than with the nation as a whole. He finds an increase in the probability of *voting* in favour of more-expansionary monetary policy if regional unemployment is high relative to the national rate.[2]

However, Gerlach-Kristen and Meade (2010) show that *dissents* occurred infrequently during Alan Greenspan's tenure as Chairman: members cast dissenting votes only when they strongly disagreed with a proposed directive and cast assenting votes in the case of weak disagreement. In the latter case, the five voting presidents (and, obviously, the seven nonvoting presidents) must rely on *other channels* if they want to express their *opposition* to the interest rate proposal.[3] One of these channels is *voiced disagreement* in internal Committee discussions: Meade (2005) illustrates that the rate of disagreement in Committee discussions (a transcript of these is publicly available) about interest rate setting was about 30 percent. In a recent paper, Meade (2010) shows that bank presidents (voters and nonvoters) are more likely to voice disagreement with a given policy proposal than are Governors. One potential source of this disagreement is concern over regional economic development, which

[1] The presidents of (i) Boston, Philadelphia, and Richmond, (ii) Cleveland and Chicago, (iii) Atlanta, St. Louis, and Dallas, (iv) Minneapolis, Kansas City, and San Francisco, respectively, alternate the voting seats.

[2] Another branch of the literature focuses on the policymakers' degree of inflation-aversion. For instance, Belden (1989) finds that presidents are more likely in favour of tighter monetary policy than Governors. Furthermore, they dissent more often in the direction of tighter monetary policy, whereas Governor dissent is more balanced. Havrilesky and Gildea (1995) confirm that presidents prefer less-expansionary monetary policy than do Governors.

[3] During our sample period (January 1998–October 2009), 74 decisions were taken unanimously; in only 26 cases did one or two of the 12 FOMC members vote against the rate proposal.

does not necessarily coincide with the national average. Presidents should react sensitively to regional developments, as they (i) mainly live in the district they represent, (ii) talk frequently with local businesspeople about their needs and problems, (iii) are selected by the district Board of Directors, members of which represent banking, industrial, or other interests in their region, and (iv) rely on expert input from members of a local staff. Chappell et al. (2008) empirically confirm that regional conditions affect the policy preferences of Fed presidents. There is some weak evidence that regional developments also influence Governors. When considering all FOMC members, the authors find that national conditions matter more than regional ones.[4]

Another channel for expressing opposition to a specific FOMC position is *strategic forecasting*: Based on a dataset of individual forecasts, Tillmann (2010) shows that nonvoters systematically overpredict inflation relative to the consensus forecast when they favour tighter policy, and underpredict inflation when they favour looser policy. These strategic motives in forecasting are used to influence policy deliberation within the FOMC. Banternghansa and McCracken (2009) discover that the most significant forecast disagreements are between the regional presidents and the Vice Chairman, even though the Vice Chairman tends to be one of the most consensus-oriented members of the FOMC. Yet, there is no evidence for strategic forecasting due to regionally-driven motives.

A third channel for voicing dissatisfaction with Fed monetary policy is via *communication*. Over the past two decades, the Fed (and other central banks) has increasingly relied on informal communication with the public. Speeches by Fed officials are an additional means of airing the bank's view on economic outlook and the future course of monetary policy. Fed speeches significantly affect financial market expectations (see, e.g., Ehrmann and Fratzscher, 2007; Hayo et al., 2008) and also explain and predict target rate decisions (Hayo and Neuenkirch, 2010). Therefore, it is of particular interest to analyse the determinants underlying these speeches.

Presidents have two incentives to use speeches to express their disagreement with the current or expected policy rate. First, speeches are non-binding; even voting presidents can 'oppose' an FOMC position publicly but still vote in line with the Fed's proposal (in case of minor disagreement) for reasons described below. Second, central bankers can choose where and when to make their speeches, and thereby express their views, on an *ad hoc* basis at any

[4] There is also empirical evidence for countries other than the United States. Berger and de Haan (2002) show that economic differences across the German Länder affected the voting behaviour of regional representatives on the Bundesbank Governing Council in the period 1948–1961. Heinemann and Huefner (2004) report that country-specific economic considerations affected ECB policy outcomes during the early years of the euro.

time (except during the blackout period seven days before and three days after FOMC meetings).

We expect presidents to express more concern over regional economic development and the corresponding future course of monetary policy in their speeches than is reflected in their actual voting behaviour, for two reasons. First, the vast majority of presidents' speeches are delivered in the home district, where the audience is mostly regionally oriented. Second, speeches by presidents receive far less national media attention than do Governors' speeches (Hayo et al., 2008) or interest rate decisions and accompanying discussion. Thus, emphasizing a regional point of view likely generates support by regionally-oriented audiences and does not cause a large reaction (if any) in the national media.

To the best of our knowledge, this is the first paper analyzing the determinants of Fed presidents' speeches and testing the hypotheses put forward above. Econometrically, we use a probit model with regional and national macroeconomic variables to explain the content of these speeches. We focus on three research questions. First, do Fed presidents use national and/or regional economic information when expressing a tightening (easing) inclination in their speeches? Second, do presidents adjust the contents of their speeches depending on whether they speak inside or outside their home district and do they react to the recent financial crisis? Third, are there significant differences in the content of speeches made by voting presidents, nonvoting presidents, and BOG members? Our contribution to the literature is twofold. First, we utilise a newly constructed dataset that covers all speeches by Fed officials over the period January 1998 to September 2009. Second, we are not aware of any other study that investigates determinants of central bank speeches, an impression supported by the comprehensive survey by Blinder et al. (2008).

The remainder of this paper is organised as follows. In Section 2, we describe the coding of central bank communication and explain the econometric methodology. Section 3 presents the empirical results for all presidents. Section 4 studies whether the factors determining the thrust of the speech are affected by the location of the speech, inside or outside the home district, and whether the recent financial crisis leads to changes in communication patterns. In Section 5 we differentiate between the determinants of speeches by voting presidents, nonvoting presidents, and Governors. Section 6 concludes with some policy implications.

2. Data and Econometric Methodology

Federal Reserve Speeches

We use the dataset introduced by Hayo et al. (2008). It includes subjectively coded indicator variables for all speeches by Fed officials. The speeches are sorted into two categories depending on whether they indicate likely increases or decreases in the Federal Funds target rate.[5] Speeches referring directly to monetary policy are easily interpreted. For example, when the Fed states that *'the Federal Funds rate must rise at some point to prevent pressures on price inflation from eventually emerging'* (Greenspan, 2004), a target rate hike is imminent. However, other statements are not so straightforward. For example, speeches stressing potentially inflationary pressures can be seen as indirect signs of a future rate hike. Speeches presenting a bright economic outlook (in terms of GDP growth or positive employment news) can also be read as an indication of rising interest rates because in good economic times the Fed needs to take steps to prevent the economy from overheating. Hayo and Neuenkirch (2010) point out that the Fed typically does not talk extensively about rate cuts and thus a speech about a negative economic outlook can be considered a particularly useful indicator of this possibility. In total, there are 612 speeches coded as either tightening or easing indications: 194 by voting presidents, 267 by nonvoting presidents, and 151 by BOG members.[6]

The following simple framework motivates our empirical approach (Meade and Sheets, 2005). Forward-looking central bankers choose their wording according to expected nation-wide economic and regional economic conditions:[7]

$$(1)\ speech_{i,t} = f[E_t(N_{t+k}), E_t(R_{i,t+k})],$$

where $speech_{i,t}$ denotes a speech by a central banker representing district i at time period t. $E_t(N_{t+k})$ represents expected national economic conditions k months ahead conditional on information available at the time of the speech and $E_t(R_{i,t+k})$ represents the corresponding regional expectations in the respective president's district. A linear representation of this function illustrates two sources of potential disagreement:

[5] In our analysis, we focus on speeches indicating the future direction of interest rates. Speeches that take a 'neutral' view of the economic outlook and the future course of monetary policy are excluded from the analysis, as are speeches with no particular information on either topic.

[6] Table A1 in the Appendix shows the frequency of these events.
Note, that other forms of communications are not included: post-meeting statements and monetary policy reports express the view of the whole committee rather than individual views, Congressional hearings are not scheduled autonomously and often also express committee views.

[7] Preliminary estimations confirm our intuition that forward-looking rather than backward-looking macroeconomic variables determine the content of speeches. Results are available on request.

$$(2)\ speech_{i,t} = \alpha_i E_t(N_{t+k}) + \beta_i E_t\left(R_{i,t+k}\right) + \mu_{i,t}.$$

First, regional economic conditions $E_t\left(R_{i,t+k}\right)$ vary across the 12 Fed districts. Second, responsiveness to regional and national economic conditions could vary across central bankers, i.e., $\alpha_{ij} \neq \alpha_{ik}\ and/or\ \beta_{ij} \neq \beta_{ik}$, with j and k indicating different persons.[8] However, we can show for our sample that central bankers' preferences are (nearly) uncorrelated with regional or national economic conditions.[9] Thus, we interpret coefficients α_i and β_i as weights of national and regional information, respectively.

Macroeconomic Data

In our empirical specification, we examine whether central bankers follow a modified Taylor rule when phrasing their speeches. Thus, expected nation-wide inflation,[10] as well as expected nation-wide and regional real indicators, should contribute to this 'reaction function.' The real-time expected one-year-ahead national *consumer price index* (CPI) inflation rate is calculated on the basis of standard forecast variables[11] and employed as a price indicator. We utilise two different variables as indicators of real economic activity. (1) The unemployment rate, which is available both at the national and district levels[12] and is a major topic in speeches, especially those by presidents; this indicator is also used by Meade and Sheets (2005) and Chappell et al. (2008). Furthermore, the unemployment rate is perceived by a broad audience and thus is the most widely observed indicator of economic performance, at least by the public. Thus, we calculate the expected (regional and national) seasonally

[8] Expectation formation and the relevant horizon of expectations *k* might also differ between individual central bankers. However, we assume the expectation-building process and the horizon as constant so as to identify the reaction to regional and national macroeconomic variables.

[9] Our results are robust to the inclusion of individual-specific effects in the estimation of α_i and β_i. As part of a robustness test, we add to Equation (3) person-specific dummy variables for all central bankers in our sample who made 20 or more speeches. Only in case of Janet Yellen (president of the San Francisco Fed during the period June 2004–October 2010), do we find a significant person-specific effect. The negative coefficient is in line with her reputation for being 'dovish.' Results are available on request.
There are also direct preference indicators in the literature. However, these have at least one major drawback. The index by Meade (2005), for example, is constructed on the basis of past voting behaviour and voiced disagreement within the FOMC, which in turn is determined by national and regional economic conditions and the individual degree of inflation-aversion. Thus, using such indicators in the empirical analysis makes it impossible to identify these conceptionally different effects.

[10] Data source: St. Louis Fed. Unfortunately, there is only national CPI data, no state or district-wide CPI data. The Fed's *Beige Book* cannot be used as a source of information of regional prices because (i) it does not regularly contain an assessment of price developments in the districts and (ii) even if it does, the assessment is typically only qualitative.

[11] We employ 12 lags of the following monthly variables, which are available at the time of forecast: CPI inflation, nation-wide unemployment rate, effective Federal Funds rate, M2 (growth rates), industrial production (growth rates), and the broad U.S. dollar index (growth rates). In a consistent general-to-specific testing-down approach (Hendry, 2000), we construct the final forecast model. Results are available on request.

[12] Data source: St. Louis Fed.

adjusted one-year-ahead real-time unemployment rate.[13] A preliminary analysis of the data suggests employing an expected *unemployment rate gap* measure rather than expected overall unemployment. This means that central bankers accept a certain degree of unemployment, often called the 'natural unemployment rate' (see, e.g., Bernanke, 2005), and only react to (cyclical) deviations from this rate.[14] (2) The Philadelphia Fed provides a six-month-ahead *Leading Index* at the national and state levels that is based on employment, housing, production, and financial data. GDP weights of the respective states and counties are used to create real-time Leading Indices for the 12 Fed districts.[15]

Econometric Methodology

Econometrically, we use a pooled setup of these speeches over all Fed districts. A pooled setup is helpful for obtaining a larger number of observations, as 12 of the 22 bank presidents in our sample made fewer than 20 speeches. Furthermore, any remaining potential bias due to region- or president-specific effects are minimised in a pooled setup. We use a probit model to take into account the discrete nature of the speeches. Central bankers discuss either an easing inclination (coded 0) or a tightening inclination (coded 1). Our specification using the unemployment rate as a real macroeconomic indicator is:[16]

$$(3)\ speech^{*}_{i,t} = \alpha E_t(\pi_{t+12}) + \beta E_t\left(u_{GAP\,t+12}\right) + \gamma E_t\left(u_{REGGAP\,i,t+12}\right) + \varepsilon_{i,t},$$

where $speech^{*}_{i,t}$ is the latent continuous variable representing the binary choice. Our 'Taylor rule' includes three explanatory variables: national inflation, national unemployment rate gap, and regional unemployment rate gap.[17] The residuals ε_t are assumed to follow a standard normal distribution, which implies that the probabilities of the different outcomes can be written as:

[13] We employ the same set of monthly variables available in real time as we did when forecasting CPI inflation. Furthermore, in the case of regional unemployment rates, 12 lags of the respective regional unemployment rates are added to the model. Again, a consistent general-to-specific testing-down approach (Hendry, 2000) is used to obtain the final forecast models. Results are available on request.

[14] The unemployment trend is estimated by a Hodrick-Prescott filter (Hodrick and Prescott, 1997) for the period 1990–2010 (λ = 14,400). Unemployment gaps are derived by subtracting trend ('natural') unemployment rates from actual ones.

[15] As national financial data are part of both the national and the regional index, we subtract the national index from the regional index to create a purely regional series: $Regional\ Index^{*}_{i,t} = Regional\ Index_{i,t} - National\ Index_t$.

[16] In the estimations using the Leading Index, we replace the national and regional unemployment rate in Equation (3) with the national Leading Index and the corresponding regional Leading Index.

[17] Table A2 in the Appendix shows descriptive statistics for the explanatory variables. Henceforth, for the sake of simplicity, we use the term 'inflation' instead of 'expected one-year-ahead consumer price index inflation rate' and 'unemployment rate' instead of 'expected one-year-ahead unemployment rate gap.'

$$\Pr\left[speech_{i,t} = 1 \middle| z_{i,t}\right] = \Phi\left(z_{i,t}'\delta\right) \text{ and } \Pr\left[speech_{i,t} = 0 \middle| z_{i,t}\right] = 1 - \Phi\left(z_{i,t}'\delta\right),$$

where Φ denotes the cumulative standard normal distribution, $z_{i,t}$ is a vector of explanatory variables, and δ a vector of coefficients. The probit models are estimated by maximum likelihood.

3. Determinants of Presidents' Speeches

In this section, we present the results of our empirical estimations employing different variations of Equation (3). Column (1) of Table 1 shows the model based on inflation and national unemployment rate, Column (2) uses regional unemployment data and inflation, and the specification in Column (3) incorporates all three variables.

Table 1: Explaining Presidents' Speeches with Inflation and Unemployment Rate

	(1) Presidents	(2) Presidents	(3) Presidents
Coefficients			
CPI Inflation	0.390 **	0.398 **	0.402 **
Unemployment Rate	–0.312 **	—	–0.077
Regional Unemp. Rate	—	–0.385 **	–0.307 **
Marginal Effects			
CPI Inflation	0.124 **	0.126 **	0.127 **
Unemployment Rate	–0.099 **	—	–0.024
Regional Unemp. Rate	—	–0.122 **	–0.097 **
Observations	461	461	461
LR Statistic	134.0 **	125.5 **	128.3 **
Pseudo Log-Likelihood	–225.7	–221.2	–220.8
Pseudo-R^2	0.190	0.202	0.203
Correct Predictions	76.1%	77.2%	76.8%

Note: * and ** indicate significance at a 5% and 1% level, respectively. Huber (1967)/White (1980) robust standard errors are used.

All three models have a similar fit in terms of pseudo-R^2 (0.19–0.20) and correct predictions (76%–77%). The results suggest that regional Fed presidents follow a modified 'Taylor rule' when they phrase their speeches: when inflation is expected to rise, they choose more hawkish words, whereas a rise in unemployment leads to more dovish speeches.

The influence of inflation is nearly the same in all three specifications. The probability of giving a hawkish speech increases by 12.4–12.7 percentage points (pp) when inflation rises by 1 pp. A hike in the national unemployment rate makes a hawkish speech less likely by 9.9 pp in Model (1). A corresponding change in the regional unemployment rate decreases the likeliness of such a speech by 12.2 pp and 9.7 pp in Models (2) and (3), respectively.

Strikingly, the regional unemployment rate dominates the national one, as the latter becomes insignificant in the joint model (Model (3)). This result stands in contrast to Chappell et al. (2008), who find that national developments outweigh regional conditions in the context of interest rate discussions. However, speeches are the least 'costly' channel of expressing (regional) concern, which might explain the predominance of regional information in this context.

In a next step, we replace the unemployment rate as our real macroeconomic indicator with the Leading Index. Column (4) of Table 2 shows the model based on inflation and national Leading Index, Column (5) uses regional Leading Index and inflation, and the specification in Column (6) contains all three variables.

Table 2: Explaining Presidents' Speeches with Inflation and Leading Index

	(4) Presidents	**(5) Presidents**	**(6) Presidents**
Coefficients			
CPI Inflation	0.203 **	0.330 **	0.248 **
Leading Index	0.333 **	—	0.310 **
Regional Leading Index	—	0.578 **	0.513 **
Marginal Effects			
CPI Inflation	0.063 **	0.103 **	0.077 **
Leading Index	0.104 **	—	0.097 **
Regional Leading Index	—	0.181 **	0.160 **
Observations	461	461	461
LR Statistic	169.9 **	107.5 **	152.8 **
Pseudo Log-Likelihood	–226.8	–236.0	–213.8
Pseudo-R^2	0.186	0.159	0.222
Correct Predictions	75.9%	76.8%	78.1%

Note: * and ** indicate significance at a 5% and 1% level, respectively. Huber (1967)/White (1980) robust standard errors are used.

The fits of Models (4) and (5) are marginally worse (0.19 and 0.16, respectively) than the ones of the corresponding models in Table 1 (Models (1) and (2)), whereas the joint model (Model (6)) slightly outperforms Model (3) of Table 1 in terms of pseudo-R^2 (0.22). The share of correct predictions in Table 2 is similar to that of Models (1)–(3) of Table 1 (76%–78%). In line with our expectations, a rise in the regional Leading Index increases the likelihood of a hawkish speech by 18.1 pp in Model (5) and by 16 pp in Model (6). In this case, the Fed needs to prevent the economy from overheating and policymakers thus choose more hawkish words. In contrast to Model (3), the national Leading Index remains significant in the joint specification (Model (6)).

However, the conclusion that regional information is more relevant than national development when it comes to speech content is still valid, as the marginal effects of the latter are smaller (10.4 pp and 9.7 pp, respectively). The influence of inflation depends on the inclusion of the national Leading Index. If the Leading Index is included, the marginal effects are considerably lower (6.3 pp in Model (4) and 7.7 pp in Model (6) than otherwise (10.3 pp in Model (5)). This can be explained by the fact that the national Leading Index contains financial information: the spread between 10-year and three-month bond yields is often used as a proxy for inflation (and monetary policy) expectations and partly crowds out the impact of inflation.

4. Determinants of Presidents' Speeches in Different Locations and Subsamples

In this section, we analyse if the factors determining the thrust of the speeches are affected by whether they are delivered (i) inside or outside the home district and (ii) before or during the recent financial crisis. We expect presidents to be even more focused on regional information when the audience is from their home district. Accordingly, during the financial crisis, we anticipate presidents to increasingly express their concerns about economic developments in their home district with the aim of reassuring the audience that their problems are taken into account. Columns (7) and (8) of Table 3 present the results for speeches delivered inside and outside the presidents' home district, Columns (9) and (10) the outcome for speeches, which were given before (January 1998–June 2007) and during the financial crisis (August 2007–September 2009).[18]

The fit of Model (7), referring to home district speeches, is much better in terms of pseudo-R^2 (0.23 vs. 0.07) and correct predictions (79% vs. 73%) than Model (8) for speeches outside the home district. Similarly, Model (9) for the period before the financial crisis outperforms Model (10) for the crisis period in both diagnostic indicators (pseudo-R^2: 0.12 vs. 0.01; correct predictions: 85% vs. 57%).

Reflecting the results for all speeches (Model (3) in Table 1), speeches delivered inside the home district are based on regional unemployment and inflation information, whereas inflation is the only significant variable explaining speeches outside the home district. A 1 pp increase in regional unemployment decreases the likelihood of a hawkish speech delivered in the home district by 7.9 pp. However, the influence of inflation is nearly the same irrespective the speech location. The probability of giving a hawkish speech increases by 10.9 pp (Model (7)) and 10.1 pp (Model (8)) when inflation rises by 1 pp.

[18] Restricting the financial crisis subsample to the period after the Lehman crash leaves us with too few observations.

Table 3: Explaining Speeches in Different Locations and Subsamples (Unemployment)

	(7) Inside Home Distr.		(8) Outside Home Distr.		(9) Pre-Fin. Crisis		(10) During Fin. Crisis	
Coefficients								
Consumer Price Index	0.411	**	0.350	**	0.457	**	0.025	
Unemp. Rate	–0.127		–0.006		–0.462	**	0.207	
Regional Unemp. Rate	–0.299	**	–0.127		–0.031		-0.375	**
Marginal Effects								
Consumer Price Index	0.109	**	0.101	**	0.110	**	0.010	
Unemp. Rate	–0.033		–0.002		–0.111	**	0.080	
Regional Unemp. Rate	–0.079	**	–0.037		–0.007		-0.144	**
Observations	390		71		342		119	
LR Statistic	108.8	**	20.9	**	111.0	**	11.0	*
Pseudo Log-Likelihood	–180.8		–37.6		–133.4		-76.4	
Pseudo-R^2	0.230		0.067		0.122		0.014	
Correct Predictions	79.0%		73.2%		84.5%		57.1%	

Note: * and ** indicate significance at a 5% and 1% level, respectively. Huber (1967)/White (1980) robust standard errors are used.

Before the financial crisis (Model (9)), speeches are influenced by both national variables: A 1 pp in inflation makes a hawkish speech more likely by 11.0 pp, whereas a corresponding change in the national unemployment rate decreases the likeliness by 11.1 pp. In contrast, inflation does not significantly explain speeches during the financial crisis. Despite the fact that inflation (and its forecasts) remained relatively high during that period (exception: the months after the Lehman crash), speakers put more emphasis on real economic and financial conditions. Regarding real economic indicators, a 1 pp increase in regional unemployment decreases the likelihood of a hawkish speech by 14.4 pp, whereas the influence of national unemployment is insignificant.[19]

Following the approach taken in Section 3, we replace the unemployment rate as our real macroeconomic indicator with the Leading Index. Columns (11) and (12) of Table 4 examine speeches inside and outside the home district, Columns (13) and (14) address the period before and during the financial crisis. Similar to Table 3, Model (11) for speeches in the home district performs better in terms of pseudo-R^2 (0.25 vs. 0.09) and correct predictions (79% vs. 76%) than Model (12) for speeches outside the home district. Model (9) for the pre-financial crisis subsample is superior to Model (10) capturing the financial crisis subsample (pseudo-R^2: 0.15 vs. 0.06; correct predictions: 85% vs. 66%).

As in case of the unemployment rate, there is a noticeable difference between speeches delivered inside and outside the home district. The results for speeches inside the home

[19] The sum of coefficients for national and regional unemployment is statistically significant ($Chi^2(1) = 6.2$*).

district are similar to the ones obtained for all speeches (Model (6) in Table 2): A 1 pp rise in inflation increases the likelihood of a hawkish speech by 6.2 pp. Furthermore, the national (8.7 pp) and the regional Leading Index (13.9 pp) significantly affect the probability of such a speech. In contrast, speeches outside the home district are only affected by inflation (8.3 pp).

Table 4: Explaining Speeches in Different Locations and Subsamples (Leading Index)

	(11) Inside Home Distr.	(12) Outside Home Distr.	(13) Pre-Fin. Crisis	(14) During Fin. Crisis
Coefficients				
Consumer Price Index	0.248 **	0.278 **	0.132 *	0.020
Leading Index	0.347 **	0.110	0.635 **	0.031
Regional Leading Index	0.555 **	0.331	0.464 **	0.597 **
Marginal Effects				
Consumer Price Index	0.062 **	0.083 **	0.028 *	0.007
Leading Index	0.087 **	0.033	0.137 **	0.011
Regional Leading Index	0.139 **	0.099	0.100 **	0.220 **
Observations	390	71	342	119
LR Statistic	141.1 **	19.2 **	138.7 **	15.3 **
Pseudo Log-Likelihood	–175.0	–36.7	–127.9	-74.3
Pseudo-R^2	0.247	0.089	0.147	0.047
Correct Predictions	79.2%	76.1%	84.5%	65.6%

Note: * and ** indicate significance at a 5% and 1% level, respectively. Huber (1967)/White (1980) robust standard errors are used.

Before the financial crisis (Model (13)), speeches are influenced by all three variables: A 1 pp increase in the inflation rate makes a hawkish speech more likely by 2.8 pp, whereas a corresponding change in the national (regional) Leading Index rate increases the likelihood by 13.7 (10.0) pp. During the financial crisis, the regional Leading Index increases the probability of a hawkish speech by 22.0 pp, whereas the effects of inflation and national Leading Index become insignificant.

Thus, in line with our expectations, presidents put relatively more weight on regional information when speaking in their home district. Speeches which are delivered outside the home district are driven by the national inflation rate only. Furthermore, presidents increasingly express their concerns about economic developments in their home district in times of major economic turbulences. Inflation plays a subordinate role in Fed communications during that period.

5. Further Results for Different Groups in the FOMC

In this section, we study speeches by various groups in the FOMC. Not all presidents have voting rights at all times and currently nonvoting presidents have to rely on other instruments to express their views and exert (regionally motivated) influence on the policy discussion. Therefore, we expect nonvoting presidents to be even more concerned with regional developments in speeches than are voting presidents. To test for these potential differences, we split the presidents into 'voting'[20] and 'nonvoting' groups and also compare these two subgroups to the group of Governors.

Rather than setting interest rates based on current information only, typically, the FOMC decides on a path for the Federal Funds target rate, which implies a significant degree of persistence when estimating Taylor rules (Clarida et al., 1998). To test to what extent the current interest rate path is represented in speeches by different groups of FOMC members, we add to Equation (3) an indicator, 'Monet. Policy Direction,' for the current interest rate direction. It takes the value –1 if the last interest rate *change* was a cut, the value of 1 in the event of a hike. Thus, including 'Monet. Policy Direction' implies that the other explanatory variables capture deviations from the current interest rate trend. Column (15) of Table 5 examines all presidents, Column (16) voters, Column (17) nonvoters, and Column (18) Governors.

The fit of Models (15)–(17) is much better than that of the Governor model (Model (18)) in terms of pseudo-R^2 (0.22 vs. 0.06) and correct predictions (79%–81% vs. 74%). However, the latter model includes no regional unemployment rate.[21] When compared to Model (3) of Table 1, the inclusion of the trend variable in Model (15) has only a small effect on the other coefficients (inflation, regional unemployment rate). In general, presidents speak in line with the current monetary policy trend: a one unit increase in this variable increases the probability of a hawkish speech by 10.2 pp. However, the results for Model (15) are primarily driven by the nonvoting presidents (Model (17)), as the same variables are significant: a 1 pp increase in inflation (regional unemployment) increases (decreases) the likelihood of a hawkish speech by 11.9 pp (10.1 pp). The current monetary policy direction exerts a marginal effect of 11.7 pp.

[20] The New York Fed president has voting rights all the time. However, omitting this president's speeches from the voting group does not change the results. Results are available on request.

[21] In some parts of the literature, Governors are assigned particular regional affiliations (e.g., Meade and Sheets, 2005; Chappell et al., 2008). However, there are some obvious problems with this procedure: (1) the Fed sometimes defines formal district affiliations to meet the legal requirement of regional diversity and these affiliations do not necessarily coincide with the Governor's true origin (some examples of this behaviour are provided by Chappell et al., 2008). (2) The Governors live and work in the capital and do not have regular contact with businesspeople from their 'home' districts. (3) They rely on input from the nationally-oriented Board staff.

Table 5: Explaining Speeches with Inflation, Unemployment Rate, and Interest Rate Trend

	(15) Presid.		(16) Voters		(17) Nonvot.		(18) Gov.	
Coefficients								
CPI Inflation	0.391	**	0.422	**	0.374	**	0.275	**
Unemployment Rate	0.016		–0.117		0.076		–0.133	
Regional Unemp. Rate	–0.273	**	–0.186		–0.318	*	–––	
Monet. Policy Direction	0.325	**	0.232		0.369	**	0.041	
Marginal Effects								
CPI Inflation	0.123	**	0.129	**	0.119	**	0.091	**
Unemployment Rate	0.005		–0.036		0.024		–0.044	
Regional Unemp. Rate	–0.086	**	–0.057		–0.101	*	–––	
Monet. Policy Direction	0.102	**	0.071		0.117	**	0.014	
Observations	461		194		267		151	
LR Statistic	104.8	**	44.3	**	60.6	**	32.5	**
Pseudo Log-Likelihood	–214.4		–86.8		–126.9		–84.2	
Pseudo-R^2	0.221		0.224		0.221		0.063	
Correct Predictions	80.3%		78.9%		80.5%		74.2%	

Note: * and ** indicate significance at a 5% and 1% level, respectively. Huber (1967)/White (1980) robust standard errors are used.

In contrast, voting presidents react only to inflation, with an increase in the likelihood of a hawkish speech by 12.9 pp. National and regional unemployment are individually insignificant, but exert a jointly significant negative impact on the probability of a hawkish speech ($Chi^2(1) = 13.8$**). The trend variable is also insignificant. Governors also react only to inflation information;[22] their likelihood of making a hawkish speech goes up by 9.1 pp. Thus, in their speeches, nonvoting presidents pay more attention to regional economic developments than do voting presidents. Furthermore, their talk is more in line with the current monetary policy trend. Voting presidents and Governors are more concerned with inflation and seemingly less backward-looking in their wording.

In a next step, we replace the unemployment rate with the Leading Index. Column (19) of Table 6 examines all presidents, Column (20) the voters, Column (21) the nonvoters, and Column (22) the Governors. Models (19)–(22) yield a better fit than the corresponding Models (15)–(18) of Table 5 that use the unemployment rate as a real macroeconomic indicator. The pseudo-R^2 (correct predictions) is 0.23–0.27 and 0.09 (are 79%–84% and 76%), respectively. Model (19) is also an improvement over the parsimonious Model (4) due to the inclusion of the trend variable, which has an influence of 9.7 pp. Furthermore, inclusion of the trend variable increases the influence of inflation (9.2 pp) and partly crowds out national Leading Index (6.5 pp) and regional Leading Index (14.0 pp).

[22] The p-value for the unemployment rate coefficient is 0.15.

Table 6: Explaining Speeches with Inflation, Leading Index, and an Interest Rate Trend

	(19) Presid.	(20) Voters	(21) Nonvot.	(22) Gov.
Coefficients				
CPI Inflation	0.298 **	0.306 **	0.301 **	0.143 *
Leading Index	0.210 **	0.312 **	0.134	0.275 *
Regional Leading Index	0.452 **	0.453 *	0.435 **	–––
Monet. Policy Direction	0.311 **	0.222	0.366 **	–0.027
Marginal Effects				
CPI Inflation	0.092 **	0.091 **	0.096 **	0.047 *
Leading Index	0.065 **	0.092 **	0.043	0.090 *
Regional Leading Index	0.140 **	0.134 **	0.138 **	–––
Monet. Policy Direction	0.097 **	0.066	0.116 **	–0.009
Observations	461	194	267	151
LR Statistic	123.0 **	64.3 **	63.2 **	41.5 **
Pseudo Log-Likelihood	–207.0	–79.7	–125.5	–81.7
Pseudo-R^2	0.240	0.265	0.227	0.091
Correct Predictions	79.8%	83.5%	79.0%	75.5%

Note: * and ** indicate significance at a 5% and 1% level, respectively. Huber (1967)/White (1980) robust standard errors are used.

Similar to Model (17) of Table 5, which utilises the unemployment rate, nonvoting presidents (Model (21)) adjust their wording in response to inflation development (9.6 pp), the regional Leading Index (13.8 pp), and the trend variable (11.6 pp). The national Leading Index exerts no significant impact. In contrast, voting presidents' speeches (Model (20)) are not significantly affected by the current monetary policy trend. Inflation (9.1 pp) and the regional Leading Index (13.4 pp) influence the speeches of voting presidents. National developments play a more pronounced role than in case of the nonvoting presidents, as the Leading Index positively affects the degree of hawkishness in these speeches (9.2 pp). Finally, Governors (Model (22)) pay attention to inflation (4.7 pp) and the Leading Index (9 pp).

Again, nonvoting presidents pay more attention to regional economic developments relative to national information in their speeches than do voting presidents. The Leading Index is a broader real indicator than the unemployment rate and, in contrast to the latter, significantly explains the wording in speeches made by both voting presidents and Governors.

In Table 7, we combine all three variables (inflation, unemployment rate, Leading Index) and derive an efficiently estimated reduced model for speeches in a consistent general-to-specific testing-down process (Hendry, 2000). Column (23) of Table 7 examines all presidents, Column (24) voters, Column (25) nonvoters, and Column (26) Governors.

Table 7: Explaining Speeches: Reduced Model

	(23) Presid.	(24) Voters	(25) Nonvot.	(26) Gov.
Coefficients				
CPI Inflation	0.409 **	0.276 **	0.386 **	0.148 *
Unemployment Rate				
Regional Unemp. Rate	–0.224 **		–0.228 **	——
Leading Index		0.382 **		0.264 **
Regional Leading Index	0.395 **	0.472 **	0.375 *	——
Monet. Policy Direction	0.293 **		0.302 *	
Marginal Effects				
CPI Inflation	0.128 **	0.082 **	0.124 **	0.048 **
Unemployment Rate				
Regional Unemp. Rate	–0.070 **		–0.073 **	——
Leading Index		0.113 **		0.086 **
Regional Leading Index	0.124 **	0.139 **	0.120 *	——
Monet. Policy Direction	0.092 **		0.097 **	
Observations	461	194	267	151
Exclusion Restriction	$Chi^2(2) = 3.7$	$Chi^2(3) = 4.1$	$Chi^2(2) = 0.6$	$Chi^2(2) = 1.8$
LR Statistic	94.4 **	70.2 **	57.7 **	41.0 **
Pseudo Log-Likelihood	–207.7	–81.1	–123.9	–81.7
Pseudo-R^2	0.238	0.258	0.234	0.091
Correct Predictions	80.5%	80.9%	80.2%	75.5%

Note: * and ** indicate significance at a 5% and 1% level, respectively. Huber (1967)/White (1980) robust standard errors are used.

The pseudo-R^2 is 0.24–0.26 and 0.09, respectively, and the correct predictions are 80%–81% and 76%, respectively. Again, the nonvoting presidents (Model (25)) drive the overall presidents' results. These presidents are concerned about national inflation (12.4 pp) and talk in line with the current monetary policy trend (9.7 pp). In case of real economic indicators, only regional variables matter: the unemployment rate (–7.3 pp) and the Leading Index (12 pp). The communication behaviour of voting presidents (Model (24)) is less backward-looking, as the past trend plays no role in their speeches. Furthermore, neither regional nor national unemployment rate is significant in the final model. The broader Leading Indices are significant, with the regional one exerting a slightly larger influence (13.9 pp in contrast to 11.3 pp). Thus, in this case regional *and* national real economic variables play an important role, whereas in case of nonvoters, only regional real variables matter. Similar to the voting presidents, Governors (Model (26)) do not necessarily talk in line with the current interest rate trend and rely on the broader Leading Index as a source of real economic information. The latter increases the likeliness of a hawkish Governor speech by 8.6 pp; inflation increases this likelihood by 4.8 pp.

6. Conclusions

In this paper, we analyse the determinants of speeches by FOMC members over the period January 1998–September 2009. Econometrically, we use a probit model with regional and national macroeconomic variables to explain speeches. Our analysis provides answers to three research questions.

First, do Fed presidents use national and/or regional economic information when expressing a tightening (easing) inclination in their speeches? Presidents follow a modified Taylor rule when they phrase their speeches. If inflation is expected to rise, they choose more hawkish words, whereas an increase in unemployment (the Leading Index) leads to less (more) hawk-like speeches. Most strikingly, the regional unemployment rate (the Leading Index) dominates the national rate, as the latter is insignificant (exerts a less pronounced influence on speeches) in a model employing both variables. This result stands in contrast to Chappell et al. (2008), who find in the context of disagreement during interest rate discussions that national developments outweigh regional ones. However, as argued above, speeches are the least 'costly' channel of expressing (regional) concern, which might explain the predominance of regional information in the determination of speech contents.

Second, do presidents adjust the contents of their speeches depending on whether they speak inside or outside their home district and do they react to the recent financial crisis? In line with our expectations, presidents put relatively more weight on regional information when speaking in their home district. Speeches, which are delivered outside the home district are only affected by the national inflation rate. During the financial crisis, presidents increasingly express their concerns about economic developments in their home district, possibly, to reassure the predominantly local audience. Finally, in the August 2007–September 2009 subsample, inflation plays a subordinate role in determining Fed communications.

Third, are there significant differences in the content of speeches made by voting presidents, nonvoting presidents, and BOG members? In their speeches, nonvoting presidents pay more attention to regional economic development than do voting presidents. This group of presidents has to rely on instruments other than voting to express views and exert influence on policy. Furthermore, nonvoting presidents' speeches are more in line with the current monetary policy trend than those of either voting presidents or Governors. Voting presidents and Governors are influenced by inflation data and seemingly less backward-looking in the wording of their speeches. In the case of real macroeconomic data, they rely on the (regional and) national Leading Index, whereas unemployment at any level is insignificant.

Our results have some interesting political economy implications. In general, speeches are an important part of interest rate decision-making process as they allow all FOMC members to express (minor) (regionally-driven) disagreement, without the members necessarily having to dissent in the actual vote on monetary policy. We find regional information to be particularly important for speeches (i) delivered inside the home district, (ii) during the financial crisis, and (iii) in the case of nonvoting presidents. Presidents seem to adjust the gist of their speeches—which significantly affect financial market expectations (see, e.g., Ehrmann and Fratzscher, 2007; Hayo et al., 2008) and predict target rate decisions (Hayo and Neuenkirch, 2010)—to the respective audience. If a speech is delivered inside their home district, they put more emphasis on regional information than for a speech outside the home district. Thus, reflecting the low frequency of actual dissents, a speech outside the home district could be a better indication of their actual behaviour when it comes to a vote in the FOMC. Furthermore, during the financial crisis they primarily try to address the specific concerns in their home district. The results for nonvoting presidents are very interesting, too: These presidents cannot directly influence policy decisions and thus express their sensitivity to local developments through speeches. Their focus on regional information is a way of connecting to the interests in their home district. Not incidentally, this focus may also help their chances of re-election, as presidents are selected by the district Board of Directors, members of which represent banking, industrial, and other interests in their home region. In contrast, voting presidents are relatively more concerned about national economic developments. Thus, they adjust their wording during their voting tenure and their speeches are similar to those given by Governors. This behavioural change might be caused by increasing *national* media attention during their voting tenure, triggering higher sensitivity to national developments.

Our paper also has some implications for the European System of Central Banks. Its decision-making body, the Governing Council, is dominated by the 17 national central bank presidents (in contrast to six members of the Executive Board in Frankfurt). As we find that regional information has a substantial influence on the phrasing of U.S. central bank speeches, this may be even more the case for the Euro area, which is much more heterogeneous than the United States. On the one hand, speeches may allow national central bank presidents to speak to, and on behalf of, their local audience in their respective home countries, without having to dissent in the actual decision. On the other hand, since the ECB does not publish its voting records, speeches by national central bank presidents and the Executive Board members could

be used as a proxy to measure potential disagreement (due to regional factors) in the Euro area, which would be an interesting topic for future research.

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Appendix

Table A1: Frequency of Speeches

	Tightening	Easing	Total
Voting Presidents	139	55	194
Nonvoting Presidents	186	81	267
Presidents (Total)	325	136	461
Governors	109	42	151

Table A2: Descriptive Statistics of Macroeconomic Variables

	Mean	Std. Dev.	Skewness	Minimum	Maximum	Corr.
Expected CPI Inflation						
National	2.4674	0.80	–0.02	0.19	5.31	——
Expected Unemployment Gap						
National	–0.0298	0.65	–0.32	–2.02	1.77	——
Atlanta	–0.0076	0.76	–0.59	–1.99	1.56	0.80
Boston	0.0142	0.61	–0.46	–1.72	1.28	0.73
Chicago	–0.0103	0.83	–0.29	–2.98	2.14	0.83
Cleveland	0.0156	0.66	–0.04	–2.08	1.71	0.59
Dallas	0.0069	0.44	0.01	–1.07	1.09	0.64
Kansas City	–0.0085	0.43	–0.25	–1.05	0.90	0.65
Minneapolis	–0.0111	0.70	0.24	–1.43	1.68	0.50
New York	0.0149	0.53	–0.09	–1.32	1.29	0.71
Philadelphia	–0.0217	0.59	–0.06	–1.70	1.62	0.71
Richmond	–0.0008	0.62	–0.41	–2.13	1.36	0.75
San Francisco	–0.0238	0.78	–0.01	–1.74	1.64	0.84
St. Louis	0.0076	0.66	–0.24	–2.23	1.40	0.75
Leading Index						
National	0.7977	1.25	–1.51	–3.58	2.36	——
Atlanta	–0.3191	0.62	–0.71	–2.00	0.96	0.25
Boston	–0.0113	0.53	0.06	–1.09	1.24	–0.05
Chicago	–0.6049	0.68	–0.14	–2.13	0.75	0.18
Cleveland	–0.4557	0.54	0.16	–1.73	1.05	–0.01
Dallas	0.1359	0.70	0.20	–1.38	1.91	–0.02
Kansas City	–0.1229	0.58	–0.42	–1.80	1.22	0.17
Minneapolis	–0.2081	0.55	–0.20	–1.57	1.26	–0.48
New York	–0.0289	0.63	0.26	–1.59	1.92	–0.48
Philadelphia	–0.1757	0.42	0.01	–1.38	0.81	–0.18
Richmond	–0.1443	0.58	–0.20	–1.43	1.15	0.27
San Francisco	0.0969	0.52	–0.25	–1.07	1.25	0.41
St. Louis	–0.4265	0.42	–0.08	–1.57	0.81	0.02

Notes: Std. Dev. = Standard deviation; Corr. = Correlation with the respective national variable.