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Hamza Bennani, Etienne Farvaque, Piotr Stanek

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Hamza Bennani* Etienne Farvaque† Piotr Stanek‡§

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Abstract

This paper sheds some new light on the determinants of FOMC members' monetary policy preferences. For that purpose, we use a new dataset of macroeconomic indicators for the Fed districts, as well as preferences revealed by FOMC members in the Transcripts, to compute a desired interest rate for each individual member. First, we find that FOMC members react to the regional unemployment rate. Second, individuals holding a Master or Bachelor degree, and issued from either the central bank, or from the private or public sector have a higher propensity to disagree on the dovish side, while women tend to disagree on the hawkish side. These findings provide further insights for central bank watchers about the upcoming policy decisions that are likely to be implemented by the FOMC, following the composition of its committee and the evolution of regional cycles.

Keywords: FOMC, Interest Rate, Individual Taylor Rule
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*EconomiX - CNRS, Université Paris Nanterre, 200 avenue de la république, 92001 Nanterre (France); h.bennani@parisnanterre.fr

†LEM-CNRS, Université de Lille, Faculté des Sciences Economiques et Sociales, 59655 Villeneuve d'Ascq Cedex (France), and CIRANO (Québec, Canada); etienne.farvaque@univ-lille1.fr

‡Cracow University of Economics, Faculty of Economics and International Relations, ul. Rakowicka 27, 31-510 Krakow, Poland; stanekp@uek.krakow.pl

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1 Introduction

Decisions by the members of the Federal Open Market Committee (FOMC)[1], the monetary policymaking body of the Federal Reserve System, have a large impact on the US and beyond. This explains why many studies have focused on the determinants of FOMC members' behavior. Even if the final decision is made collectively by the FOMC, its members enter the decision-making process with their own and personal policy preferences, themselves being shaped by their past (education and professional backgrounds) and their aspirations (e.g., future job opportunities). As a consequence, they may process the same information differently or may take into account data that are not available to, or would be considered as irrelevant by, other members. This may explain why interest rate decisions by the FOMC are not always made unanimously (with 28% of voiced disagreement and 5% of officially recorded dissents; see Meade, 2005 and Horvath et al., 2014). This reveals that disagreement exists among members of the FOMC, with two popular explanations put forward in the literature.

The first source of disagreement mentioned in the literature is the presence of a bias related to the regional origins. This comes from the fact that several FOMC members are representatives of different economic regions. These may, at each point in time, be located at different positions of the business cycle. As a consequence, FOMC members' preferred policy may be influenced by the situation in their home district. This possibility has been proven to be relevant by the literature: Belden (1989), Tootell (1991), Gildea (1992), Meade and Sheets (2005), Chappell et al. (2008) and Eichler and Lähner (2014b), notably, have shown that, among other factors, the regional unemployment rate and the regional price index impact on the Reserve Bank presidents' monetary policy preferences and voting behavior. Moreover, regional considerations are also noticeable in presidents' public speeches (Hayo and Neuenkirch, 2013). Thus, it seems interesting to extend this literature and identify the strength of regional influences on the members of the Board

[1] As is officially stated on the Fed's website: "The FOMC consists of 12 voting members--the seven members of the Board of Governors; the president of the Federal Reserve Bank of New York; and 4 of the remaining 11 Reserve Bank presidents, who serve one-year terms on a rotating basis. All 12 of the Reserve Bank presidents attend FOMC meetings and participate in FOMC discussions, but only the presidents who are Committee members at the time may vote on policy decisions." (https://www.federalreserve.gov/aboutthefed/structure-federal-open-market-committee.htm)

of Governors.

The obvious difficulty is that, if such regional influences exist, they may be accompanied by a second source of heterogeneity implying disagreement among policymakers. This source relies on their personal characteristics, such as their professional and educational backgrounds. Following this line of thought, studies by Gildea (1990), Havrilesky and Schweitzer (1990), Havrilesky and Gildea (1991) and Chappell et al. (1995) reveal that experiences in the government, academia or inside the Federal Reserve Board tend to induce different degrees of "hawkishness". More recently, Eichler and Lähner (2014a) have shown that experiences within the financial sector tend to induce a FOMC member to dissent on the "tightening" side while an NGO career is associated with more frequent "loosing" dissents.[2] Political connections also are to be considered, as FOMC members appointed by a Democratic President seem to be more "dovish", according to studies by, e.g., Havrilesky and Gildea (1991, 1995), Chappell et al. (1993, 1995), Tootell (1996), Chang (2003) or Meade and Sheets (2005). A recently topical, but debated since at least Chappell and McGregor (2000), determinant of policy preferences is also gender. According to a number of recent studies, women tend to have rather hawkish preferences in the "men's world" of central banking: higher share of female members are associated with lower inflation levels (Farvaque et al., 2011, 2014) and female central bank chairs focus more than their male counterparts on achieving the price stability goal (Diouf and Pépin, 2017).[3]

However, in the existing literature, either it has been searched for regional economic influences without considering background effects or, on the opposite, it has been looked at background effects without controlling for regional developments. The question is thus: do personal features still impact monetary policy decisions when the regional bias has been cleared out? In this paper, we thus investigate both the regional and background determinants of the FOMC members' propensity to disagree.

Hence, we proceed in five steps. First, we build a dataset of regional economic aggregates coinciding with each Reserve Bank's area for the period 1994-2008. Second, we use

[2]Dissents are not only characteristic for the FOMC - Harris et al. (2011) provide an account for the Bank of England Monetary Policy Committee.

[3]This may be due to the fact that women have to "show-off" to fight the systematic bias against women in central banking (as evidenced by Masciandaro et al., 2015, or Charléty et al., 2017).

the Transcripts to derive the preferences of each voting member of the FOMC. Third, we compute desired policy rates for each member. Fourth, we estimate the impact of the FOMC members' background and regional bias on disagreement, defined as the distance between their desired policy rates and the adopted one . Fifth, we run several robustness checks, including one based on voting data.

Our study thus adds at least two contributions to the field. First, it analyzes the influence of FOMC members' local areas key economic variables on their preferred monetary policy. Standardly assuming that FOMC members (at least implicitly) follow a Taylor-like reaction function when deciding on the interest rate, we expect different evolutions of the local economic indicators - i.e., inflation and output - to induce different policy preferences. Second, it points out which personal characteristics of FOMC members tend to increase or decrease the degree of disagreement inside the Committee. Hence, we separate out two effects which are generally confounded in the literature, either because the authors searched for regional economic influences without considering background effects or, on the opposite, were looking for background effects without controlling for regional developments.

Our results show that considering both the personal and regional influences is relevant, for economic as well as for policy reasons. We show that some personal characteristics induce more hawkish preferences than others. For instance, women tend to be more hawkish than men, and policymakers with a career inside the Fed tend to be on the more dovish side. Furthermore, we also find that regional unemployment do impact FOMC members' decisions.

Therefore, our findings have two-fold policy implications. First, given that regional representation impacts, and thus biases, monetary policy decisions, the present debate about reforming the Fed is timely, although inadequately focused. Founders of the Fed wanted to make the system truly federal, even though the system is designed so that the Washington-based Board of Governors (appointed by the President of the US and confirmed by the Senate) has a majority. However, given that vacancies on the Board have often been filled slowly and with heated hearings, it has happened quite often that Reserve Banks representatives have matched governors in terms of voting power. In such cases, the regional bias would apparently induce monetary policy decisions that

would be carried away from the (nationally-) optimal ones. However, our results show that governors suffer from a regional bias, too. Hence, reforming the structures of the Fed to reduce the Reserve Banks' power - as has been recently proposed - would not necesarily achieve the expected result. It would probably be more appropriate to, for example, appoint real outsiders, just like the UK did with Mark Carney (from Canada) to head the Bank of England. Second, and as shown by the results, the personalities choosen by the US President to fill the permanently voting spots which remain vacant may have various monetary policy preferences according to their personal backgrounds. As an illustration, if Marvin Goodfriend, a professor of economics at Carnegie-Mellon University, is chosen to fill one of the vacant seats[4], the latter is expected to behave more hawkishly than his colleagues from the financial sector (see table 2 and 4). This suggestion is supported by his conservative views that reflect very profound distaste for inflationary monetary policies, and thus, more hawkish positions than Janet Yellen, the current head of the FOMC, in the present phase of the economic cycle. These policy implications show the importance of investigating the determinants of FOMC members' monetary policy preferences and disagreement, in order to gain insights about future policy decisions.

The remainder of the paper is structured as follows. We first expose the methodology we have used, before analyzing the results of our empirical estimates and providing additional robustness checks, while the concluding section summarizes the findings.

2 Data and methodology

2.1 Data issues

To assess each member's policy preference, two possibilities exist: either using the votes (as in Chappell and McGregor, 2000), or the Transcripts. As stated by Meade (2005) and Jung (2013), using the votes could generate more shortcomings than gains. This is notably the case if members vote strategically (as evidenced by, e.g., Havrilesky and Gildea 1991, Johnson et al., 2012 or Ellis and Liu, 2013), if only because they do not

[4] "Trump Said to Pick Nominees for 2 Positions on Fed Board". Binyamin Appelbaum and Kate Kelly, *The New York Times*, June 2 2017.

want to appear on the losing side of a vote - something they can guess from the meetings' inner workings or from before-meeting discussions (Axilrod, 2009). As a consequence, the Transcripts may be a better source of information, because they could reveal the initial preferences of FOMC members. Nevertheless, even if Transcripts are available for voting as well as for non-voting members, this is not as advantageous as it first may appear, given that non-voting members may attempt to influence their voting colleagues by behaving strategically during the discussions (and this clearly happens, according to the results by Meade, 2006, and Tillmann, 2011). The bottom line is thus that it is safer to err on the conservative side and to consider only preferences expressed by the voting members.

More precisely, the Transcripts contain information on whether a FOMC participant expressed agreement, argued for a higher or a lower federal funds rate with respect to chairman's proposal. The dataset we build contains the expressed monetary policy preferences of governors and voting regional Reserve Bank presidents who attended a FOMC meeting between February 1994 and December 2008.[5] This corresponds to 121 meetings, and to the chairmanship of Alan Greenspan (1994-2006) and to the beginning of the one of Ben Bernanke (2006-2008).

As regards the macroeconomic data, while the Federal Reserve publishes what belongs to the widest possible range of data across central banks, strong data limitations remain for the scope of the present analysis. As an illustration, individual forecasts of bank presidents are only available for the sub-sample ranging from 1992 to the end of 2002 and cover exclusively nationwide data. However, Gildea (1992) provides evidence that presidents are more concerned about developments in the districts they represent than with the nation as a whole, while Meade and Sheets (2005) find that regional unemploy-

[5]As the Fed itself acknowledges, before 1994, the Transcripts are not real Transcripts, which limits the information they convey (a detailed presentation of various forms of Fed's communication of discussions within the FOMC is provided by Danker and Luecke, 2005). An early exploration of their content focused on interaction between policymakers and econometric models, however based on case studies rather than a formal quantification itself, is contained in Edison and Marquez (1998). An important publication lag explains why they have not so often been used - as of 2017 the Transcripts are not yet available after 2011. Nevertheless, we decided to limit our analysis to the period 1994-2008, as the subsequent period necessitates to take into consideration the effective zero lower bound in the estimation of Taylor rules (Belke and Klose, 2013), which would be impossible in our case, given the small number of observations available for individual FOMC members - see the following subsection.

ment rates influence the interest rate setting behavior. Chappell et al. (2008) empirically confirm that regional conditions affect the policy preferences of Fed presidents, and Hayo and Neuenkirch (2013) present additional insights of why they react to regional developments. Hence, national forecasts available for presidents are not as useful as may have seemed for our purpose. We thus follow this literature and consider that FOMC members may react to actual changes in the inflation rate, the industrial production index, and the unemployment rate of their respective districts.

The real issue, however, lies in computing data consistent with the districts monitored by the Federal Reserve Banks, given that the Reserve Banks regions do not coincide with the ones of the American States nor with the Census regions. Hence, we build the relevant data at the Fed's district level to improve the consistency of the analysis. Concerning output developments, we make use of the Coincident index (based on employment, housing, production, and financial data), published by the Federal Reserve Bank of Philadelphia. However, this indicator is only available at the state level. To create a Coincident Index at each of the Fed's districts level, we aggregate the Coincident Indexes of the states that stand inside a district's borders, considering that they have a similar weight within the district[6]. As an illustration, for the Boston Fed district, we aggregate the Coincident Indexes of Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island and Vermont. Nevertheless, other districts comprise a unique state, such as the New York district (state of New York) and the Cleveland district (state of Ohio).

Concerning price developments, there is no state or district-wide consumer price index (CPI) measure available. Only CPI data for metropolitan areas are available from the Bureau of Labor Statistics (BLS), and some districts contain more than one metropolitan area. As Hayo and Neuenkirch (2013) indicate, there is no straightforward way of creating district CPI figures. Therefore, we are forced to rely on aggregating metropolitan CPI data to compute the ones of the districts. For the unemployment rate, data at the district level are provided by the Federal Reserve Bank of St. Louis. Finally, the preferred policy rate of FOMC members are derived from the available Transcripts of the FOMC. All in all, then, we use the most district-consistent dataset.

[6]See Appendix A for the list of states comprised in the Fed districts.

2.2 Using Taylor-rule based individual reaction functions

It has been shown that the reaction function of the Fed, at least since the eighties, can be described by a Taylor rule (Taylor, 1993). For example, Blinder and Reis (2005, p. 14) point out that "monetary policy decisions of the Greenspan era are well described by a Taylor rule". Moreover, Judd and Rudebusch (1998, p. 3) find that a Taylor-rule framework "is a useful way to summarize key elements of monetary policy" in the US during the Burns, Volcker and, for what concerns us (i.e., the 1994-2008 period), the Greenspan periods. More recently, Mehra and Sawhney (2010) find that this has not changed even recently and that deviations from the Taylor rule between 2002 and 2006, and even during the financial crisis, were much smaller than generally believed.

Finally, it is also quite standard to augment the traditional Taylor rule with a "smoothing" parameter to make it correspond even more to the observed pattern of interest rates (Woodford, 2003). However, individuals have much less incentives than institutions to smooth their behavior. As a consequence, it makes sense to assume that individual decision makers do not smooth their desired interest rates.[7] Moreover, it has been demonstrated by, e.g., Farvaque et al. (2009), that (at least part of) the smoothing behavior is a product of the nature of monetary policy making by committee itself.

2.3 Estimating individual reaction functions using regional data

The dependent variable we consider is the preferred policy rate expressed by the central banker when he/she votes during the period 1994-2008, i_t^p, while the independent variables include the one-month lagged values of the consumer price index, of the relative regional economic position (corresponding to the difference between the regional Coincident index and the national one, which we hereafter call for expositional simplicity the regional cycle gap), and of the unemployment rate in his/her district. We choose not to include the national inflation and unemployment rates in order to avoid multicollinearity with the rest of the independent variables.

We check whether there is correlation between the lagged values of the CPI, the

[7] Sirchenko (2013) analyzes the behavior of the Polish central bankers in a framework that acknowledges that policy decisions by individual members are potentially unrelated from one meeting to another.

regional cycle gap, and the unemployment rate, and find no evidence for correlation.[8] We use the heteroskedasticity-consistent estimator (HCE) to control for potential heteroskedasticity, as in Jung (2013). We present the results of the estimated reaction functions for the Federal Reserve districts in the form of individual Taylor-type rules estimated separately for each district's member d, using the frequency of the FOMC meetings (8 regular meetings per year) covering the period 1994-2008 :

$$i^{p}_{d,t} = c_d + \beta\pi_{d,t-1} + \gamma y_{d,t-1} + \delta u_{d,t-1} + \varepsilon_{d,t} \tag{1}$$

where $\pi_{d,t-1}$ is the (district-based) measure of inflation in the observed district, and $y_{d,t-1}$ and $u_{d,t-1}$ are, respectively, the regional cycle gap and unemployment in the same district. Note also that the time index t designates the voting period of each central banker. Then, t will cover all the meetings during which a FOMC member has voted, like, for example, those of 1997, 2000, 2003 and 2006 for Jack Guynn. Furthermore, we only consider FOMC members for which more than 15 observations are available. Thus, we do not estimate the individual reaction functions for Edward Boehne (15 observations), Richard Fisher (13), Jeffrey Lacker (7) and Lawrence Lindsey (7).[9] Moreover, we do not include the chairmen, because they have a national mandate and are therefore not likely to have a regional bias. The available macroeconomic data are averaged to correspond to the frequency of the meetings (i.e., 8 per year): e.g., for the third meeting in 2003, if the data are available at a monthly frequency, we average the monthly macroeconomic records between the second and the fourth meeting. We obtain a set of estimated parameters $\left(\hat{c}, \hat{\beta}, \hat{\gamma}, \hat{\delta}\right)$ for each central banker, which reflects the reaction of each FOMC member for a variation in the inflation rate, the industrial index and the unemployment rate of his/her district during his/her voting period. Table 1 presents the results of the estimates of equation (1) for each FOMC member.

[8]Even though the coincident index is constructed using employment related data, there is no risk of doubling up the predictors when we include it in the regression. We check for multicollinearity using the Variance Inflation Factor (VIF), and find no correlation between the independent variables. We also drop the coincident term from the estimation and find that the results are qualitatively and quantitatively consistent. Alternative results available upon request.

[9]Lawrence Lindsey served as a member of the board of governors of the Federal Reserve from 1991 until 1997 and was affiliated to the Richmond district. Unfortunately, CPI data for the Richmond area are not available before January 1996.

Several results are worth highlighting here. First, there does not seem to be strong differences in the reaction functions of presidents and governors. President Gary Stern is a case in point here, as all the (district-based) variables are strongly significant in his case. Also, on average, the district-based CPI measure does not seem to influence FOMC members. Second, the regional measure of output influences both the presidents and the governors, confirming the relevance of considering both types of policymakers. Third, the unemployment variable has the expected sign: an increase in the unemployment rate is related to a decrease in the preferred rate.[10] The estimates in table 1 thus confirm the presence of a regional bias of FOMC members. Typically, our estimates indicate that, holding everything else equal, a FOMC member coming from a district in which unemployment increases by 1 percentage point will prefer a lower policy rate, on average by -1.23 percentage point, with a range equal to $[-2.96; 0.23]$ percentage points.

This result is consistent with the existing literature, although it is built on a district-consistent dataset, and is thus probably more accurate than the previous ones (Gildea, 1992; Meade and Sheets, 2005; Chappell et al., 2008; El Shagi and Jung, 2015). Moreover, while comparing our results with the previous ones is not obvious (given the sample and data building differences), our estimates deliver a ranking of the districts that is quite similar to the one that can be derived from Jung (2013, table 3). Both types of support thus allow us to pursue our investigation.

[10] Except for Janet Yellen and Alice Rivlin.

Table 1. Individual Taylor-rule reaction functions

	Position	FED district	Constant ($\hat{c}$)	CPI ($\hat{\beta}$)	Cycle gap ($\hat{\gamma}$)	Unemp. ($\hat{\delta}$)	No of Obs.
Jack Guynn	President	Atlanta	8.24***	0.69	1.34*	-0.88	29
Cathy Minehan	President	Boston	4.6***	0.16	3.75***	-0.19	35
Michael H. Moskow	President	Chicago	9.73***	0.36*	-0.33	-1.20***	52
Sandra Pianalto	President	Cleveland	14.6***	-0.10	0.42	-1.99***	23
Jerry Jordan	President	Cleveland	8.53***	0.10	0.34**	-0.81***	38
Robert D. McTeer	President	Dallas	5.19*	0.39	3.46*	-0.33	23
Thomas M. Hoenig	President	Kansas city	9.98***	-0.06	-0.61	-1.39***	40
Gary H. Stern	President	Minneapolis	10.21***	0.71**	-3.09***	-1.59***	31
Timothy Geithner	President	New York	15.93***	0.28**	-1.57*	-2.53***	40
William J. McDonough	President	New York	7.5***	0.18	1.2***	-0.49***	73
Anthony M. Santomero	President	Philadelphia	8.82***	0.05	1.73**	-1.2***	15
Alfred Broaddus	President	Richmond	11.2***	-0.58	0.71	-1.71***	23
Robert Parry	President	San Francisco	11.1***	0.89**	-2.87***	-1.02***	31
William Poole	President	St. Louis	9.73***	0.09	-0.74	-1.1***	30
Ben Bernanke	Governor	Atlanta	4.71***	0.10	-0.41	-0.63**	21
Roger Ferguson	Governor	Boston	9.45***	0.03	1.00	-1.45***	66
Frederic S. Mishkin	Governor	Boston	1.62	0.01***	1.54*	0.15	15
Susan Bies	Governor	Chicago	12.4***	0.03	-0.12	-1.68***	41
Susan M. Phillips	Governor	Chicago	6.15***	-0.12	0.11	-0.16	34
Edward W. Kelley	Governor	Dallas	5.13***	-0.09	1.01**	-0.01**	62
Donald Kohn	Governor	Kansas city	6.78***	0.38	2.04***	-0.94***	51
Mark W. Olson	Governor	Minneapolis	3.95***	0.06	0.99	-0.46**	35
Kevin M. Warsh	Governor	New York	18.1***	0.34**	-2.3***	-2.96***	22
Alice M. Rivlin	Governor	Philadelphia	4.09***	-0.05	0.07	0.23***	23
Randall S. Kroszner	Governor	Richmond	13.13***	-0.22	-2.26**	-1.86***	22
Edward Gramlich	Governor	Richmond	13.5***	0.56***	1.64**	-2.32***	61
Janet Yellen	Governor	San Francisco	5.15***	-0.16***	0.09***	0.05***	27
Laurence Meyer	Governor	St. Louis	6.72***	0.38**	-0.69	-0.32	44

In a second step, we use the estimated parameters $\left(\hat{c}, \hat{\beta}, \hat{\gamma}, \hat{\delta}\right)$, along with the ex-post regional data, to derive the "desired" interest rate for each FOMC member j, $\widehat{i_{j,t}}$:

$$\widehat{i_{j,t}} = \hat{c_j} + \hat{\beta_j}\pi_{j,t} + \hat{\gamma_j}y_{j,t} + \hat{\delta_j}u_{j,t} \tag{2}$$

where t = 1994Meet1-2008Meet8.

We then derive the difference between the desired interest rate, $\widehat{i_{j,t}}$, and the Fed's actually decided interest rate, i_t, for the period 1994-2008. This difference is thus a measure of the "policy differential", $PD_{j,t}$, between what the situation of his/her district would have induced a FOMC member j to aim at and the policy implemented during the FOMC meeting, and can thus be depicted as disagreement. Table A.2 in the Appendix delivers the descriptive statistics of the desired interest rate and of the "policy differential" for the FOMC members during the period under review.

3 Measuring personal backgrounds' influence

In the final step, we assess how much the "policy differential", i.e. our measure of disagreement, is related to the biographical data of FOMC members. The use of the difference $PD_{j,t}$ allows revealing the impact of FOMC members' biographical features on their propensity of being more hawkish (if, on average, $PD_{j,t} \geq 0$), or more dovish (if, on average, $PD_{j,t} \leq 0$) than the other members of the committee.

We use the Least Squares Dummy Variables model (LSDV), which allows to bring the unobserved effects explicitly into the model. The unobserved effects are being treated as the coefficients of the dummy variables, i.e., the $\alpha Prof_j$ terms represent fixed effects on the dependent variable $PD_{j,t}$ for the professions of central banker j. Having specified the model in this way, it can be fitted using OLS with robust standard errors. Given the limited number of central bankers ($N = 28$), using the LSDV method is a practical proposition (Hayo and Neumeier, 2014). Finally, we control for the influence of the national macroeconomic variables (CPI, output and unemployment, from the BLS):

$$PD_{j,t} = c_0 + \alpha Prof_j + \lambda Educ_j + \rho Woman_j + \phi Member_j + \upsilon ViceChair_t + \tau X_t + D_{1j,t} + D_{2j,t} + \mu_{j,t} \quad (3)$$

where t = 1994Meet1-2008Meet8, c_0 is a constant, $Prof_j$ and $Educ_j$ indicate, respectively, the career and the educational background of the FOMC member, while $Member_j$ is a dummy variable indicating whether the voting member is a Board member or a Bank president, also controlling for the fact that a member has been appointed by a Democrat or Republican administration.[11] The meaning of the dummy $Woman_j$ is self-explaining, as well as the $ViceChair_t$ one. Finally, X_t is the vector of national macroeconomic variables, $D_{1j,t}$ and $D_{2j,t}$ are dummy variables that take the value 1 if, respectively, the regional unemployment rate is higher than the national one, and the national unemployment rate is higher than the NAIRU. This specification allows the regression to be cleanly indicative of regional influences.

We consider five indicators (dummy variables) for the professional experience: financial sector (positions at banks or other financial institutions), non-financial private sector, economic scholars (positions at universities or colleges), central bank (positions at a regional Federal Reserve Bank, except for president), and civil servants (positions in government sector, except for positions at the Federal Reserve System). We follow the rule adopted in Farvaque et al. (2011 and 2014) and assume that the habits, customs, preferences of the policy-maker are more influenced by the occupation in which he/she has spent the largest number of years. This has a side-benefit: it allows us to obtain dummy variables for both professional and educational attainments[12]. We classify educational background in five categories: Professors, holders of a Ph.D, an MBA, a MSc., or a Bachelor.

As reference for the dummy variables, we consider the variables which appear with the highest frequency. The FOMC member who is a Reserve Bank president, holds a Ph.D, has previously worked in the financial sector, and is male thus serves as the reference for

[11] One has to remember that only the 7 Federal Reserve Board members are appointed by the President, while the presidents are appointed by the board of directors of the Federal Reserve Bank of the different districts. Hence, both Republican and Democratic dummies can be used in the estimations.

[12] Other choices would have induced some weighting of their different types of experiences, and would have made it difficult to disentangle the respective impacts of each of them.

the estimations provided in the following tables.

The first regression in table 2 includes all the variables, while the two following ones intend to check for potential multicollinearity between the biographical data (notably between some educational and professional background indicators). The dependent variable is the policy differential variable, PD, in the first three estimates displayed in table 2, while the last two ones present estimates for the positive (resp., negative) values of the policy differential. So doing should allow differentiating the influence different types of backgrounds have on a (relative) tendency to disagree on the policy decisions, and the incentive to disagree when the difference between the desired interest rate and the actual one is positive or negative (which would, respectively, signal a degree of hawkishness or dovishness).

As can be seen from table 2[13], it appears that Bachelor- and Master-level backgrounds tend to be associated with a propensity to disagree on the dovish side, as the policy differential is significantly related to this category (column (1)). Even more interestingly, as can be seen from columns (4) and (5), the propensity to disagree is more significant in case of a negative differential than in case of a positive one. Hence, this signals a greater dovishness of Bachelor- and Master-level members (relatively to those holding a PhD). The magnitude of the effect, when significant, lies in the range $[-1.06; -0.34]$, the dispersion being slightly larger for Bachelor holders. Another interesting result holds for Professors, who tend to be more hawkish when the differential is positive.

Members of the FOMC with experiences in the private or the public sector appear to have a propensity to disagree on the dovish side (with regard to the reference category, i.e., members coming from the financial sector). However, their background is negatively related to the policy differential, when its sign is negative. This result is in accordance with the findings of Chappell et al. (1995) and Eichler and Lahner (2014a).[14] Members

[13]Given the low number of observations for some central bankers in the first step (i.e., the estimation of the individual reaction functions), we have re-estimated eq. (3) using only the desired interest rates of central bankers with a number of observations superior to the median. This delivers results qualitatively similar as the ones displayed in table 2 (available upon request).

[14]Relating this result to the one by Eichler and Lähner (2014a) is not immediate, though, as they focus on dissent while we identify a propensity to disagree. Nevertheless, as they show that FOMC members with longer careers in the public sector are more focused on output stabilization, which can be considered as a sign of dovishness, our results refine and complement their previous one.

with a previous experience at the Federal Reserve seem also to be more accommodative through their expressed preferences. The inverse stands for female members of the FOMC, for whom the same pattern is observed, but with the opposite sign for the coefficients. This is in line with previous results on a larger degree of hawkishness from women. This is explained by the fact that women tend, on average, to be more conservative in their monetary policy preferences - possibly in order to establish a reputation -, as exposed in Farvaque et al. (2011, 2014).[15] Here, we obtain a measure of woman's hawkishness as larger than their male counterpart by, on average, 0.4 percentage points.

Members of the Board of Governors tend to be more dovish than the Reserve Banks presidents. This is the case in particular for those appointed by a Democrat administration, which is consistent with the literature. Concretely, our measure of dovishness for Democrat appointees with regard to Republican ones is larger by almost 0.3 percentage points on average. Finally, and as could be expected, it appears that vice-chairs of the FOMC tend to be more hawkish, especially when the sign of the policy differential is negative.

Our results thus clearly reveal that there are some influences from FOMC members' backgrounds on their distance between the policy they would favor as representative of their district and the policy implemented by the Federal Reserve. These results reveal that the impacts have policy relevant sizes. Moreover, our procedure reveals that background influence go beyond the regional bias, and that both should be taken into account.

It is also worth noting that the macroeconomic variables are strongly significant in the five regressions. And the coefficient of "Dummy Unemployment" has the expected sign and is strongly significant, thus showing that in case of a positive differential between the regional unemployment rate and the national one, a FOMC member tends to disagree on the dovish side, as shown also in Meade and Sheets (2005).

[15] Although the number of women in the sample is quite small (5), the effect is a real "gender effect", and not a "Yellen effect", for instance.

Table 2. FOMC members' backgrounds influence on the policy differential

	(1)		*(2)*		*(3)*		*(4)*		*(5)*	
	Policy Differential (PD)						*Positive PD*		*Negative PD*	
	Coefficient	*p-value*	*Coefficient*	*p-value*	*Coefficient*	*p-value*	*Coefficient*	*p-value*	*Coefficient*	*p-value*
Constant	-1.19***	< 0.00001	-1.62***	< 0.00001	-1.62***	< 0.00001	-0.69**	0.03	-1.07***	< 0.00001
PhD					Ref.					
Professor	-0.01	0.84	0.33***	< 0.00001			0.20***	0.006	-0.05	0.36
MBA	0.37***	< 0.00001	-0.12	0.22			0.18*	0.071	-0.06	0.49
Master	-1.03***	< 0.00001	-0.54***	< 0.00001			-0.10	0.27	-0.72***	0.0002
Bachelor	-1.06***	< 0.00001	-0.34***	0.002			-0.11	0.39	-0.95***	0.0001
Financial sector					Ref.					
Academic	0.71***	< 0.00001			1.08***	< 0.00001	0.20	0.11	0.53***	< 0.00001
Central Bank	-0.96***	0.001			-0.55***	< 0.00001	-0.41***	< 0.00001	-0.35***	< 0.00001
Private Sector	-0.57***	< 0.00001			-0.03	0.69	-0.05	0.54	-0.30***	0.003
Public Sector	-0.23**	0.02			-0.42***	< 0.00001	0.11	0.24	-0.21**	0.01
Man					Ref.					
Woman	0.4***	< 0.00001	0.54***	< 0.00001	0.57***	< 0.00001	0.12*	0.008	0.37***	< 0.00001
President					Ref.					
Board Rep.	-0.79***	0.001	-0.34***	< 0.00001	-0.77***	0.0004	-0.20***	< 0.00001	-0.46***	< 0.00001
Board Dem.	-1.03**	0.017	-0.08	0.33	-1.1***	0.002	-0.42***	0.0009	-0.63***	< 0.00001
Vice Chair	0.33***	< 0.00001	-0.16*	0.07	0.32**	0.01	-0.03	0.82	0.37***	< 0.00001
CPI (National)	0.17***	< 0.00001	0.08**	0.03	0.16***	< 0.00001	0.09***	0.0003	0.009	0.78
Var. Coincident Index (National)	-1.79***	< 0.00001	-1.84***	< 0.00001	-1.96***	< 0.00001	-0.11	0.32	-0.38***	0.003
Unemp. (National)	0.44***	< 0.00001	0.37***	< 0.00001	0.45***	< 0.00001	0.34***	< 0.00001	0.12**	0.01
Dummy Unemp.	-0.24***	< 0.00001	-0.15***	0.002	-0.20***	< 0.00001	0.10**	0.03	-0.13***	0.001
Dummy Nairu	0.32***	< 0.00001	0.42***	< 0.00001	0.30***	0.002	0.59***	< 0.00001	-0.40***	< 0.00001
Observations	3022		3022		3022		1412		1610	

4 Robustness checks

4.1 Excluding Governors

Hayo and Neuenkirch (2013, p. 69) point out some issues related to the regional affiliations of governors: "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 (see Chappell et al., 2008)", and "The governors live and work in the capital and do not have regular contact with business people from their home districts". As a consequence, we have run a robustness test, by excluding governors from the second step estimations. Variables related to the position of members inside the FOMC (board member, bank president or vice chair) are obviously not taken into account and there is no bank president who held an academic position before taking his/her position. Furthermore, there is now perfect collinearity between the educational variable "MBA" and the gender variable "Women". Therefore, we omit the latter in the estimation procedure.

The results are reported in table 3. The thrust of the results is not modified, even though the attrition of the sample makes the estimates less precise, with some categories much less well identified (for instance, there is only 1 bank president who is also categorized as Professor in the sample, namely M. Robert Parry, from the San Francisco Fed).

Table 3. FOMC members' backgrounds influence on the policy differential - without Governors

	(1)		*(2)*		*(3)*		*(4)*		*(5)*	
	Policy Differential (PD)						*Positive PD*		*Negative PD*	
	Coefficient	*p-value*	*Coefficient*	*p-value*	*Coefficient*	*p-value*	*Coefficient*	*p-value*	*Coefficient*	*p-value*
Constant	-0.54	0.22	-0.43	0.35	-0.65	0.15	-0.39	0.37	-1.30***	0.0001
Professor	0.10	0.42	-0.04	0.73			0.11	0.36	-0.03	0.62
MBA	0.13	0.23	-0.08	0.38			0.32**	0.012	0.09	0.17
Master	-0.44***	0.004	-0.33***	< 0.00001			0.008	0.94	-0.42***	0.001
Bachelor	0.66***	< 0.00001	-0.94***	< 0.00001			0.32**	0.03	0.30***	0.0012
PhD					Ref.					
Central Bank	-0.41***	< 0.00001			-0.34***	0.0021	-0.22**	0.015	-0.17**	0.03
Private Sector	-0.08	0.51			0.09	0.33	0.05	0.64	-0.19*	0.07
Public Sector	-0.16	0.28			-0.34***	0.002	-0.09	0.43	-0.24	0.11
Financial sector					Ref.					
CPI (National)	0.25***	< 0.00001	0.24***	< 0.00001	0.24***	< 0.00001	0.14***	0.0001	-0.002	0.94
Var. Coincident Index (National)	-1.81***	< 0.00001	-1.61***	< 0.00001	-1.88***	< 0.00001	-0.08	0.57	-0.39**	0.04
Unemp. (National)	0.20***	0.002	0.12	0.19	0.22**	0.018	0.24***	0.009	0.16**	0.02
Dummy Unemp.	-0.36***	< 0.00001	-0.40***	< 0.00001	-0.32***	< 0.00001	0.06	0.32	-0.27***	< 0.00001
Dummy Nairu	0.45***	0.00053	0.51	0.0001	0.42***	0.0015	0.73***	< 0.00001	-0.6"***	< 0.00001
Observations	1536		1536		1536		701		835	

4.2 Simultaneous inclusion of the regional and background effects

To test whether our results are sensitive to the step corresponding to the computation of the desired interest rates for FOMC members, we skip the estimation of eq. (2), and consider in a simultaneous regression eqs. (1) and (3). Hence, we regress the monetary policy preferences of FOMC members directly on their regional and biographical data, to check whether we obtain results consistent with those reported in table 2. If, by definition, this procedure does not allow to estimate the variation in individual reaction functions among FOMC members as shown in table 1, it nevertheless allows to check the influence of the regional economic conditions when one wishes to reveal the background effect on FOMC members' preferred policy rates.

We thus run the following panel regression, using OLS with robust standard errors:

$$i^p_{j,t} = c + \eta_j + \beta\pi_{j,t-1} + \gamma y_{j,t-1} + \delta u_{j,t-1} + \alpha Prof_j + \lambda Educ_j + \rho Woman_j + \phi Member_j + \upsilon ViceChair_t + \tau X_t + \mu_{j,t} \quad (4)$$

On the left hand side, $i^p_{j,t}$ represents the preferred policy rate of central banker j during his/her voting period. The right hand-side variables have similar meanings as in the previous regressions (see equations 1 and 3). The additional element, η_j, represents individual fixed effects. We do not include the national inflation and unemployment rates, as the correlation matrix with the regional inflation and unemployment rates shows that the null hypothesis of no correlation is rejected. Table 4 displays the results of the estimation.

Table 4. FOMC members' regional and backgrounds influence on the preferred policy rates

	Preferred policy rate $i^p_{j,t}$	
	Coefficient	*p-value*
Constant	5.71***	< 0.00001
CPI (β)	0.05*	0.09
Output (γ)	0.12**	0.003
Unemp. (δ)	-0.21***	< 0.00001
Professor	-0.28**	0.029
MBA	0.61***	< 0.00001
Master	0.027	0.83
Bachelor	-0.25**	0.04
PhD		Ref.
Academic	0.30**	0.01
Central Bank	-0.08	0.40
Private Sector	0.70***	< 0.00001
Public Sector	-0.82***	< 0.00001
Financial sector		Ref.
Woman	0.19*	0.06
Man		Ref.
Board Rep.	-0.52***	< 0.00001
Board Dem.	-0.22***	0.008
President		Ref.
Vice Chair	0.05	0.71
Var. Coincident Index (National)	2.1***	< 0.00001
Dummy Nairu	-1.86***	< 0.00001
Observations	936	

As shown in table 4, and consistently with detailed individual results presented in table 1, the regional cycle gap and the regional unemployment exert a significant influence on the preferred policy rates of the FOMC members. Analogically with the results provided above, they also collectively care about the national growth rate. The sign of the coefficients lies in conformity with what could be expected, i.e., the coefficient linked to the regional unemployment rate and the NAIRU dummy are negative and significant (the higher the regional unemployment rate or the NAIRU, the lower the FOMC member's preferred policy rate).

The results for educational categories are globally consistent with our main empirical strategy for MBA and Bachelors. We however get different results for the category of Professors: here, they appear to be more dovish than the reference category.

The robustness check for professional categories confirms the dovish character of public sector representants as compared to the reference category (i.e., decision-makers issued from the financial sector), as well as compared to members with a former experience in the private sector. Another similar result is related to the fact that the results reported suggest a significant hawkishness of members from the academia.

Finally, qualitative results for the Board members nominated by the Republican and Democratic Presidents, and for the women, are consistent with those reported above.

4.3 Using monetary policy voting records instead of monetary policy preferences

As emphasized in section 2.2, FOMC Transcripts are supposed to reveal the policy preferences of FOMC members. If the positions expressed in the discussions are reflected in votes, then, one should expect similar results in table 2 if we use the *voted* policy rates rather than the *expressed* policy rates, i.e., a similar influence of FOMC members' background characteristics on their policy differential. To show whether this is the case, we re-estimate equation (1) using voted policy rates rather than expressed policy preferences as dependent variables, to check if our results are driven by our interpretation of the Transcripts, or whether we obtain similar results when using the interest rates voted by FOMC members.

The results of the individual reaction functions show that the determinants of policy

rates as revealed by the votes are similar quantitatively, as well as qualitatively, and with the same significance as for the expressed preferences revealed by Transcripts. This is also true for the second step. Given the similarity of the result, to save space, we do not report here the estimates, but they are available upon request.

5 Conclusion

Recent debates about governors' nomination to the FOMC have shown the importance of assessing the determinants of policymakers' behavior. This is particularly true if there is a high level of uncertainty about FOMC's future policy actions, as it is the case nowadays.

Using the FOMC Transcripts covering the pre-zero-lower-bound period (that is, 1994 - 2008), as well as a consistent set of regional (i.e., central bank districts level) price, output and unemployment variables, this paper aims at disentangling the regional and biographical influences on the behavior of FOMC members. According to our estimates, regional variables (especially unemployment) play a significant role in shaping the preferences of monetary policymakers, complementing the effect of national variables. The results also indicate that professional backgrounds matter for policy preferences and for the propensity to disagree. We document that a private and a public sector experience, as well as the fact of being a former central banker is associated with disagreement on the dovish side, as compared to the reference category (experience in the financial sector). As for the educational levels, holders of Bachelor and Master degrees seem to be more dovish than the reference category of PhD holders. Finally, we also show that women are consistently on the hawkish side, as well as vice-chairs. These results are robust to alternative estimation strategies.

The findings of this paper show that it is crucial to consider both regional and educational effects to explain the motives behind FOMC members' policy preferences and disagreement. Moreover, the results provide further insights about the upcoming policy decisions that should be adopted by the FOMC according to its composition. It shows notably that following the likely nomination of Marvin Goodfriend as a governor by the US President, decisions taken by the FOMC should be more hawkish and the likelihood of a future rate rise would increases accordingly.

This paper is thus of interest for central bank watchers as it provides valuable insights on FOMC's decision-making process, according to the background of its members and the evolution of regional cycles.

Appendix

Table A.1. U.S. states comprised in the Fed districts

Fed district	States within a district	Fed district	States within a district
Atlanta	Florida	Boston	Connecticut
	Alabama		Massachusetts
	Georgia		Maine
	Tennessee		Vermont
	Louisiana		New Hampshire
Chicago	Illinois		Rohde Island
	Indiana	Kansas City	Wyoming
	Michigan		Colorado
	Wisconsin		Kansas
	Iowa		Nebraska
Cleveland	Ohio		Oklahoma
Dallas	Texas	New York	New York
	New Mexico	Philadelphia	New Jersey
Minneapolis	Minnesota		Delaware
	Montana		Philadelphia
	North Dakota	San Francisco	Alaska
	South Dakota		Arizona
Richmond	Columbia		Hawaii
	Maryland		California
	Virginia		Idaho
	North Carolina		Nevada
	South Carolina		Oregon
	West Virginia		Utah
St. Louis	Arkansas		
	Kentucky		
	Missouri		
	Mississippi		

Table A.2. Descriptive statistics

			Desired interest rate			Policy differential		
	Position	FED district	Average	Median	Standard dev.	Average	Median	Standard dev.
Jack Guynn	President	Atlanta	4.19	4.3	1.28	0.15	-0.16	1.71
Cathy Minehan	President	Boston	4	3.98	0.79	-0.035	-0.38	1.51
Michael H. Moskow	President	Chicago	3.85	3.78	1.3	-0.18	-0.29	1.09
Sandra Pianalto	President	Cleveland	3.94	4	1.68	-0.09	-0.17	1.45
Jerry Jordan	President	Cleveland	4.26	4.24	0.71	0.21	-0.16	1.39
Robert D. McTeer	President	Dallas	3.96	3.87	0.69	-0.07	-0.39	1.66
Thomas M. Hoenig	President	Kansas city	3.78	3.96	1.13	-0.26	-0.42	1.08
Gary H. Stern	President	Minneapolis	4.06	4.1	1.27	0.02	-0.04	1.53
Timothy Geithner	President	New York	2.83	2.4	2.18	-1.65	-0.82	2.39
William J. McDonough	President	New York	4.91	4.84	0.54	0.87	0.37	1.76
Anthony M. Santomero	President	Philadelphia	2.83	2.99	0.95	-1.2	-1.48	1.69
Alfred Broaddus	President	Richmond	3.4	3.29	1.33	-0.35	-0.25	1.09
Robert Parry	President	San Francisco	4.97	5.3	1.98	0.93	0.68	2.02
William Poole	President	St. Louis	3.98	3.88	1.16	-0.05	-0.23	1.54
Ben Bernanke	Governor	Atlanta	4.19	4.15	0.74	0.15	-0.90	2.21
Roger Ferguson	Governor	Boston	2.96	2.81	1.51	-1.07	-0.92	1.65
Frederic S. Mishkin	Governor	Boston	2.37	2.41	0.24	-1.66	-2.44	1.74
Susan Bies	Governor	Chicago	4.06	4.02	1.75	0.02	-0.03	1.13
Susan M. Phillips	Governor	Chicago	5.27	5.27	0.21	1.23	0.45	1.66
Edward W. Kelley	Governor	Dallas	5.12	5.11	0.15	1.08	0.21	1.74
Donald Kohn	Governor	Kansas city	3.08	3.21	0.92	-0.95	-1.25	1.2
Mark W. Olson	Governor	Minneapolis	2.11	2.19	0.39	-1.92	-2.56	1.59
Kevin M. Warsh	Governor	New York	2.24	2.43	2.53	-1.79	-0.95	2.64
Alice M. Rivlin	Governor	Philadelphia	5.26	5.25	0.17	1.22	0.31	1.85
Randall S. Kroszner	Governor	Richmond	4.44	4.89	1.83	0.69	0.5	1.37
Edward Gramlich	Governor	Richmond	3.44	3.41	1.74	-0.31	-0.23	1.08
Janet Yellen	Governor	San Francisco	5.43	5.43	0.2	1.39	0.49	1.86
Laurence Meyer	Governor	St. Louis	5.19	5.22	0.91	1.15	0.68	1.85

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