Quantifying Perceived Policy Preferences of the FOMC: 1960-2015 *

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Abstract

This paper introduces a novel measure of perceived policy preferences for the FOMC, which reflects the perceptions of market participants as expressed in newspaper articles, financial media outlets and business reports of Fed watchers in the US. Following the language of financial markets, I categorize the information on the preferences of FOMC members in two leanings, hawk and dove, which represent the weights that market participants believe each member assigns to one of the dual objective of the Federal Reserve. Investigating the period 1960-2015, I find substantial variation in the perceived Hawk/Dove scale of the FOMC. Overall, markets have perceived a hawkish FOMC, especially for the most part of Arthur Burns, Paul Volcker and Alan Greenspan's years. Furthermore, a clear dovish bias of the FOMC is perceived during the last years of Fed chairmanship of Martin (second part of the 1960s) and during the years of Ben Bernanke and Janet Yellen. Reserve Bank Presidents are systematically perceived as hawkish and to have more persistent preferences while Board Governors are perceived as swinging more often between types. Overall, these results match well with narratives on monetary policy in the US. Moreover, I observe a good match of the measure of perceived preferences with FOMC voting patterns and with existing proxies for policy preferences.

JEL codes: E43, E47, E63, G12.
Keywords: monetary policy, Federal Reserve, FOMC.

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1 Introduction

> My experience as a member of the FOMC left me with a strong feeling that the theoretical fiction that monetary policy is made by a single individual maximizing a well-defined preference function misses something important. In my view, monetary theorists should start paying some attention to the nature of decision-making by committee, which is rarely mentioned in the academic literature.
>
> Blinder (1998)

Market participants have long learned that monetary policy is not decided by a single individual maximizing a well-defined preference. For example, the so called Fed watchers, devote a lot of time (and money) to infer the policy preference of the policymakers with the aim to predict future policy path. They recognize that policy decisions selected by a committee are a product of members' policy choices and preferences and that these preferences differ. Therefore, personal background, political affiliation and public statements of all policy makers who participate in committee discussions are closely watched for clues to the likely course of policy.

Although there have been attempts in the literature to learn *ex post* about the policy preferences of individual members of monetary policy committees, based either on voting records or studying the textual records of committee deliberations (see Belden (1989) or Chappell and Vermilyea (2005)), nothing is known on how markets have perceived these preferences either in real time or *ex post*. Eventually, market participants' decisions depend on their perceptions of who they think the policymaker is and what consequences that has for policy.

This paper contributes to this direction. To this aim, I construct a novel measure of perceived policy preferences for the Federal Open Market Committee (FOMC). The measure is based on a narrative approach where qualitative information on perceived policy preferences is extracted from newspaper articles, financial media outlets and business reports of Fed watchers in the US. This information reflects the perceptions of market participants as expressed in these mediums. Following the language of financial markets, I categorize the information on the preferences of FOMC members in two leanings, hawk and dove. These leanings represent the weights that market participants believe each member assigns to one of the dual objective of the Federal Reserve. Hawks are believed to put the inflation fight high above other goals. Conversely, doves are seen as pro-growth and more tolerant to price pressures, or at least the threat of them.

Based on this information, I construct a unique data set, with perceived policy

preferences for individual FOMC members, per year, during the period 1960-2015 (136 members x 570 meetings). The preference of each FOMC member is followed in "real time". The preference of FOMC members in year t, meeting m is based on perceptions up to year t, before meeting m. This allows for perceived preferences to vary over time. Market participants can learn and update their beliefs in light of new information about the preferences of the policymaker. Perceived monetary preferences are based on a large set of information like personalities, interest communities they present, past actions (votes), testimonies and speeches. Since these preferences are based on perceptions, they are model free.

Why care about policy preferences of central bankers? These preferences take an important role in monetary economics. They are discussed as either a solution to the time inconsistency problem (i.e., assigning a conservative central banker) or as an exogenous source of monetary policy shocks and/or regime switches in policy. For similar reasons, policy makers also care about how their preferences, actions and communications are perceived in public. Indirectly they can use communication to signal their preferences in order to manage expectations. Markets participants obviously care too. Frequent discussions in the media emerge especially at times when a new chairman or a new member of Board of Governors is nominated and confirmed or when Federal Reserve Bank presidents rotate in the FOMC. The discussions often concentrate on whether they are a "hawk" or a "dove" and what this means for the balances within the committee and for future policy decisions.

Investigating the period 1960-2015, I find substantial variation in the perceived Hawk/Dove scale of the FOMC. Overall, markets have perceived a hawkish FOMC, especially for the most part of Arthur Burns, Paul Volcker and Alan Greenspan's years. Furthermore, a clear dovish bias of the FOMC is perceived during the last years of Fed chairmanship of Martin (second part of the 1960s) and during the years of Ben Bernanke and Janet Yellen. Within the FOMC, there are also differences in the preferences' bias between the Federal Reserve Bank Presidents and the Board of Governors. Reserve Bank Presidents are systematically perceived as hawkish while the Board is perceived to switch often between the dovish and hawkish bias. Furthermore, looking *ex-post*, Reserve Bank Presidents are perceived to have more persistent preferences, meaning that for the whole period they have been in office they are perceived to be mostly of one type, either hawk or dove. Conversely, Board Governors are perceived as swinging more often between types. Overall these results match well with narratives on monetary policy in the US. More specifically, they are in line with existing research, which usually find Board Governors to prefer more expansionary policy than Reserve Bank presidents. Moreover, I observe a

good match of the measure of perceived preferences with FOMC voting patterns and with existing proxies for policy preference.

This unique data set can be used for several research purposes. In regard to monetary policy uncertainty, one can construct a measure that represents uncertainty over who will be the policy maker. The rotation scheme of Fed presidents every year brings exogenous variation in the combination of the FOMC policy preferences that can be exploited for identification. Furthermore, in the context that shifts in policy preferences are considered as an exogenous source of monetary policy shocks and regime switches, one can relate them to monetary policy and regime switches in monetary policy (Christopher and Zha (2006), Michael and Ramey (2004)).

The structure of the paper is as follows. Section 2 presents an overview of the literature on policy preferences and the FOMC. Section 3 presents the methodology to quantify perceived preferences and a discussion of results. Section 4 concludes.

2 Policy preferences of the FOMC: a review

2.1 The Federal Reserve and the FOMC

The Fed is a federal system, composed of a central, governmental agency - the Board of Governors - in Washington, D.C., and twelve regional Federal Reserve Banks. The Federal Reserve Act of 1913 made the Fed responsible for setting monetary policy. The Banking Act of 1935 formed the FOMC as the monetary policy-making body. The FOMC is made up of 12 members - seven members of the Board of Governors, the president of the Federal Reserve Bank of New York, and presidents of four other Federal Reserve Banks, who serve on a rotating basis. The rotation scheme is such that nine Reserve Bank presidents vote one out of every three years. Presidents of the Federal Reserve Banks of Chicago and Cleveland vote in alternate years. Board Governors are appointed by the US president, with the approval of the US Senate for a 14-year term. Reserve Bank presidents are appointed for a 5-year term by his/her Bank's board of directors, with the approval of the Board of Governors.

In regard to monetary objectives, the Employment Act of 1946 established "maximum employment, production and purchasing power" as national goals. These goals became the goals of monetary policy but the Employment Act provided no guidelines for achieving them. The Federal Reserve Act 1977 and the Humphrey-Hawkins Act 1978 gave Fed a dual mandate: to promote maximum sustainable employment and price stability. To this aim, the FOMC oversees open market operations, which is the main tool used by the Federal Reserve to influence overall monetary and credit conditions.

Over the years the FOMC decision making process and the procedures have evolved considerably.[1] However, a typical FOMC meeting nowadays starts with a presentation on recent developments in the financial and foreign exchange markets from the New York Fed representatives, followed by a presentation of economic and financial forecasts as reflected in the Greenbook, prepared from the Board of Governors' staff. Then the meeting continues with two "go-rounds". In the first "go-round" the Board Governors and all 12 Reserve Bank presidents offer their views on the economic outlook. In this part of the meeting policy alternatives are presented from the staff of the Board. In the second "go-round", each member discusses and states his/her preferred policy alternative. At the end, the Chair summarizes a policy proposal and the proposed policy statement. The FOMC members will deliberate on both proposals before they vote. After voting, the process is closed with the communication of the policy decision. The policy directive informs the Desk of the FOMC's objective for "open market operations"- whether to maintain or alter the current policy. The Desk buys or sells U.S. government securities on the open market to achieve this directive.

2.2 Monetary policy preferences in the literature

Given their importance in understanding the making of monetary policy, a number of studies have been devoted to quantifying the preferences of policymakers. Literature has mostly looked at policy preferences in aggregate but also for individual member preferences in cases where monetary policy is a committee decision. Below I shortly discuss the related available studies, with focus on the Federal Reserve.

Aggregate preferences based on reaction functions. A large literature estimates monetary policy reaction functions or rules of the form proposed by Taylor (1993) that relate a policy instrument (e.g., the Federal funds rate) to past or expected macroeconomic conditions (see among others, Levin et al. (1999), Richard Clarida and Gertler (2000), Michael and Ramey (2004), Levin et al. (2003)). Often, parameters in front of the macro variables included in the rule (usually inflation and output gap) are referred to as the policy preference of the monetary authority. For instance, Taylor's original rule suggested a coefficient of 1 and 0.5 for inflation and the output gap, respectively. A Taylor rule with these coefficients appears to explain well the behavior of the Fed under Volcker and Greenspan. However, Fed policy rates were below the Taylor rule-implied rates during 2002-2005. **?**

[1] Before 1979 the FOMC met at least once a month and sometimes twice. Starting from 1979, the FOMC has met eight times a year. These are the scheduled meetings but there are also unscheduled meetings.

argues that this deviation may have been a cause of the boom and bust in housing starts and inflation just before the crisis.

Policy preferences based on estimated reaction functions are model dependent and there are different choices, i.e., linear versus non-linear rules or backward versus forward looking. Furthermore, additional estimation problems arise because potential output is difficult to measure in real time (see Orphanides and van Norden (2002)). Also, the inflation target is often unobservable. For the Fed this is the case at least until 2012 when the target became explicit. In addition, the usage of the Fed funds rate as the main source to infer preferences limits the period for which preferences can be estimated. For instance, in most studies, the Volcker period with non-borrowing reserves as the monetary policy instrument is excluded.

Individual preferences based on voting record. Some papers have relied on voting records and particularly on dissents to infer policy preferences of the FOMC. For instance, Belden (1989), observing dissents during 1970 to 1987, finds that Federal Bank Presidents tend to dissent more often than Board Governors for tighter policy. The latter are equally likely to dissent for tighter and easier policy. However, in regard to preferences, voting records provide limited information as they partly reflect differences in opinion and understate disagreement among members. Formally the voting process requires a simple majority, however in practice the FOMC has a preference for making policy decisions by consensus. A large majority gives the decision more credibility and increases markets' confidence on the policy.[2]

FOMC transcripts show as well that disagreement in internal discussions is usually quite high in comparison with what dissents would suggest. For instance, Meade (2005) shows that during Greenspan's time as the chairman the internal disagreement is estimated to be about 30 percent while dissents show only 7.5 percent. Therefore, looking only at dissents, one cannot tell if consensus was easily reached and at what "cost" (compromises). The chairman is instrumental in guiding the committee towards reaching a consensus but given the different composition of preferences they do not have always an easy time. For example, FOMC records show that due to large disagreement in the FOMC, chairman Martin often postponed taking a decision until a consensus was formed. More dramatically, both Arthur Miller and Paul Volcker as Fed chairmen have been on the losing side of the votes

[2]For example, New York Times quotes a member of the FOMC as follows: "I don't like to dissent particularly," said Mr. Morris, president of the Boston Fed, who just concluded a stint as a voting committee member. "I'm not sure it's healthy for the system to have an awful lot of dissents." A look inside Paul Volcker's Fed, NYT, 3 May 1981. In 2012 Bernanke expressed that any policy adopted by less than a 7-to-3 majority by the FOMC would not be viewed by markets as a credible policy, likely to endure. The FOMC had only 10 members for several years due to unfilled seats in the Board of Governors.

within the Board of Governors (on the discount rate). Records show that Miller did not seem to care about this result and its consequences.[3] Conversely, Paul Volcker considered resigning.

Individual preferences based on FOMC transcripts. To study decision making by the FOMC, Chappell and Vermilyea (2005) use transcripts and summaries of deliberations contained in the committee's Memoranda of Discussion and FOMC Transcripts to construct data sets describing individual committee members' policy preferences (in terms of preferred interest rates) for the 1970-1978 and 1987-1996 periods when the FOMC was chaired by Arthur Burns and Alan Greenspan, respectively. This information is used to estimate monetary policy reaction functions for individual Committee members and to explore the role of majoritarian pressures, pressures for consensus, and the power of the chairman in collective decision making. They find that members' leaning positions, revealed in the Memoranda of Discussion, help to capture aspects of individuals' policy preferences which are not evident in voting data alone.

Using FOMC transcripts is beneficial in assessing the preferred policy of the FOMC members but given that they are released to the public with a five-year delay, they have low market value. These documents are open to public with delay with the idea that at the time of the release they will not provide information that might trouble the markets. Furthermore, when available they are not easy to interpret. Greenspan comments on this point as follows: "People think reading raw transcripts is a way of learning things, I would suggest that if they spend six or eight months reading through some of this stuff, they won't like it" (Greenspan 1993). Third, the real debate on policy might be taking place outside the FOMC, especially after the decision in 1993 to release FOMC transcripts (with five-year delay). Several FOMC members acknowledge that this decision changed the nature of the FOMC's deliberation to a more formal, structured and routine process.

3 Policy preferences of the FOMC: 1960-2015

3.1 Methodology of quantifying perceived policy preferences

The perceived policy preference of the FOMC is based on narrative records. Qualitative information on preferences is extracted from newspaper articles, financial

[3]In July 1978, Miller voted against a discount-rate increase after a clear majority of the board already had voted for it. WSJ quotes Board Governor J. Charles Partee saying: "I told him, 'Ah, that's a little unusual,"' noting that Fed chairmen are never supposed to lose monetary-policy votes, for fear of upsetting the markets. Source: Monetary Zeal: How Federal Reserve Under Volcker Finally Slowed Down Inflation, The Wall Street Journal, 7 December 1984.

media outlets and business reports of Fed watchers in the U.S. This information reflects the perceptions of market participants on the policy leanings of each FOMC member, as expressed in these mediums. To this aim, I have consulted about 20,000 articles or reports with reference to FOMC members. Articles are read from more than 30 newspapers: i.e., Chicago Tribune, The New York Times (NYT), The Wall Street Journal (WSJ), Financial Times, Reuters, Dow Jones Newswire, Los Angeles Times, Baltimore Sun, The Washington Post, American Banker, The Associated Press, Market News International, International Business Times, Investors Business Daily, Market Insight. The sources for the newspapers used are: Proquest Historical Newspapers with Los Angeles Time, Chicago Tribune, NYT, 1960-1999; Proquest with WSJ, Baltimore Sun, Washington Post, Chicago Defender, 1960-1999; Newspaper Archiver for regional newspapers, 1958-1990 and Factiva for 1985-2015. Financial reports from different market strategies firms are mostly available in recent years.

Perceptions are related to the dual objective of monetary policy in the US and also discussed with respect to the policy instrument.The perception on the policy preference of a particular member can be expressed in different terms and those have evolved through time. In the beginning of the 1960s the most used terms were: conservative, liberal, monetarist, supply side conservative, tight or easy money guy. After the Vietnam War, the terms hawk and dove began to be used more frequently. These terms are generally used from market participants to indicate their belief on the weights each FOMC member assigns to one of the dual objectives of the Fed: full employment and price stability. A reference from Dow Jones Capital Markets Report in 2005 expresses this categorization as follows: *"Market participants tag central bankers in avian terms, seeking to describe officials' inflation fighting appetites. Hawks are central bankers who put the inflation fight high above other goals. Dovish Fed members, meanwhile, have historically been inclined to tolerate a bit more price pressures, or at least the threat of them, if it allowed higher growth and better job gains."* Often for members whose preferences are believed not to strongly belong in one of the camps, terms like middle of a road-er, swinger, pragmatic or eclectic are used.

Following the financial markets' language, I summarize the information on the preferences of FOMC members with two qualitative terms - Hawk and Dove. Steps for arriving at these two categories are as follows:

1. Per each FOMC member search for articles that contain this name (articles before and during the time in office).

2. Read and identify parts in the article with reference to the policy preference

of the FOMC member. Save this information.

3. Evaluate the saved information and assign a policy preference to it, in one of the following categories: Expected Hawk, Hawk, Expected Dove, Dove.

4. Assign the perceived policy preference accordingly in years it is observed.

To illustrate these steps, Table 1 displays some examples with quotes on preferences as extracted from newspaper articles. The table shows three different articles in 1978, a year when inflation in the US was increasing rapidly to double digits and two recent articles from 2015. There are two cases to pay attention to. The first case reflects expectations on the policy preference during the period that FOMC members have not yet participated or voted in an FOMC meeting. These are periods when the future FOMC member is either a candidate for Board of Governors nominated from the President waiting for Senate confirmation, or a confirmed new Board member that is expected to sit in the FOMC at a later time or a new Federal Reserve President that has not voted yet due to the rotation scheme.

Figure 1: Coding of FOMC perceived preferences

Year/Name	Policy Preference	Newspaper quotes	Source
1978			
Miller	Expected dove	More crucial to the outlook is the confirmation of Miller and the direction of his leadership if he becomes chairman. "My guess is that he is going to be fairly liberal with monetary growth," Mr Sprinkel said.	New Faces on Fed Committee Confuse Credit Markets: Faster Money, New York Times, Feb 27, 1978
Wallich Coldwell Jackson	Hawk	President Carter wants the Federal Reserve Board to hold the line on interest rate increases but fears that a majority of tight money "hawks" on the board will continue to raise them, an administration official said Friday…3 board members who voted for the increase in the discount rate, labeled "hawks" on inflation issue by the white House aide, were Wallich, Coldwell and Jackson.	Carter Wants Halt in Interest Rate Boosts: But White House Fears Fed 'Hawks' Will Not Comply Los Angeles Times, Jul 8, 1978;
Teeters	Expected Dove	Teeters is thought of as a liberal economist who probably will be more reluctant to use high interest rates to fight inflation than most of other FOMC colleagues.	Fed chief Miller only 1 vote out of 7, The Pittsburgh Press, August 1978
2015			
Yellen	Dove	In earlier positions as San Francisco Fed president and Fed vice chairwoman, Ms. Yellen staked out clear ground as a policy "dove" strongly supportive of the Fed's easy money policies. Given that history, she might be expected to favor keeping rates near zero for a while longer.	Divided Fed Puts Yellen on Hot Seat; Central bank chief faces cliffhanger decision as rate call comes down to wire, The Wall Street Journal, 20 August 2015
Plosser Fisher	hawk	In the language of monetary policy, hawks are policy makers like Mr. Plosser and Mr. Fisher who are constantly urging a war on inflation, while doves are those who see less threat from inflation and more opportunity to stimulate economic growth. Hawk is a label that Mr. Fisher, in particular, once publicly embraced…In their final years at the Fed, both Mr. Plosser and Mr. Fisher abandoned warnings that faster inflation was imminent, arguing instead that the Fed was risking a future surge in inflation.	Playful Parting Gifts Show Heads Aren't Inflated at the Fed, New York Times, 21 March 2015

Markets participants take clues to policy leanings of these members mostly from information on their personal background (origin, education, profession), on earlier

writings or positions with respect to economic debates, on party affiliations or who is supporting or pushing their candidature (i.e., a democrat or a republican president, liberals or conservatives). These cases are coded as Expected Dove or Expected Hawk. For example, the NYT article in February 1978 guesses on the policy preference of G. William Miller, which was already nominated from President Jimmy Carter as the Fed chairman but not yet confirmed by the Senate (confirmation was done in March 1978). Miller is expected to be "fairly liberal with monetary growth", which can be interpreted as a Dove characteristic. Therefore, I code the perception on him as Expected dove (see second column, Policy Preference).

The other case refers to members that have already participated in FOMC meetings and therefore clues on the policy preference can be inferred in addition from positions that FOMC members take while in the FOMC, i.e., either through votes or speeches. These cases are coded as Hawk or Dove. For example, Los Angeles Time in July 1978 discusses the preference of President Carter versus that of some FOMC members with respect to interest rate policy. In this particular year, the Board is perceived to have a hawkish majority. Wallich, Coldwell and Jackson are referred as the hawks, who voted for the increase in the discount rate. Therefore, the coding of the preference is Hawk for each of them.

To summarize, I code four categories: Expected Hawk, Hawk, Expected Dove and Dove. The Hawk/Expected Hawk category includes perceptions as conservative, monetarist, tight money guy, hawk, hawkish, middle of a road-er or swing man with hawkish leanings and pragmatic or eclectic with hawkish leanings. The Dove/Expected Dove category includes perceptions as liberal, supply-side, easy-money guy, dove, dovish, middle of a road-er swinger with dovish leanings and pragmatic or eclectic with dovish leanings.

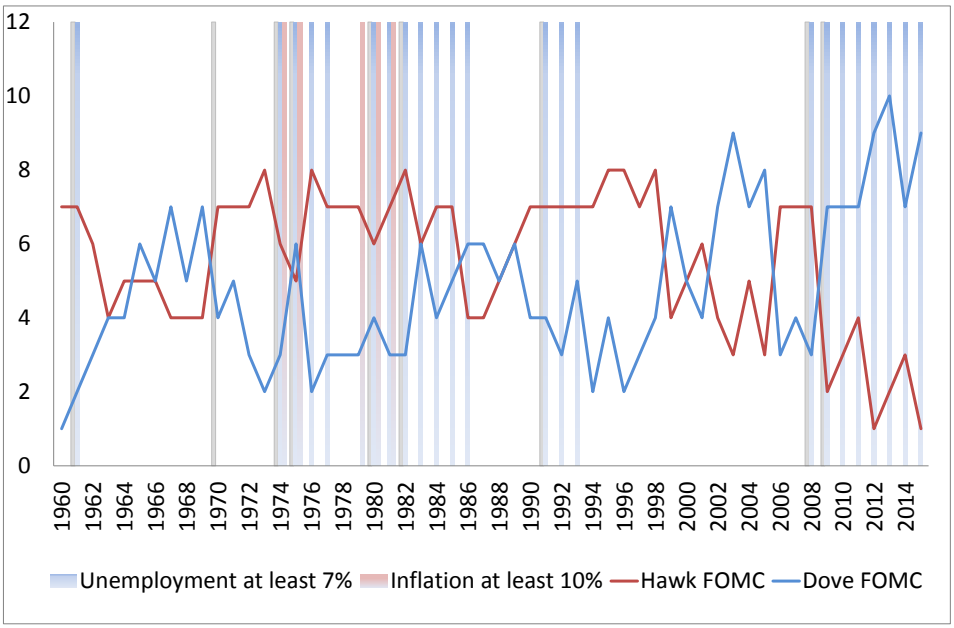
3.1.1 Hawks and Doves in FOMC

Having the perceived preference for each individual member, per year, I calculate the hawk/dove score of the FOMC in a given year as follows: the FOMC's hawk/dove score in a particular year t and meeting m is based on the perceived preferences up to year *t-1* or t, one day before meeting m. The idea is that each year starts with an expectation of what the combination of the preferences for the new FOMC would be. For instance, the preferences for the new FOMC in 2016 are based on perceived preferences up to 2016 of its composing members. These preferences will be updated meeting by meeting if there is new information revealed before the meeting. Following perceptions year by year is beneficial since it allows tracking policy preferences of FOMC members over time. Furthermore, when studying on a

meeting-by-meeting basis, it is useful to update information on new FOMC members that enter in the FOMC during the year (i.e they are not known at the beginning of the year). This helps also in capturing the leaning of swingers (middle of road-ers).

Figure 2 shows the total of perceived hawks (including the expected hawks) and doves (including the expected doves) for the (pointwise) FOMC during the period 1960-2015. For each year, the perceived composition corresponds to the new FOMC (the first meeting of the year with the new rotation of the Fed Presidents).[4] The line in red displays the number of perceived hawks and in blue the number of perceived doves. The bars in gray denote years with NBER recession dates for the US, in blue the years with the unemployment rate being at least 7 percent and in light red, years with inflation rate being at least 10 percent.

Figure 2: Perceived composition of FOMC preferences (1st meeting of new FOMC)



Notes: The FOMC members are 12 in maximum and likewise the total of hawks and doves per meeting. However, in the graph the total does not always add up to that. One reason is that often there are vacancies in the Board of Governors. In addition, it can be that the policy preference of one or more members is not known yet. This means that the available information in newspaper articles or other business reports for the member(s) does not allow to assign a perceived preference (i.e., they are "an unknown quantity" to markets).

Figure 2 displays substantial variation in the perceived Hawk/Dove scale throughout the entire period under consideration. Overall, it seems that markets have perceived a hawkish Fed, especially for the most part of Arthur Burns, Paul Volcker and Alan Greenspan's years. A clear dovish bias of the FOMC is perceived during

[4]The first meeting of the new FOMC did not correspond with the first meeting of the year until 1979. The new FOMC would have the first meeting around March. Starting from 1979, the new FOMC meets on the first meeting of the year (either January or February).

the last years of Fed chairmanship of William McChesney Martin (second part of the 1960s) and of Ben Bernanke and Janet Yellen years. Furthermore, several interesting observations are worth discussing. First, it is interesting to see that during the major part of the 1970s the FOMC is perceived having a strong hawkish bias. This suggests that the Fed during those years worried about inflation and spoke against it. The problem was that the Fed of those years believed that monetary policy is ineffective to deal with that type of inflation, what **?** refer to as the most dangerous idea in Fed history.[5]

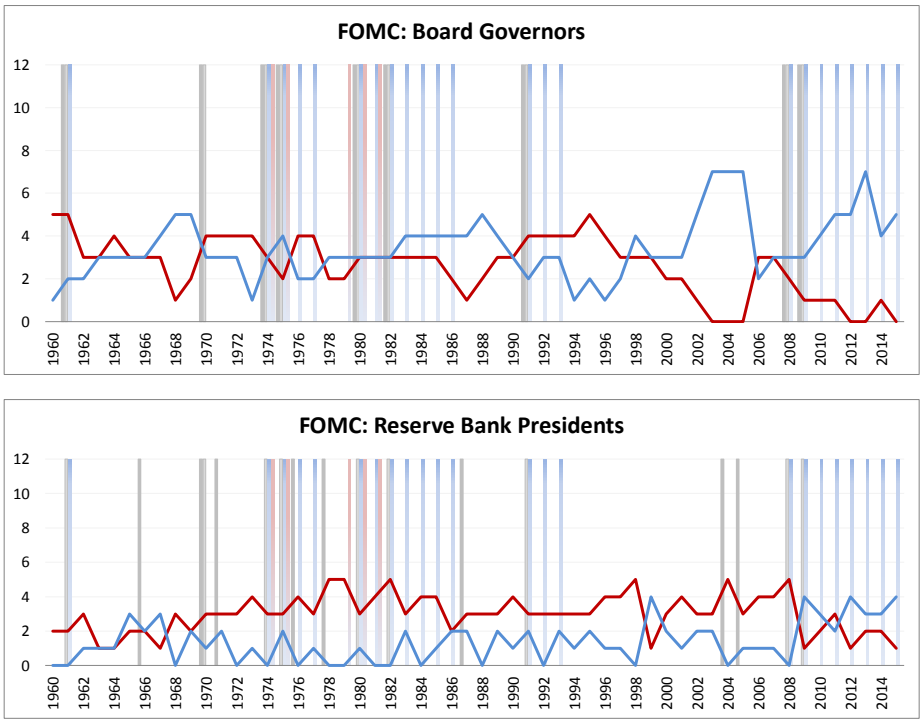
In the 1990s one observes a hawkish bias growing again. In these years the FOMC started discussing about inflation targets as important to reach monetary policy objectives. Several FOMC members very often spoke publicly about "removing inflation from the equation". Later, implicitly a consensus built around the 2 percent target. Further, in the 2000s a rise of the dovish bias is perceived. These years correspond with Greenspan advocating that due to productivity growth, the economy can grow faster, without exacerbating inflation. During these years a dovish stance is perceived for the majority of the FOMC, including Greenspan.

In more detail, Figure 3 shows perceived preferences across FOMC members: the Board of Governors (first top panel) and the rotating Reserve Bank Presidents (second bottom panel). We observe that the Board of Governors composition is perceived to switch often between the dovish and hawkish bias. On certain periods the Hawk/Dove score is relatively tight but there are periods were differences are considerable and persistent. The end of the 1960s, the most of the 1980s and since 2000 a strong dovish bias is perceived for the Board. Especially during 2002-2005 none of the Board Governors is perceived to have a hawkish preference (the chairman included).

It is also interesting to see that the Board was perceived with a dovish bias during the years that are considered as Volcker's disinflation years. This goes pretty well in line with narratives that President Ronald Reagan was not happy with the tight policies of the Fed under Volcker. In response, Reagan filled the Board with members whose policy preferences would counteract Volcker's. During Volcker's tenure, President Reagan nominated and filled six seats in the Board of Governors. All these members were perceived by markets to have a dovish bias, i.e., Preston Martin, Martha Seger, Wayne D. Angell, Manuel H. Johnson, H. Robert Heller and Edward W. Kelley. Later in years, both Wayne D. Angell and Edward W. Kelley revealed a more hawkish bias.

[5]The beginning of these years corresponds with inflation rising considerably and the government taking several actions, like price and wage controls, in response. The Fed was supportive of these measures.

Figure 3: FOMC preferences (1st meeting of new FOMC): Board Governors vs. Reserve Bank Presidents



Notes: The Board Governors are 7, and the voting Fed presidents are 5 in maximum and likewise the total of hawks and doves per meeting, respectively. However, in the graph the total does not always add up to that. One reason is that often there are vacancies in the Board of Governors. In addition, it can be that the policy preference of one or more members is not known yet. This means that the available information in newspaper articles or other business reports for the member(s) does not allow to assign a perceived preference (i.e., they are "an unknown quantity" to markets).

Interestingly, perceived preferences of Federal Reserve Bank Presidents differ systematically from those of the Board. Throughout the sample, the composition of rotating Fed Presidents is generally perceived as hawkish. This results matches fairly well those discussed in the FOMC literature, which usually find that Board members appear to prefer more expansionary policies than the Reserve Bank presidents (see Belden (1989), Havrilesky and Gildea (1989) and Chappell and Vermilyea (2005)). However, during recent years, the perceived Hawk/Dove scale seems to have reversed as well on the dovish side. Compared to the Board Governors, there is also more variation from year to year, mostly due to the rotation scheme.

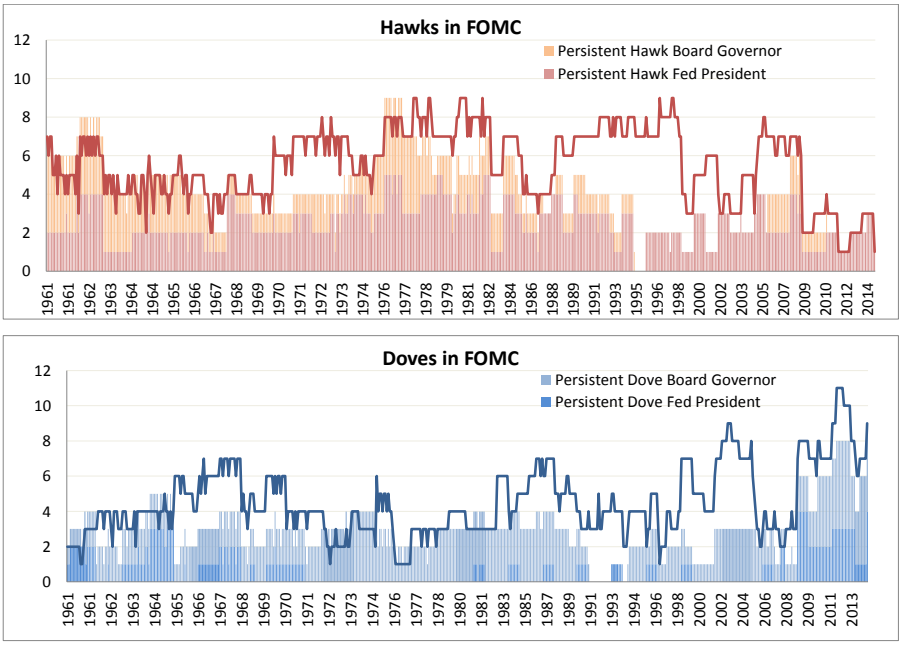
3.2 Persistent Hawks and Doves in FOMC

Individual policy preferences are not necessarily static. Market participants are careful to observe if FOMC members are having a different leaning from what was perceived before, either by observing the votes or new positions taken in speeches, and update accordingly. To investigate whether there is time variation in policy preferences I look over the whole time span of an FOMC member and observe if this member has been always perceived as one type (a hawk or a dove) or if the perception on the type has varied through time. I summarize this information in three categories: persistent hawks, persistent doves and swingers. Persistent hawks (doves) are those FOMC members for whom perceptions on preferences have been of one type only. Swingers are FOMC members for whom perceptions on preferences have varied over time. I find that out of 136 FOMC members in total, 38 percent of them have been perceived as persistent hawks and 29 percent as persistent doves. In addition, about 25 percent of the FOMC members constitute the swingers. The remaining 8 percent are unknown in terms of preferences. This group includes FOMC members that stayed for a very short period on the FOMC and for whom the market could not form a perception on.

Generally, market participants are able to make the distinction if a particular leaning of an FOMC member in a given time constitutes a shift in preferences or just a temporary position due to circumstances. As an example, I highlight a quote from WSJ in 2002, referring to Alfred Broaddus Jr., President of the Federal Reserve Bank of Richmond in the period 1993-2004. In this discussion, Broaddus is referred as a long time hawk and market specialists discuss if his worries about deflation in 2002 mean that he had a change of heart or they reflect a change of circumstances. *"Fed officials generally dislike being labeled "hawk" or "dove". Being pigeonholed can diminish one's influence with different-minded colleagues. But Mr. Broaddus didn't shy away. In one speech pointing to faint signs of inflation, he*

said: "It is a hawk's job to point out developments like these." (...) That a die-hard inflation hawk such as Mr. Broaddus now talks of the dangers of inflation going too low has raised eyebrows both inside and outside the Fed. One fellow policy maker has started referring to him as the "leading dove" Mr. Broaddus says. Yet people who have watched Mr. Broaddus consider the apparent change consistent with his commitment to price stability, which means battling both inflation and deflation ... "It's not a change of heart" says Mr. Meltzer, the Carnegie Mellon economist. "It's a change of circumstance."[6]

Figure 4: Persistent Hawks and Doves



Notes: Persistent hawks (doves) are those FOMC members for whom perceptions on preferences have been of one type only.

Admittedly, there have been cases in the history of the FOMC where its members are perceived to have a "change of heart". The most recent example is that of Narayana Kocherlakota, President of the Federal Reserve Bank of Minneapolis during 2009-2015. When he was assigned to the position of the Fed President, markets correctly perceived him to be a hawk (preference coded as Expected hawk). By 2011, he was a noted hawk, arguing against further monetary easing and suggesting that the Fed has become tolerant to inflation. However, by 2012, Kocherlakota makes a complete shift from hawk to dove and market participants updated their percep-

[6]The Flip Side: Inflation Subdued, Top Hawk At Fed Frets Over the Opposite - Mr. Broaddus Helped Reach Goal of "Price Stability" But Is Deflation a Danger? May 2002, The Wall Street Journal.

tions on him accordingly. WSJ (2012) refers to this case as follows: "*In the nearly three years Narayana Kocherlakota has held the keys to the Minneapolis Fed, the central banker has undergone a pronounced evolution from hawk to dove, in a shift made complete Thursday. In a speech Thursday in Michigan, Mr. Kocherlakota completed his shift. He noted he "liked" Mr. Evans's ideas...Mr. Kocherlakota's Thursday speech caught some Wall Street observers totally off guard. Calling the official a "noted hawk," Eric Green, economist at TD Securities said the policy maker's path to his current view is "tortured". "In a matter of months a hawk moves from a premature exit strategy to raising the inflation target and then suggests keeping real fed funds at 50-year lows" even if that breaches what many consider to be inflation generating full-employment levels, Mr. Green said.*" [7]

The case of Kocherlakota is just one of several other swingers in the FOMC. Figure 4 shows the evolution of the Hawk/Dove scale, per meeting, since 1960. The line in red (blue) shows the total number of hawks (doves) as perceived in "real time". Bars show how many of the "real time" hawks (doves) have been persistent hawks (doves).[8] The difference between the lines and the bars (the white space) indicates the number of FOMC members that for that period of time were considered a hawk (dove) but looking at their whole time span in the FOMC they rank as swingers. For example, the FOMC in 1995 was expected (perceived) to have seven hawks and four doves. Nonetheless, none of the perceived hawks were persistent ones but all swingers. On the side of the doves only two appear as persistent ones.

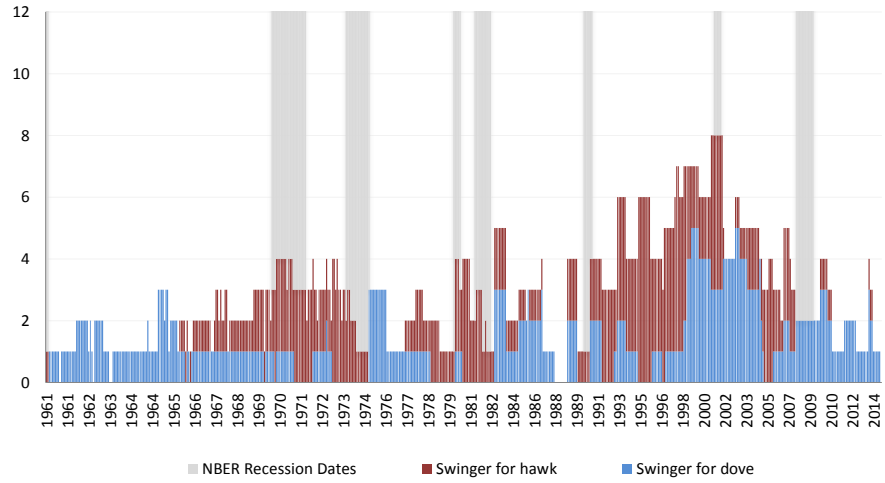
In the hawkish camp, a large share of swingers is observed during the early 1970s, early 1980s and during the 1990s. They are all different periods in terms of monetary policy concerns. The first corresponds with the start of inflation and the second correspond with the beginning of the Volcker's disinflation period. The second panel shows that a share of doves switched to hawks in the second part of 1960s, when inflation became problematic. Furthermore, the hawks of the 1975-1978 are all persistent hawks, meaning that they are not hawks only in this period due to circumstances. However, while the FOMC is perceived to have had nine persistent hawks, the Fed Chairman in 1978, G. William Miller, is perceived to be a dove.

During the 1990s two observations can be made. The first relates with the fact that the majority of new Board Governors started to come forward as pragmatic or eclectic, in attempts to avoid looking dogmatic in terms of policy. This ambiguity was helpful as well for them to get an easier confirmation from both the conservatives

[7]FED WATCH; Kocherlakota Completes Extreme Swing from Hawk to Dove, 20 September 2012, The Wall Street Journal.

[8]Sometimes the bar surpasses the line. This means that the policy preference of one or more members was not known in "real time" but *ex post* it is perceived to be a persistent hawk (dove).

Figure 5: Swingers in FOMC



Notes: Swingers are those FOMC members for whom perceptions on preferences have changed through time.

and the liberals in the senate. Therefore, newspapers and markets refer to them more often as "middle-of-roaders". Furthermore, during these years there was a lot of discussion within and outside the Fed on price stability and inflation targeting as a potential policy framework. In this respect, many of the FOMC members sounded more hawkish in public.

In Figure 4 there are two colors for the bars, the darker corresponds to Fed presidents and the lighter to the Board Governors. Fed presidents display more consistent preferences and mainly hawkish. When looking at the swingers in FOMC the majority are from the Board camp (on average, 70 percent of swingers). When looking at the direction for swinging, on average, both Fed Presidents and Board Governors, slightly swing more often for dove (51 percent versus 49 percent).

3.3 Evaluating FOMC perceived preferences

The measure of perceived preferences is based on what market participants believe the policy preference of a particular member is. This does not require the true policy preference of the FOMC member to be the same. Certainly, a good match between the two would be a positive sign that markets have a good intuition. However, the true preference is unobservable and as discussed above there are several attempts in the literature to estimate them. First, I compare how perceived preferences line up with FOMC voting records and second, I provide a comparison with the preferred interest rate measure of Chappell and Vermilyea (2005).

3.3.1 Perceived Preferences and Dissents

How do the perceived preferences of the FOMC line up with dissents? Since 1960 until the first FOMC meeting of 2015 there have been 434 dissents on policy[9]; 268 for tighter policy and 166 dissents for ease. Table 1 shows the distribution of dissents for ease or tight, conditional on the perceived preference of the dissenter. Recall that for each FOMC member, the vote in a meeting m is matched with perceived preferences that include information known before meeting m. This means that the votes of meeting m do not enter in the perceived preference of meeting m.

Table 1 shows a very good match of perceptions with voting outcomes; dissents for tighter policy are predominantly cast from perceived hawks (about 86 percent of them) and dissents for ease are cast from perceived doves (about 77 percent). Also, perceived hawks seem to be the biggest dissenters but this is also related with the sample dominated by perceived hawks.

Table 1: Share of dissents for ease or tight, conditional on perceived preference

	Perceived Hawk	**Perceived Dove**	**Unknown**	**Total**
Dissent for tight(er)	86.2%	6.7%	7.1%	268
Dissent for ease(ier)	12.6%	77.7%	9.6%	166

3.3.2 Perceived policy preferences versus preferred interest rate

As already mentioned, Chappell and Vermilyea (2005) use transcripts and summaries of deliberations contained in the committee's Memoranda of Discussion and FOMC Transcripts to construct data sets describing individual committee members' policy preferences, in terms of preferred interest rates, during 1970-1978 and 1987-1996. For the comparison exercise I proceed as follows. First, using the dataset of Chappell and Vermilyea (2005), per each FOMC meeting, m, in time t, I compare the estimated preferred interest rate of each voting member i, $r^i_{t,m}$, with the chosen target rate, $r_{t,m}$. If the difference between the preferred rate, $r^i_{t,m}$, and the target rate, $r_{t,m}$, is equal to, or higher (lower) to a certain threshold, I denote this as a hawkish (dovish) preferred rate. I choose the threshold to be 0.25 percentage

[9]There have been additional dissents not related with the direction of policy and these are abstracted from the analysis.

points.[10]In the second step, I compare this classification of the preferred rates with the perceived policy preference of each member, for the same meeting. Recall that the perceived policy preference is based on information before this meeting.

$$\text{Preferred rate}_{t,m} \quad = \quad \begin{cases} \text{dovish if} & r^i_{t,m} - r_{t,m} \leq -0.25 \\ \text{hawkish if} & r^i_{t,m} - r_{t,m} \geq 0.25 \end{cases} \tag{1}$$

During the period 1970-1978, one can count 99 scheduled meetings and (unique) 38 FOMC members. In these meetings, out of 1151 preferred interest rates in total, only 27 percent of them pass the 0.25 percentage points threshold. During 1987-1996, there were 76 scheduled meetings and (unique) 36 FOMC members. In these meetings, out of 846 preferred interest rates only 11 percent of them exceed the threshold. The match between perceived preferences and preferred interest rates is shown in Table 2.

Table 2: Comparison of perceived preferences with preferred interest rates of Chappell and Vermilyea (2005)

	Perceived Hawk	**Perceived Dove**	**Unknown**	**Total**
1970-1978				
Hawkish preferred rate	67%	23%	10%	163
Dovish preferred rate	33%	55%	12%	150
1987-1996				
Hawkish preferred rate	77%	15%	8%	61
Dovish preferred rate	9%	91%	0%	32

The match between preferred rates and perceived preferences goes in line with what one would expect: the majority of hawkish (dovish) preferred rates belong to perceived hawks (doves). It is remarkable especially for the second period where about 77 percent of hawkish preferred rates belong to the perceived hawks and 91 percent of dovish preferred rates belong to perceived doves.

4 Conclusion

This paper proposes a novel measure of perceived policy preferences for the Federal Open Market Committee (FOMC). The measure is based on a narrative approach

[10]Usually FOMC members express their preferences either in terms of alternatives proposed in the Bluebook or in 25- or 50-basis point movements relative to the prevailing funds rate (Chappell and Vermilyea (2005)).

where qualitative information on perceived policy preferences is extracted from newspaper articles, financial media outlets and business reports of Fed watchers in the US. Following the language of financial markets, information on the preferences of FOMC members is categorized in two leanings, hawk and dove, representing the weights that market participants believe each member assigns to one of the dual objective of the Federal Reserve.

Investigating 1960-2015, one observes that markets have perceived an FOMC with time varying policy preferences. A hawkish bias is observed for the most part of Arthur Burns, Paul Volcker and Alan Greenspan's years as chairmen. Furthermore, a clear dovish bias of the FOMC is perceived during the last years of Fed chairmanship of Martin (second part of the 1960s) and during Ben Bernanke and Janet Yellen's years. Within the FOMC, Reserve Bank Presidents are systematically perceived as hawkish while the Board is perceived to switch often between the dovish and hawkish bias. Fed Presidents also appear to have more persistent preferences while Board Governors swing between types. These results match well with narratives on monetary policy in the US, with FOMC voting patterns and with existing proxies for policy preference in the literature.

This unique data set can be used for several research purposes. In regard to monetary policy uncertainty, using this dataset, I construct a measure that represents uncertainty over who will be the policy maker. The rotation scheme of Fed presidents every year brings exogenous variation in the combination of the FOMC policy preferences that can be exploited for identification. Furthermore, in another project, in the context that shifts in policy preferences are considered as an exogenous source of monetary policy shocks and regime switches, I relate them to monetary policy and regime switches in monetary policy (see for example, Christopher and Zha (2006), Michael and Ramey (2004)).

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