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Abstract

Although many central banks in the 21st century have become more transparent, Chinese monetary policy communications have been relatively opaque, making it more difficult for financial market participants to make decisions that depend on the future path of interest rates. We conduct a novel systematic textual analysis of the discussion in the quarterly reports of China fund managers, from which we infer their near-term expectations for monetary policy. We construct an aggregate index of manager expectations and show that, as a forecast of Chinese monetary policy, it compares favorably with both market-based and model-based alternative projections. We find that expectations are more accurate for funds that commit more analytical resources, have higher management fees, and with stronger managerial educational background. We also show that fund managers act on these expectations, and that correctly anticipating shifts in Chinese monetary policy improves fund performance. Our results imply that manager skill is an important determinant of fund returns, providing the first evidence from China on a question for which studies of asset management in other countries have reached conflicting conclusions. economy.

Keywords: Chinese monetary policy; fund managers; textual analysis
JEL Classification: E52, G23

1 Introduction

The adoption of unconventional monetary policies over the past decades has made monetary policy much more complicated to understand, thereby increasing the importance of central bank communications and transparency. Chinese monetary policy communications have remained relatively opaque in comparison to those of, e.g., the Fed and ECB, however, making it more difficult for Chinese financial market participants to make decisions that depend on the future path of interest rates. We evaluate implications of this policy communications mise en scene for China fund managers, and hence ultimately for Chinese monetary policy itself.

Our starting point is a novel, systematic textual analysis of the qualitative discussion in the quarterly reports of China's mutual fund managers. From this, we obtain a large panel data set of mutual fund managers' near-term expectations about shifts in Peoples Bank of China (PBoC) monetary policy.[1] The aggregate index of manager expectations we construct does well as a forecast of Chinese monetary policy. For example, the index predicts 49 percent of the variation of changes in the stance of monetary policy in the subsequent quarter, which is more than alternative projections such as the implied forward rates and an unrestricted Taylor rule, as well as the PBoC Survey of Commercial Bankers.

We furthermore examine how monetary policy expectations affect investment decisions by fund managers. We find that managers of money market funds buy (sell) long-term assets when expecting an easing (tightening) of monetary policy, consistent with the prediction of standard models. This finding confirms that our textual analysis quantifies managers expectations well and that mutual fund managers take their own words seriously. Moreover, this finding provides direct evidence that monetary policy expectations serve as an important factor behind investors portfolio choice. It implies that systematic revisions of monetary policy expectations among market participants can induce significant rebalancing of asset holdings at the aggregate sector level, and thus potentially act as a channel of monetary policy transmission

Our monetary policy expectations measure allows us to construct an index of forecast skill by calculating how often managers correctly anticipate shifts in monetary policy. Because we observe both fund and manager identities, we match the expectations to manager and fund characteristics and their investment records. We find that higher performers tend to manage a

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[1]The data set includes 4,571 funds between 2008 Q3 and 2019 Q1.

larger fund and charge higher management fees, both of which reflect how the market judges their skill. Good forecasters also have more years of experience in the asset management industry and are more likely to hold a Ph.D. degree. Both results are consistent with the idea that acquiring the necessary information to optimize investment decisions entails non-negligible resource input, as first formalized by Grossman and Stiglitz (1980). Finally, we find that Beijing-based fund managers are better forecasters of monetary policy, consistent with managers obtaining an informational advantage from geographical proximity to policy makers.

We then examine whether correctly anticipating shifts in monetary policy improves fund performance. The answer crucially depends on the fund type and the interest rate regime. Correct predictions of monetary policy improved money market funds performance in the period prior to 2013, when market interest rates (such as inter-bank rates), which largely determine money market fund returns, remained in a narrow range around the benchmark deposit rate set by the central bank. After 2013, market interest rates have been less closely connected to benchmark policy interest rates, at least in the short-run.[2] Hence correctly predicting the benchmark policy interest rate did not help the money market funds achieve a superior return in the latter part of the sample. However, we find that bond funds typically earn higher returns when their managers correctly predict the near-term direction of monetary policy, regardless of the policy regime. A possible interpretation of this finding is that bond funds invest in relatively long-term assets, whose value is heavily influenced by both the level of policy interest rates and revisions to near-term expectations. In contrast, we find that correct predictions of monetary policy do not improve fund performance for equity funds and mixed funds, consistent with factors other than monetary policy being more important drivers of stock prices.

Finally, we investigate whether expected shifts in monetary policy, proxied by fluctuations of the managers' consensus forecast, induce systematic fund flows. We find significant net inflows into Chinese money market funds associated with near-term prospects for monetary policy easings. This is consistent with strategic substitution by yield chasing depositors from bank deposits to money fund shares. Specifically, an easing (tightening) of monetary policy typically widens (narrows) the interest spread between the deposit rate and the money market funds' yield, due to the loose link between the wholesale bank funding market and the short-term securities market in China. Interestingly, the sign of this relationship is at odds with what

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[2]For example, inter-bank interest rates initially rose at the beginning of the 2014-2015 easing cycle.

is found for banks in most other countries, where the link between wholesale bank funding and the short-term securities markets tends to be much closer, and low rates tend to depress net interest margins (Claessens et al. (2018)). All else equal, this substitution mechanism could weaken transmission of Chinese monetary policy to the real economy, because most bank borrowers do not have access to money-market financing.

Related literature

Our paper contributes in several ways to the literature that studies monetary policy expectations.[3] First, to our knowledge, ours is the first study to infer institutional investors' monetary policy expectations from their written reports. Second, we provide evidence on monetary policy expectations for China, a previously under-studied economy in this literature. Third, while most work considers the monetary policy expectations of the professional forecasters or primary dealers, we provide monetary policy expectation measures for institutional investors, whose views, whether right or wrong, are particularly relevant because they are important players taking positions in these markets. Thus we provide more direct insights into how expectations about future monetary policy affect financial decisions and market prices. Our data set matches monetary policy expectations to investment behavior at the individual level, which enables us to identify the causal effect of monetary policy expectations on investment behavior.

Our work also contributes to several branches of the literature by providing new evidence from the rapidly growing financial markets in China, which thus far have been studied much less than those in other large economies. Our result that Chinese money-market fund managers can benefit from anticipating changes in monetary policy by adjusting portfolio duration is broadly consistent with Kane and Lee (1983). Those authors found in a 1978-1981 sample that U.S. money funds on average profited by maturity adjustments ahead of shifts in the short end of the yield curve that suggested some forecasting ability, but without reference to an explicit measure of expectations. We also broaden the evidence on determinants of mutual fund performance more generally, including the benefits of manager skill and active portfolio management, for which there is conflicting evidence from other markets. For example, for U.S. equity investors, an influential paper by Carhart (1997) called into question an earlier "hot hands" literature

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[3]See Christensen and Kwon (2014) for an overview of different ways to measure expectations of Fed monetary policy, and Coibion et al. (2019) on the importance of the Fed communicating their intentions accurately.

by attributing performance persistence entirely to priced factors and to the worst-performing funds. Similarly, for U.S. money-market funds from 1990 to 1994, Domian and Reichenstein (1998) found that expenses were the main determinant of net return differentials, with similar gross returns across funds. Consistent with customer skepticism about active management, Bhattacharya and Galpin (2011) document a worldwide shift toward passive management, but less so in emerging markets. However, some more recent papers find benefits to manager skill, such as Kacperczyk et al. (2016).

2 Data description

2.1 The raw data: mutual fund reports

Throughout our sample period 2008Q3 to 2019Q1, all mutual fund managers in China were required by the China Securities Regulatory Commission (CSRC) to discuss their expectations for the near-term condition of the economy and financial markets. These commentaries were published in the Market Outlook subsections of the Quarterly, Semi-annual, and Annual Reports of the China Securities Journal. We obtain the mutual fund reports from Wind. See online Appendix A for a sample report.[4]

The CSRC does not assign specific topics, so the managers are free to address what they find most relevant.[5] Managers provide qualitative forecasts of economic policies, economic conditions, and other subjects. The length of the Market Outlook subsection of each report ranges from 50 to 2000 Chinese characters, depending on the number of topics and the amount of detail. We construct a dictionary of key words and phrases, so that we can categorize narrative passages as qualitative opinions within 17 topical categories, including monetary policy, fiscal policy, politics, and exchange rates. We posit that mutual fund managers have a reputational incentive to write the Market Outlook subsection carefully, as investors can evaluate managers' ability and credibility from the correctness of their opinions. Furthermore, as we document later, there is a positive relationship between accuracy in forecasting monetary policy and managers' compensation. Since the launch of the first Chinese mutual fund in September 2001,

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[4]Beginning in 2017 Q1, mutual fund managers were only required to fill out the Market Outlook subsections in their Semi-annual and Annual Reports. However, many managers voluntarily continued to include commentary on their expectations in the Quarterly Reports even after 2016 Q4.

[5]However, they are not allowed to mention any stock or company names.

the industry has experienced strong growth. In March 2019, the mutual fund industry had 5,334 funds, consisting of 914 equity funds, 1,526 bond funds, 2,339 mixed funds, and 381 money market funds, 147 Qualified Domestic Institutional Investor (QDII) funds, and 27 funds of other types.[6] We omit the last two fund classes from our analysis due to their small number of funds. The total assets under management was 13.7 trillion yuan (about 2.04 trillion US dollars) for the mutual fund industry. Of this, 6.5, 19.7, 12.6, and 60.5 percent were managed by equity, bond, mixed, and money market funds, respectively.

2.2   Fund and manager characteristics and investment data

A crucial detail of the mutual fund report data for our purposes is that it identifies each fund and its manager. This feature enables us to match the manager and fund characteristics, and investment history, to managers' expectations. This matched panel structure enables us to identify the causal effect of expectations on investment behavior and returns. We obtain reference information on the characteristics of both mutual funds and their managers from Wind and RESSET. We obtain monthly information on fund size (total net asset value under management), fund return, share redemptions (outflows), and share purchases (inflows). For money market funds, we observe information on the value of holding of assets with different maturities and their position in the repo market at a quarterly frequency. We observe fund expense ratios and their turnover ratio of equities semi-annually. At the fund level, we observe characteristics such as management fees, purchase and redemption fees, and geographic location. We also observe information on managers' age, education level, and professional experience.

2.3   Quantifying monetary policy forecasts

We map the qualitative information on expected monetary policy changes embedded in mutual fund reports to quantitative measures as follows.

Step 1: divide each report in the Market Outlook sections into semantic units that are separated by punctuation marks (commas, periods, and semicolons) and other indications that signal a pause in the narrative flow.

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[6]QDII are domestic financial institutions that are allowed to invest in offshore markets.

Step 2: keep the semantic units that are related to China's monetary policy. To do so, we judgmentally select a dictionary of keywords related to China's monetary policy, including

- nouns that indicate monetary policy (e.g., "interest rate" and "required reserve ratio");

- verbs that indicate the direction of monetary policy shifts (e.g., "increase" and "raise");

- adjectives that indicate the condition of monetary policy stances (e.g., "high" and "low");

- adverbs that indicate the probability or magnitude of monetary policy shifts (e.g., "strongly" and "potentially").

We next apply a rule that treats a semantic unit as potentially informative about future monetary policy change if it has at least one noun keyword and at least one verb or adjective keyword from our list. Note that some keywords reveal information about the *level* of the monetary policy stance rather than its change. We describe how we map the level to the change in the appendix. In addition to the dictionary of selection keywords, we also construct a list of disqualifying words such as "Federal Reserve" and "ECB" that in our judgment indicates that the semantic unit does not characterize the stance of Chinese monetary policy. Any semantic unit that contains these words is dropped. We then assign scores to the keywords defined in step 2. The nouns take score values from $\{-1, 1\}$.[7] The verbs and adjective take the score value from $\{-1, 0, 1\}$.[8] Lastly, the adverbs take the score value from $\{0, 0.5, 1\}$.[9]

Step 3: assign each semantic unit with a score within the set $[-1, 1]$ based on the combination of keywords in the semantic unit. The sign of a semantic unit's score depends on the combination of nouns and verbs, which reflects the direction of the expected monetary policy change (e.g., interest rate increases; tighten monetary policy):

$$\text{score(semantic unit k)} \begin{cases} > 0 & \text{if expects an tightening monetary policy} \\ = 0 & \text{if expects an unchanged monetary policy} \\ < 0 & \text{if expects a easing monetary policy} \end{cases}$$

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[7]For example, score("interest rate") $= -1$, score("money supply") $= 1$.
[8]For example, score("decrease") $= 1$, score("increase") $= -1$, score("same") $= 0$.
[9]For example, score("strongly") $= 1$, score("mildly") $= 0.5$, score("unlikely") $= 0$.

The absolute value of the score depends on the adverbs, which reflect either the degree of certainty or the magnitude of the expected monetary policy change (e.g., possibly; mildly); higher certainty or magnitude is assigned a larger absolute score. Either type of adverb signals certainty about a nonzero move in that direction, which is what we ultimately test.[10]

Step 4: compute the mean score across the semantic units within each report, denoted as $E_t^i(\Delta mp_{t+1})$ for manager i in period t. By construction, $E_t^i(\Delta mp_{t+1}) \in [-1, 1]$. The sign of $E_t^i(\Delta mp_{t+1})$ indicates the expected direction of monetary policy change in period $t+1$ compared to the monetary policy stance in period t:

$$
E_t^i(\Delta mp_{t+1}) \begin{cases} > 0 & \text{if manager i expects an tightening monetary policy} \\ = 0 & \text{if manager i expects an unchanged monetary policy} \\ < 0 & \text{if manager i expects a easing monetary policy} \end{cases}
$$

$E_t^i(\Delta mp_{t+1})$ incorporates the adverbs (e.g. "possibly", "strongly") across these semantic units, and thus we expect its absolute value to reflect the level of certainty and expected magnitude of the monetary policy change.[11]

The data set has 88,908 quarterly reports, of which 18,184 have a valid forecast score. Of this total, 2,497, 6,156, 6,916, and 2,615 are reported by managers of equity, bond, mixed, and money market funds, respectively. Table 1 reports the summary statistics of forecast score and a dummy variable for participation which is equal to one if a report has a valid forecast score.[12]

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[10] In our algorithm, adverbs that imply either a higher probability or a larger magnitude are both assigned a bigger number. Although we recognize that probability and magnitude have different economic meanings, for simplicity we don't distinguish between the two. Our approach is reasonable if what matters most is the expected change in monetary policy, which is the product of probability and magnitude. For example, in the context of an interest rate cut, we assign the same score to an adverb that reflects high probability as an adverb that reflects large magnitude, because both imply that the expected cut in the interest rate is relatively large.

[11] It is worth noting that managers use language in individual-specific ways. Therefore, the absolute value of $E_t^i(\Delta mp_{t+1})$ should be compared within manager, not across managers, thus making it critical to control for individual clusters when computing standard errors.

[12] To gauge the performance of the algorithm, we randomly drew a set of reports from the database and subjectively assigned numerical forecast scores to those reports and compared to the result of our algorithm. We thus verified that our objective algorithm was equipped to operate as intended.

Table 1: Monetary policy forecast scores: summary statistics

	Obs.	Mean	Std.	Min	Median	Max
Forecast Score	18193	-0.12	0.64	-1.00	0.00	1.00
Participation	88908	0.20	0.40	0.00	0.00	1.00

Summary statistics of the monetary policy forecast score and dummy for forecast participation across all funds.

3   Consensus forecast

We assess accuracy of mutual fund managers' beliefs each quarter by comparing their consensus forecast (i.e., the average across managers) to the subsequent shift in actual monetary policy. Mutual fund managers have strong incentives to form accurate expectations about monetary policy. First, monetary policy directly shifts the supply of and demand for credit, which influences the interest rates that determine the yield of mutual funds' portfolio. Second, monetary policy affects risk-free rates, which are used to discount future cash flows. Third, Chinese monetary policy can have further effects on asset prices through regulatory channels. For example, the issuing rates of corporate bonds cannot be 40 percent higher than benchmark deposit rates. Mutual fund managers also have incentives to report their expectations correctly as potential fund customers might use it to gauge their managerial skill. Table B6 in the appendix shows that the accumulative growth in fund size is positively correlated with the accuracy of managers' monetary policy expectation.

We compute the consensus forecast, denoted as $E_t\left(\Delta mp_{t+1}\right)$, as the mean of forecast scores across managers in each quarter:

$$E_t\left(\Delta mp_{t+1}\right) = \frac{\sum_{i=1}^{N_t} E_t^i\left(\Delta mp_{t+1}\right)}{N_t},$$

N_t is the number of reports with a forecast score in period t.[13]

By construction, the consensus forecast $E_t\left(\Delta mp_{t+1}\right)$ takes a value between -1 and 1. A positive (negative) value indicates that, on average, managers expect an tightening (easing) of monetary policy. The consensus forecast is zero if, on average, managers expect monetary policy to be unchanged relative to the current period. The absolute value of the consensus forecast reflects the perceived probability of monetary policy change.

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[13]We do not consider the median forecast as it is discretely concentrated in a few values such as -1, 0 and 1.

Our constructed consensus forecast is similar to the robust consensus measure proposed by Chiang et al. (2019), who showed that even when the level of individual forecasts is observed, the fraction of forecasts with the same sign is a more robust estimate of the consensus belief than the mean of the level of individual forecasts.

Figure 1 plots the consensus forecast (the solid line) along with the 25- and 75-percentiles (the dashed lines). The figure exhibits strong variation in the consensus forecast over time, reflecting the frequent and systematic revision of monetary policy expectations. The wide inter-quartile range reflects large cross-sectional variation in monetary policy expectations.

Figure 1: Consensus forecast and disagreement
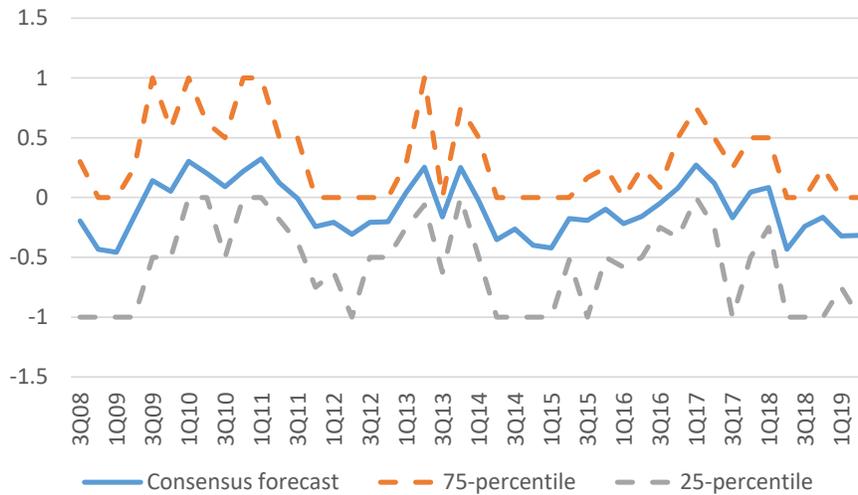
The solid line is the consensus forecast, measured as the mean of forecast scores across managers. The dashed lines are the 25- and 75-percentiles of forecast scores.

3.1 Measuring China's monetary policy stance

To compare the constructed monetary policy expectation measures to realized policy, we construct a Chinese monetary policy index, denoted as Δmp_t. Like other central banks, the PBoC (People's Bank of China) uses a combination of monetary policy instruments to achieve its economic targets. These include the market-based tools commonly used in advanced economies, such as open market operations and central bank lending, as well as others less actively used elsewhere, such as the required reserve ratio. The PBoC also deploys levers with more direct effects on lending markets, such as administrated benchmark interest rates for deposits and retail lending and window guidance for retail bank lending. The benchmark interest rates impose

a ceiling for deposit rates and a floor for lending rates.[14] For example, in 2012, the deposit rates were not allowed to surpass 1.1 times the benchmark deposit rate; while the lending rates could not be lower than 0.7 times the benchmark lending rate.

A popular viewpoint, as argued by Chen et al. (2018a), is that M2 growth has been the unique intermediate target of PBoC. Thus this target could be considered a direct measure of China's intended path of monetary policy. The most actively used monetary policy instruments in the 2000s and early 2010s were the required reserve ratio, the benchmark deposit rate, and the lending rate (Chen et al. (2012)). However, as argued by Chang et al. (2015), (raising) the required reserve ratio has occasionally been used to finance PBoC's foreign reserve accumulations, which makes it a noisy signal of PBoC's monetary policy intentions. More recently, it is believed that other monetary policy instruments such as central bank repo rates have become increasingly important in signaling the PBoC's policy intentions. Following the spirit of Romer and Romer (2004), Sun (2018) measures PBoC policy intentions with a narrative approach, by analyzing two official documents: the "Press Release" on quarterly meetings of the Monetary Policy Committee (MPC) and China Monetary Policy Report (a quarterly executive report of monetary policy of China). Sun (2018) finds that none of the quantitative policy measures (such as the M2 growth rate) are strongly correlated with her constructed policy indicator, which reflects the opaque nature of China's monetary policy stances.

Our research focuses on studying how mutual fund managers form expectations about monetary policy rather than identifying the importance and effectiveness of different policy instruments or measuring the exact policy intentions of PBoC. However, it is interesting to see how they frame their references to monetary policy when it entails such a wide variety of instruments. We find that when mutual fund managers mention specific monetary policy instruments, rather than using general terms such as "monetary policy", they refer mostly to the required reserve ratio and the benchmark deposit rate and lending rate. Specifically, "interest rate" and "reserve requirement" occur 28,479 and 9,188 times, respectively, while "money supply" and "M" occur only 294 and 1,386 times. This fact implies that interest rates and required reserve ratio are the key instruments investors look to for judging the stance of monetary policy during our sample. Accordingly, we construct a measure of shifts in Chinese monetary policy from the

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[14]Before 2004, the PBoC restricted both deposit and lending rates to a corridor around the corresponding benchmark interest rate, but it has not imposed any deposit rate floor or lending rate ceiling since then.

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direction of change in the required reserve ratio, the benchmark deposit interest rate, and the benchmark lending interest rate. We define an easing of monetary policy as a decline in either the required reserve ratio or at least one of the benchmark policy interest rates, and conversely for a tightening of monetary policy. Often in our quarterly sample, all three of these monetary policy instruments are unchanged from the previous quarter, introducing the third possible outcome for our discrete indicator of policy direction (unchanged).

The monetary policy index is defined as

$$\Delta mp_t = \begin{cases} 1 & \text{if monetary policy is tightening} \\ 0 & \text{if monetary policy is unchanged} \\ -1 & \text{if monetary policy is easing} \end{cases}$$

Figure 2 plots the monetary policy index Δmp_t with the required reserve ratio (orange line) and the benchmark interest rates (blue and purple lines). The darkly and lightly shaded columns indicate the periods of tightening and easing monetary policy, respectively. The figure shows that monetary policy eased at the end of 2006. The reason for this at that time was a rising inflation rate, initially triggered by a hike in food prices. Despite the tightening, the inflation rate remained high, while the GDP growth rate started to flatten in 2008 Q1, and made the PBoC uncertain about the appropriate policy stance. In 2008 Q3, the global financial crisis started. Chinese officials were strongly concerned as exports comprised 36% of Chinese GDP. As a result, the PBoC immediately eased monetary policy in 2008 Q3.

While the expansionary policy in 2008 and 2009 successfully prevented the Chinese economy from entering an economic recession when most other countries did, it also greatly inflated asset prices, particularly housing. Concerned with the rapidly increasing asset prices and potential inflation, the PBoC increased the required reserve ratio in 2010 Q1 and continued to tighten the money supply until 2011 Q3. Due to this tightening, economic growth, particularly investment growth, flattened significantly. Chinese officials started to worry about the possibility of a hard landing, particularly given that the global economy was still in a gloomy state. Consequently, the PBoC lowered the required reserve ratio in 2011 Q4. A new round of monetary easing started in 2014 Q4 when real GDP growth declined to 7.1%, compared to more than 10% in 2011 Q1, below the official target of 7.5% set at the beginning of the year. The most recent monetary

easing started in 2018 Q3 as China faced an increasingly challenging economic outlook, due to declining GDP growth and a series of tariff announcements and other restrictions on trade between the United States and China.[15]

Figure 2: Monetary policy in China
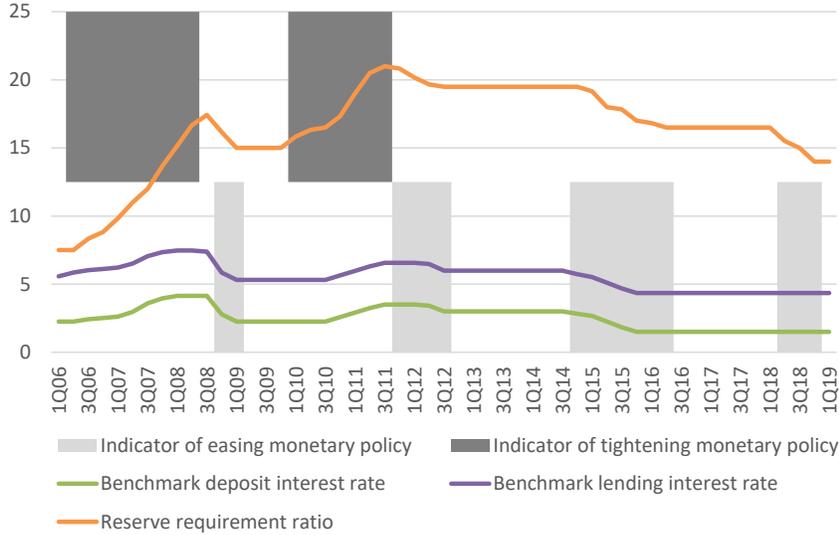
The green line is the benchmark 3-month deposit interest rate. The purple line is the benchmark 3-month lending interest rate. The orange line is the required reserve ratio. The shaded columns are the monetary policy index. The darkly shaded columns indicate tightening monetary policy periods. The lightly shaded columns indicate easing monetary policy periods. Monetary policy is unchanged in the periods with no columns.

3.2   Predictive power of the consensus forecast

Figure 3 displays the consensus forecast $E_{t-1}(\Delta mp_t)$ (solid line) along with the monetary policy index Δmp_t (shaded columns). The figure reveals that mutual fund managers' forecasts have strong predictive power, particularly considering the text-based and inferential nature of the data set. Our consensus forecast index leads shifts in monetary policy: the turning points of monetary policy, indicated by the edges of the shaded columns, are usually well-anticipated by mutual fund managers. For example, China eased monetary policy in 2014 Q4, yet the consensus forecast started rising in 2014 Q1, three quarters before implementation of the policy. It is also interesting to note that mutual fund managers occasionally made incorrect forecasts, indicated by large deviations of the consensus forecast from actual monetary policy shown in Figure 3. For example, in 2013 Q2 and 2017 Q2, the consensus forecast rose from a positive to a negative

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[15]Chow and Perkins (2014) provides an extensive review of China's historical monetary policy stances.

value, meaning that mutual fund managers at that time anticipated an easing of monetary policy, while actual monetary policy remained unchanged. Both mispredictions made by the mutual fund managers are understandable in hindsight. In 2013 Q2, the financial industry was confronted with liquidity pressure. The liquidity shortage was amplified by rumors that two large commercial banks might default on their debt. As a result, 1-month Shibor rose to 9.7% on June 21 from 4.5% on May 21. Market participants expected the PBoC to ease monetary policy to mitigate the liquidity shortage, but it decided to maintain the current monetary policy stance. What happened in 2017 Q2 was similar. The financial market experienced a shortage in liquidity caused by the implementation of a new asset management regulatory rule, which was enforced to restrain the size of the shadow banking sector. While market participants expected the PBoC to assist the market with an easing of policy, their expectations came to nothing.

Figure 3: Consensus forecast and monetary policy index
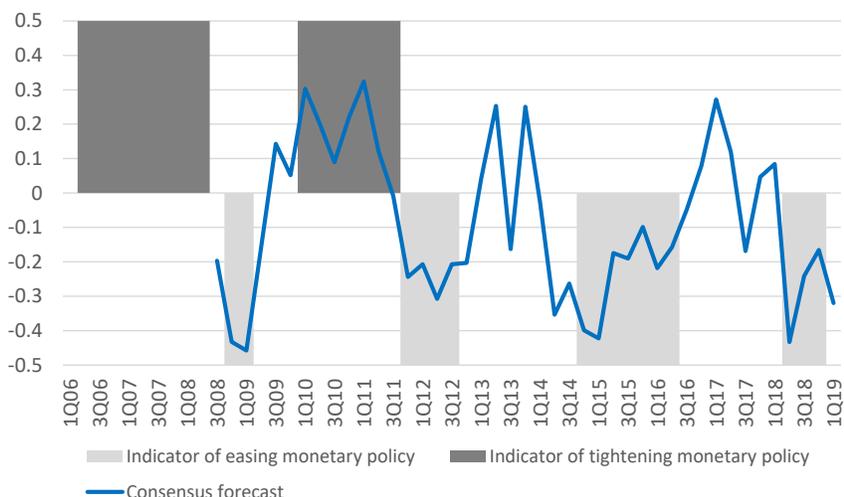
The solid line is the consensus forecast, measured as the mean of forecast scores across managers. The shaded columns are the monetary policy index. The darkly shaded columns indicate periods of tightening. The lightly shaded columns indicate easing periods. Monetary policy is unchanged in periods with no columns.

Column (1) of Table 2 reports the results of univariate regressions of the monetary policy index on the consensus forecast. As shown in Column (1), monetary policy is well predicted by the consensus forecast in the previous quarter, confirming the predictive nature of the consensus forecast revealed by Figure 3. The explanatory power of the consensus forecast is large, with $R^2 = 0.42$. As shown in Column (2) of Table 2, the consensus forecast remains statistically significant when the regression includes the monetary policy indicator in the previous period.

Table 2: Predicting shifts in monetary policy

	Consensus forecast		Taylor rule		IFR		All	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$E_t\left(\Delta mp_{t+1}\right)$	2.04***	0.83*					1.54***	0.86*
	(5.39)	(1.70)					(3.35)	(1.68)
Δy_t			25.10***	11.94*			14.19**	8.68
			(3.92)	(1.85)			(2.15)	(1.31)
$\Delta \pi_t$			11.91	-0.96			-3.87	-6.33
			(1.11)	(-0.10)			(-0.36)	(-0.63)
$F_{t,6}^{12} - i_{t,6}$					1.79**	0.74	1.17*	0.93
					(2.10)	(1.15)	(1.69)	(1.41)
Δmp_t		0.52***		0.56***		0.68***		0.41**
		(3.39)		(3.87)		(6.04)		(2.39)
Constant	-0.04	-0.03	-2.16***	-1.01*	-0.51***	-0.19	-1.38***	-0.87*
	(-0.40)	(-0.36)	(-4.19)	(-1.90)	(-2.88)	(-1.37)	(-2.69)	(-1.66)
R^2	0.42	0.53	0.38	0.55	0.08	0.50	0.51	0.57
Observation	43	43	43	43	43	43	43	43

The dependent variable is the monetary policy index in the subsequent quarter, Δmp_{t+1}. The independent variable $E_t\left(\Delta mp_{t+1}\right)$ is the consensus forecast. Δy_t is the growth rate of real GDP per capita. $\Delta \pi_t$ is the growth rate of inflation. $F_{t,6}^{12} - i_{t,6}$ is the the spread between the implied 6-12 month forward rate and 6-month treasury rate. Data is quarterly from 2008 Q3 to 2019 Q1. t-statistics are in the parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

3.3 Manager consensus forecast compared to the Taylor rule

To further evaluate the predictive power of the consensus forecast, we compare the consensus forecast with both market-based and model-based alternatives, as well as other survey data. We first compare the consensus forecast with a modified Taylor rule. Suppose the short-term interest rate is determined by the following equation:

$$i_t = i^* + \beta y_t + \gamma \left(\pi_t - \pi^*\right) + \nu_t, \tag{1}$$

where y_t is the real GDP per capita, π_t is the inflation rate, π^* is the inflation rate target, and ν_t is the monetary policy shock.

Our first step is to examine to what extent shifts in China's monetary policy are explained by the modified Taylor rule. Specifically, we estimate the following regression model:

$$\Delta mp_t = \alpha + \rho \Delta mp_{t-1} + \beta \Delta y_t + \gamma \Delta \pi_t + \epsilon_t$$

Both β and γ are expected to be positive: a higher GDP growth rate or inflation rate induce the central bank to tighten policy. Estimation results reported in Table 3 indicate that the coefficients are of the correct signs, that 46% of China's monetary policy shifts can be explained

by the Taylor rule, and that 63% can be explained by the Taylor rule augmented with the lagged monetary policy shifts. This result echoes an earlier finding in the literature (from before the beginning of our sample period) that China's monetary policy was well-explained by the Taylor rule (Xie and Luo (2002)).

Table 3: Explanatory power of the Taylor rule

	(1)	(2)
Δy_t	22.18***	9.54*
	(3.83)	(1.72)
$\Delta \pi_t$	24.76**	22.95***
	(2.54)	(8.04)
Δmp_{t-1}		0.51***
		(4.47)
Constant	-1.94***	-0.84*
	(-4.17)	(-1.84)
R^2	0.46	0.63
Observation	43	43

The dependent variable is the monetary policy index. $\Delta \hat{y}_t$ is the growth rate of real GDP per capita. $\Delta \pi_t$ is the change in the inflation rate. Δmp_{t-1} is the lagged monetary policy index. Data is quarterly from 2008 Q3 to 2019 Q1. t-statistics are in the parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Next we examine how much the modified Taylor rule *predicts* the stance of monetary policy. Ideally we want to estimate:

$$\Delta mp_{t+1} = \alpha + \rho \Delta mp_t + \beta E_t \left(\Delta y_{t+1} \right) + \gamma E_t \left(\Delta \pi_{t+1} \right) + \epsilon_{t+1},$$

Unfortunately, we do not observe $E_t \left(\Delta \hat{y}_{t+1} \right)$ and $E_t \left(\Delta \pi_{t+1} \right)$ as forecast indices constructed by government agency and universities are only available after 2015. Hence, we estimate the following regression model instead:

$$\Delta mp_{t+1} = \alpha + \rho \Delta mp_t + \beta \Delta y_t + \gamma \Delta \pi_t + \epsilon_{t+1}.$$

The results are reported in columns (3) and (4) of Table 2. By comparing column (3) with column (1), we see that the predictive power of the modified Taylor rule is lower than that of the consensus forecast. According to Column (4) of Table 2, when the Taylor rule is augmented with an AR(1) term, this model mildly outperforms the joint predictive power of the consensus forecast similarly augmented with lagged monetary policy.

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3.4 Managers consensus forecast and the implied forward rate

Next we compare the predictive power of the consensus forecast with 6-12 implied forward rate.[16] We obtain the 6-12 month forward rate $F_{t,6}^{12}$ from:

$$(1 + i_{t,12})^2 = (1 + i_{t,6}) \left(1 + F_{t,6}^{12}\right),$$

and estimate:

$$\Delta mp_{t+1} = \alpha + \eta \left(F_{t,6}^{12} - i_{t,6}\right) + \epsilon_{t+1},$$

where $i_{t,6}$ and $i_{t,12}$ are six- and twelve-month treasury rates, respectively. $F_{t,6}^{12} - i_{t,6}$ is the expected change of the six-month Treasury rate in the next two quarters.

The coefficient η is expected to be positive: an expected increase in the interest rate implies a tightening monetary policy in the future. The results are reported in Column (5) of Table 2. While the 6-12 month implied forward rate does have some significant predictive power, a comparison with column (1) shows that it does not match the predictive power of the consensus forecast. Moreover, as is apparent from Column (6) of Table 2, the joint predictive power of the implied forward rate and an AR(1) term is less than that of the corresponding combination of the consensus manager forecast and current monetary policy index in column (2). The superior predictive power of the consensus forecast might be due to the fact that most fund managers were not prominent, thus it is less likely that the consensus views would move market prices. Moreover, as the reports were aimed at potential fund customers, they may not have been noticed much by other investors.[17] An alternative explanation is that the dependent variable, the monetary policy index, is constructed with variables that are most concerned by the money managers. The implied forward rate may be more directly related to some other aspects of monetary policy stances.

We have shown that our constructed consensus forecast has greater predictive power than the modified Taylor rule and the implied forward rate. Does the consensus forecast provide any better predictive information beyond these? Columns (7) and (8) of Table 2 report the results for the multi-variate regression of monetary policy index on the consensus forecast and

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[16]Table B2 shows the results for both 6-12 and 3-6 implied forward rates.

[17]With a cross-sectional median of zero most of the time, other investors have to read a lot of reports to infer the consensus view.

other macroeconomic variables. As shown in Column (7), the coefficient of $E_t\left(\Delta mp_{t+1}\right)$ is positive and statistically significant. The GDP growth rate and spread between the implied 6-12 month forward rate and 6-month treasury rate are also significant. As shown in Column (8), as an AR(1) term is included in the regression, only the consensus forecast remains statistically significant. The results show that the consensus forecast provides more predictive power beyond the selected macroeconomic variables.

3.5   Forecasts of mutual fund managers and commercial bankers

We turn next to the Survey of Commercial Bankers, conducted by the PBoC since 2004. Like our constructed manager consensus forecast measure, the survey is intended to elicit the near-term expectations of an important set of market participants. Each quarter, this survey asks commercial bankers for their assessments of the current economic environment as well as their near-term expectations about the economy.[18] For their expectations about monetary policy in the next quarter, the bankers can choose from the following three options: "to be eased," "to be tightened," and "to be unchanged." The distribution of the answers is published on the PBoC website.[19] We construct the consensus forecast for commercial bankers using the same ternary structure as for our fund manager expectations: $E_t\left(\Delta mp_{t+1}^{banker}\right)$, as:

$$E_t\left(\Delta mp_{t+1}^{banker}\right) = s_t^{tight} - s_t^{ease},$$

where s_t^{tight} and s_t^{ease} are the fraction of bankers who expect monetary policy to be tightened and eased in the next quarter, respectively.

Figure 4 plots the consensus forecast for commercial bankers (the blue line, discontinuous due to missing data). Note that one would get exactly the same consensus forecast if we compute the mean of the forecast scores, with $score$ ("to be eased") $= -1$, $score$ ("to be tightened") $= 1$, and $score$ ("to be unchanged") $= 0$, which is how we construct the consensus forecast for mutual fund managers. Thus, the two consensus forecasts are comparable to each other. The key difference

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[18]The survey covers all commercial bank branches beyond the city-level. In 2019 Q1, about 3,200 bankers were surveyed.

[19]The information on the distribution of the answers is sometimes incomplete, in which case we interpolate the distribution as much as we can. Otherwise, we treat them as missing observations. An additional drawback is that this question is not asked in every quarter.

between the consensus forecast for the commercial banker and the mutual fund managers, as shown by Figures 3 and 4, is that the bankers' forecast is much less forward-looking. Specifically, the turning of the consensus forecast for commercial bankers usually lags the shift of monetary policy by a few quarters. In contrast, the turning point of the consensus forecast for mutual fund managers often leads the shift of monetary policy by a few quarters.

The comparison suggests that commercial bankers' get less of a payoff from the accuracy of their forecasts of monetary policy, and consequently they would have less incentive to invest resources in making an accurate forecast than do mutual fund managers. One possible explanation is that the survey responses offer no scope for signaling proficiency to bank customers, because the PBoC survey report includes only summary statistics on the survey results, with no identification of the participating bankers.

Column (1) of Table 4 reports the results of regressions of monetary policy index on the consensus forecast for commercial bankers. The coefficient on $E_t\left(\Delta mp_{t+1}^{banker}\right)$ is positive and statistically significant, which implies the predictive nature of the variable. The R^2 is estimated as 0.17, which is significantly lower than the R^2 from the mutual fund managers' consensus forecast (0.42) as reported in Column (1) of Table 2. When an AR(1) term is included in the regression, Column (2) of Table 4, the consensus forecast for commercial bankers is not statistically significant.[20]

Table 4: Bankers' consensus forecast and monetary policy

	(1)	(2)
$E_t\left(\Delta mp_{t+1}^{banker}\right)$	1.03***	0.28
	(2.74)	(1.22)
Δmp_t		0.80***
		(8.40)
Constant	-0.17	-0.01
	(-1.46)	(-0.10)
R^2	0.17	0.74
Observation	34	34

The dependent variable is the monetary policy index in the subsequent quarter, Δmp_{t+1}. The independent variable $E_t\left(\Delta mp_{t+1}^{banker}\right)$ is commercial bankers' consensus forecast. Δmp_t is the monetary policy index. Data is quarterly from 2008 Q3 to 2019 Q1. t-statistics are in the parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

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[20]In the appendix, Table B3 shows that the consensus forecast for commercial bankers have poor predictive power for different measures of monetary policy stances.

Figure 4: Consensus forecast, commercial banker survey
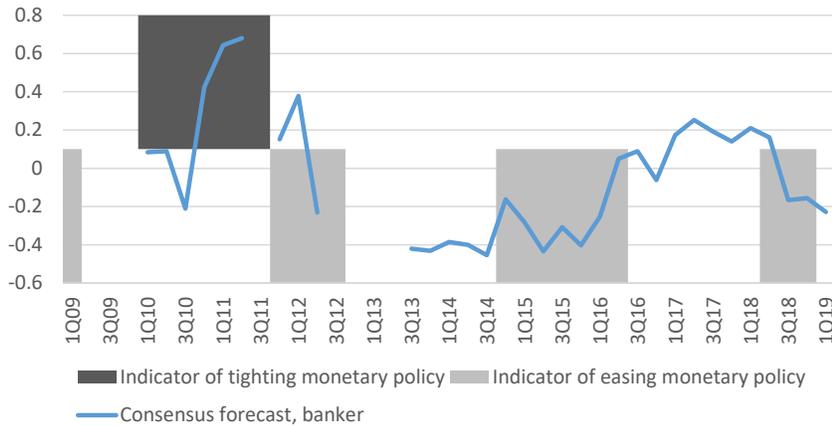
Time series from 2009 Q1 to 2019 Q1: the blue line plots the consensus forecast of monetary policy for commercial bankers.

4 Monetary policy expectations and maturity adjustment

In this section, we explore how fund managers' investment choices take into account their monetary policy expectations. We focus on money market funds, because their maturity structure is observed, and standard theories provide a clear prediction on how they should adjust maturity according to monetary policy expectations. Specifically, when interest rates fall, fixed-income security prices rise, and vice versa. As maturity increases, the fixed-income security price becomes more sensitive to interest rate changes. Money market fund managers should lengthen (shorten) the maturity of their investments when they expect rates to fall (rise). As long as their forecasts are not already fully reflected in the term structure of money-market yields, anticipating changes in interest rates will allow money fund managers to delay (accelerate) their rolling of maturing instruments into lower-yielding (higher-yielding) replacements. Another theory of maturity adjustment is the liquidity risk effect of monetary policy as argued by Jensen and Meckling (1976). Specifically, a lower interest rate (an easing of monetary policy) induces customers to withdraw money from money market funds for other types of investments. Therefore, expecting an easing monetary policy, under the pressure of fund outflow, money market fund managers reach for yield and take more liquidity risk by increasing their holdings of long-term fixed-income assets.[21]

Similar to money market funds in other countries, money market funds in China invest in

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[21]Although we do not have comparable information on the portfolio duration of bond funds, it is clear that bond fund managers also should lengthen (shorten) duration when they expect bond yields to decline (increase).

relatively short-term, highly rated securities and are considered to be low-risk and low-return products with high liquidity. The weighted-average maturity is constrained below 120 days. For each money market fund, we denote the weight of holding of assets in maturity interval κ at the end of period t as $w_{t,\kappa}^i$, $\kappa \in \{[0, 30], (30, 60], (60, 90], (90, \ ]\}$. For example, $w_{t,[0,30]}^i$ measures the weight of assets with maturities equal to or shorter than 30 days.

We characterize the maturity structure of a money market fund at the end of period t as:

$$w_t^i = \left(w_{t,[0,30]}^i, w_{t,(30,60]}^i, w_{t,(60,90]}^i, w_{t,(90, \ ]}^i \right)$$

Table 5 displays summary statistics for the weight of holding of assets with maturities in each interval. As shown by Column (2), money market funds invest most heavily in assets with maturities less than 30 days. On average, money market funds invest about half of their capital in assets with maturities longer than 60 days. Therefore, we categorize an asset as long-term if its maturity is longer than 60 days; an asset is short-term if its maturity is equal to or shorter than 60 days. The weight of long-term and short-term asset holding by fund i is denoted as $w_{t,l}^i = w_{t,(60, \ ]}^i$ and $w_{t,s}^i = w_{t,[0,60]}$, respectively.

Table 5: Summary statistics of maturity structure for money market funds

	Obs.	Mean	Std.	Median	Min	Max
[0,30]	6004	0.369	0.227	0.331	0.00	1.00
[30,60]	6004	0.131	0.107	0.114	0.00	1.00
[0,60]	6004	0.500	0.222	0.483	0.00	1.00
(60,90]	6004	0.218	0.171	0.187	0.00	1.00
(90,]	6004	0.282	0.173	0.277	0.00	0.95
(60,]	6004	0.500	0.222	0.517	0.00	1.00

Each row reports the summary statistics of weight of holding of assets in the corresponding maturity interval. $[0, 30)$ is maturity less than or equal to 30 days. $[30, 60)$ is maturity longer than 30 days and less than or equal to 60 days. $[0, 60)$ is maturity less than or equal to 60 days. $[60, 90)$ is maturity longer than 60 days and less than or equal to 90 days. $[90,]$ is maturity longer than 90 days.

We test the prediction that money market funds adjust maturity structure according to monetary policy expectations, with the following panel regression, separately for each maturity interval κ:

$$w_{t,\kappa}^i = \alpha + \beta E_t^i \left(\Delta m p_{t+1} \right) + \delta X_{t-1}^i + \phi_t + \gamma^i + \epsilon_t^i,$$

where the dependent variable $w_{t,\kappa}^i$ is the weight of holding of assets with maturity κ in percentage point; $E_t^i \left(\Delta m p_{t+1} \right)$ is the forecast score; X_{t-1}^i includes a set of fund characteristics including

fund size, age, and net inflows; ϕ_t and γ^i are time and fund fixed effects, respectively. The coefficient of interest is β, expected to be positive for small κ and negative for large κ.[22]

The regression results are reported in Table 6. Each column presents results when the dependent variable is the change of weight of asset holding in the maturity interval shown on the top row. The main conclusion is that expecting an easing monetary policy in the next period, managers tend to substitute assets whose maturities are less than 60 days with assets whose maturities are more than 60 days. Analogously, expecting a tightening monetary policy in the next period, managers tend to substitute assets whose maturities are more than 60 days with assets whose maturities are less than 60 days.[23] Importantly, by controlling for both fund and time fixed-effects, the regressions identify the *causal* effect of monetary policy expectations on portfolio adjustment.[24]

The fact that money market fund managers act on their words confirms that our constructed forecast scores accurately reflect managers' expectations, and that the mutual fund managers take their own words seriously. Moreover, our findings provide direct evidence that monetary policy expectations serve as an important driver of investors' portfolio choice. A sudden revision of monetary policy expectation among market participants can induce systematic adjustments of portfolio holdings, and can potentially result in financial turmoil (such as seen in the "taper tantrum" during the summer of 2013, see Feroli et al. (2014) and references therein).

5   Characterising superior forecasters

We construct an index of forecast accuracy and then identify the characteristics of the superior funds and managers. We use a dummy variable $correct_t^i$, which is equal to one if the manager's forecast is in the same direction as the realization of monetary policy, to measure the correctness of a forecast:

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[22]As an alternative demonstration, Figure B1 in the appendix shows a positive relationship between the weighted average of short-term asset holding and the consensus forecast.

[23]The coefficient of forecast score in Column (3) is the inverse of that in Column (6), because we have that $w_{t,[0,60]}^i + w_{t,(60,]}^i = 1$.

[24]As asset prices are observable to all managers, the feedback effect of asset prices on expectations formation is ruled out by controlling for time-fixed effects. Hence, our estimation result cannot be driven by the possibility that managers form their expectations of monetary policy from the asset market. Similarly, the co-movement of maturity structure and $E_t^i(\Delta mp_{t+1})$ identified in the third specification cannot be driven by any aggregate variables or fund-specific characteristics.

Table 6: Holding Changes in Response to Beliefs in Monetary Policy

	(1) [0, 30]	(2) (30, 60]	(3) [0, 60]	(4) (60, 90]	(5) (90,]	(6) (60,]
Forecast Score	1.458	0.456*	1.914**	-0.750	-1.164*	-1.914**
	(1.61)	(1.70)	(2.03)	(-0.93)	(-1.92)	(-2.03)
Lag Log(Size)	-2.931***	-0.030	-2.961***	0.847**	2.114***	2.961***
	(-3.74)	(-0.08)	(-4.74)	(2.07)	(4.34)	(4.74)
Lag Age	-3.415**	-2.128**	-5.543***	2.393*	3.150***	5.543***
	(-1.96)	(-2.14)	(-3.51)	(1.78)	(2.68)	(3.51)
Lag Inflow	0.030	0.027	0.057	-0.034	-0.023	-0.057
	(0.28)	(0.35)	(0.51)	(-0.48)	(-0.39)	(-0.51)
Expense Ratio	-146.012	-183.401**	-329.414	-27.307	356.720***	329.414
	(-0.59)	(-2.02)	(-1.62)	(-0.26)	(2.89)	(1.62)
Fund FE	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Observation	2,142	2,142	2,142	2,142	2,142	2,142
R^2	0.038	0.008	0.055	0.010	0.043	0.055

The dependent variables are the proportions (in percentage point) of net asset value allocated in assets with each maturity interval. $[0, 30)$ is maturity less than or equal to 30 days. $[30, 60)$ is maturity longer than 30 days and less than or equal to 60 days. $[0, 60)$ is maturity less than or equal to 60 days. $[60, 90)$ is maturity longer than 60 days and less than or equal to 90 days. $[90,]$ is maturity longer than 90 days. *Lag Log(Size)* is the lagged logarithm of fund total net asset value. *Lag Age* is the lagged age of the fund measured in quarters. *Lag Inflow* is the lagged fund net inflow into the fund. Data is quarterly from 2008 Q3 to 2019 Q1. All standard errors are clustered at the fund level. t-statistics are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

$$correct_t^i = \begin{cases} 1 & \text{if } sign\left[E_t^i\left(\Delta mp_{t+1}\right)\right] = sign\left(\Delta mp_{t+1}\right) \\ 0 & \text{if } sign\left[E_t^i\left(\Delta mp_{t+1}\right)\right] \neq sign\left(\Delta mp_{t+1}\right) \end{cases}$$

We then measure a manager's forecast skill as the conditional mean of the forecast correctness in her reports:

$$correctness^i = \frac{\sum_{t=t_0^i}^{T^i} correct_t^i}{\sum_{t=t_0^i}^{T^i} parti_t^i},$$

where $correctness^i$ denotes manager i's forecast correctness; $correct_t^i$ is an indicator function of reporting a forecast which is consistent with the realization of monetary policy. t_0^i and T^i are the periods of entry and exit, respectively. A higher $correctness^i$ implies that the manager has a better forecast skill.

Next, we examine characteristics of the mutual funds and mutual fund managers who provide the most accurate forecasts and those who pay the most attention to monetary policy. We focus on: management fee, fund age, fund size, having a Ph.D. degree, years of asset management experience, fund being based in Beijing. Table 7 reports the summary statistics of these

variables.[25] Throughout the paper, we focus on mutual funds whose age is greater than two quarters and size is larger than one million yuan.

Table 7: Summary statistics of correctness and fund/manager characteristics

	Obs.	Mean	Std.	Median	Min	Max
Correctness	2905	0.412	0.316	0.400	0.00	1.00
Fees	3693	2.347	0.952	2.400	0.10	4.25
Log(Size)	4571	6.843	1.476	6.817	0.00	13.68
Age	4571	23.639	13.740	19.000	0.00	72.00
Ph.D.	4571	0.115	0.255	0.000	0.00	1.00
Experience	4571	10.640	3.002	10.167	2.00	23.00
Beijing	4571	0.133	0.340	0.000	0.00	1.00

This table reports summary statistics. *Correctness*, is the fraction of correct forecasts. *Fees* is the management fee of the fund. *Age* is the maximum age of the fund measured in quarters. *log(Size)* is the logarithm value of fund total net asset value measured in million yuan. *Ph.D.* is a dummy variable which is equal to one if the manager has a Ph.D. degree. *Experience* is the manager's asset management experience measured in years. *Beijing* is a dummy variable which is equal to one if the fund is based in Beijing. For the manager characteristics, if a fund has multiple managers, we compute the mean of the manager characteristics within the fund.

We regress forecast skill on fund and manager characteristics for the listed variable:

$$\text{correctness}^i = \alpha + \beta X^i + \text{fund type} + \epsilon^i,$$

where X^i is the fund and manager characteristics variable, and fund type is a vector of fund type dummies. Columns (1)-(7) of Table 8 report the results for univariate regressions. Column (8) reports results when all fund and manager characteristics are pooled in a single multi-variate regression. We find that managers who manage a larger fund have a better forecast record, implying a positive assortative matching between large funds and highly skilled managers. Fund age is also positively correlated with forecast accuracy, which suggests that skilled managers tend to work for long-established funds. Furthermore, mutual funds that provide better forecasts on average charge higher management fees (as a percent of net assets). Presumably, both fund size and management fees reflect the managerial skill perceived by the market. Managers with a Ph.D. degree turn out to be better forecasters, which is consistent with the fact that policy forecasting requires non-negligible resource input, as in the spirit of Grossman and Stiglitz (1980).[26] Unsurprisingly, professional experience significantly contributes to the accuracy. We

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[25]Figure B2 shows the cross-sectional distribution of forecast accuracy for each fund type.

[26]Our results contrast those of Berger et al. (2011), who found that forecasters with a Ph.D. degree did significantly worse at forecasting Fed policy. Instead, these authors found that past working experience at the Board of Governors was associated with forecasting performance.

also find that Beijing-based fund managers, who might have a closer connection with PBoC and the central government, have significantly higher forecast accuracy.[27] Pooling all fund and manager characteristics in a multi-variate regression, as in Column (8), we find that fund size, management fees, having a Ph.D., professional experience, and locating in Beijing remain statistically significant.

Table 8: Forecast skill and manager-fund characteristics

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Log(Size)	0.021***						0.010*
	(4.74)						(1.76)
Age		0.002***					0.000
		(4.20)					(0.57)
Fees			0.077***				0.061***
			(4.34)				(3.23)
Ph.D.				0.057**			0.049*
				(2.23)			(1.69)
Experience					0.006***		0.008***
					(2.88)		(3.57)
Bejing						0.032*	0.048***
						(1.90)	(2.71)
Constant	0.267***	0.366***	0.232***	0.405***	0.346***	0.404***	0.109*
	(8.43)	(24.91)	(5.50)	(37.16)	(14.27)	(36.81)	(1.85)
Type FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observation	2,905	2,905	2,425	2,944	2,944	2,944	2,389
R^2	0.012	0.011	0.011	0.007	0.008	0.006	0.022

The dependent variable, *Correctness*, is the fraction of correct forecasts, measured in percentage point. *Fees* is the management fee of the fund. *Age* is the maximum age of the fund measured in quarters. *Log(Size)* is the logarithm value of fund total net asset value in million yuan. *Ph.D.* is a dummy variable which is equal to one if the manager has a Ph.D. degree. *Experience* is the manager's asset management experience measured in years. *Beijing* is a dummy variable which is equal to one if the fund is based in Beijing. For the manager characteristics, if a fund has multiple managers, we compute the mean of the manager characteristics within the fund. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

6   Forecast skill and fund performance

6.1   Cross-sectional results for fund performance

We follow the literature by measuring mutual fund performance as *alpha* estimated from a Fama-French three-factor model or a CAPM model for equity funds, bond funds, and mixed

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[27]This finding is similar to that of Berger et al. (2011). It also relates to the literature on information economics. For example, Li et al. (2011) find that Chinese analysts' earnings forecasts are more accurate when the companies are based in the analysts' home town. Another example is Yang et al. (2019) who find that Chinese analysts' earnings forecasts are more accurate and less dispersed for companies located along the high-speed railway network.

funds.[28] The fund performance for money market funds is measured as the fund return in excess of the risk-free rate. Table 9 reports the summary statistics of before-fee and after-fee unadjusted average returns.[29]

Table 9: Summary statistics of fund performance

	Obs.	Mean	Std.	Median	Min	Max
Panel A: Before Fee						
Equity	57066	0.616	6.915	0.531	-49.85	47.93
Bond	73334	0.455	1.576	0.368	-35.18	47.66
Hybrid	145354	0.863	5.971	0.516	-49.84	45.68
MMF	26552	0.302	0.095	0.297	0.01	3.21
Panel B: After Fee						
Equity	57066	0.522	6.914	0.436	-50.00	47.78
Bond	73334	0.399	1.576	0.317	-35.25	47.63
Hybrid	145354	0.735	5.970	0.401	-49.99	45.54
MMF	26552	0.272	0.095	0.268	0.00	3.18

This table reports the summary statistics of before-fee and after-fee unadjusted average returns for equity funds, bond funds, mixed funds, and money market funds. All returns are monthly in percentage points.

To test whether superior forecast skill (i.e., a high $correct^i$) associates with better fund performance, we estimate the following regression model for each fund type:

$$\text{perform}^i = c_0 + c_1 \text{correctness}^i + X^i + \epsilon^i, \tag{2}$$

where perform^i is yearly risk-adjusted return in percentage points, $correct^i$ is the measure of forecast skill, and X^i is a set of control variables. The coefficient of interest is c_1. Tables (10) (11) (12) and (13) report the results for money market funds, bond funds, mixed funds and equity funds, respectively.

As reported in Table 10, forecast skill ($correctness^i$) is positively and significantly correlated with money market fund performance. The result is robust to including various controls. Managers who forecast correctly all the time (i.e., $correctness^i = 1$) outperform the managers who forecast incorrectly all the time (i.e., $correctness^i = 1$) by 0.20- and 0.23-percent on a yearly

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[28]Following Blake et al. (1993) and Dahlquist and Soderlind (2000), to calculate CAPM *alpha*s, we regress fund excess returns on stock market return, bond market return, and both market returns for equity funds, bond funds, and mixed funds, respectively. To calculate Fama-French *alpha*s, in addition to the market returns, we add term structure and default risk factors as regressors for bond funds; size and value factors for equity funds; and all the additional factors for mixed funds.

[29]Table B1 in the appendix reports the summary statistics of risk-adjusted returns. Choi et al. (2016) documents the general facts about China's mutual fund industry. Leippold and Rueegg (2020) studies the fund performance for the world-wide mutual fund industry.

basis when fund performance is measured after-fee and before-fee, respectively. The estimates are economically large considering that the distribution of money market fund performance is so concentrated, as shown in Table 9. The results are consistent with the fact that monetary policy is a crucial factor in the money market, and that the skill of correctly anticipating monetary policy shift is rewarded. We also find stronger performance for larger funds, consistent with economies of scale reported by Domian and Reichenstein (1998) and by Dahlquist and Soderlind (2000) for U.S. and Swedish money market funds, respectively.

As reported in Table 11, forecast skill is also positively and significantly related to the performance of bond funds when it is computed from a CAPM model. Bond fund managers who forecast correctly all the time (i.e., correctness$^i = 1$) outperform the managers who forecast incorrectly all the time (i.e., correctness$^i = 1$) by 0.86- and 0.90-percent on a yearly basis when fund performance is measured after-fee and before-fee, respectively. Presumably, monetary policy is critical to the bond market; hence correctly anticipating monetary policy shifts contributes to superior performance in the bond market. However, the correlation is not statistically significant when fund performance is computed from a Fama-French three-factor model.

Finally, as shown by Tables 12 and 13, forecast skill is not significantly and positively correlated with the fund performance for equity funds and mixed funds for most specifications. The findings are consistent with the consensus view in the literature that for equity, and mixed funds, stock-picking skill is usually more significantly rewarded than market timing skill (e.g., Graham and Harvey (1996)), which includes skill in anticipating monetary policy shifts, of course.

6.2   Panel regression results for fund performance

One complication interpreting the cross-sectional analysis above is our unbalanced panel data set. We are comparing average forecast correctness and fund performance across managers who operated over different time intervals. A second issue is related to the underlying driver of differences in managers' performance. A positive correlation between fund performance and forecast skill could be due to a wiser investment choice guided by correct anticipation of monetary policy shifts or it could be that both fund performance and forecast skill are correlated with an unobserved managerial skill. Both issues can be addressed by estimating a

Table 10: Forecast skill and fund performance: money market funds

	(1) CAPM	(2) CAPM
	After Fee	Before Fee
Correctness	0.202**	0.229**
	(2.16)	(2.40)
Log(Size)	0.152***	0.149***
	(9.06)	(8.67)
Age	-0.020***	-0.017***
	(-10.07)	(-8.96)
Expense Ratio	-48.785***	-44.234***
	(-4.28)	(-3.79)
Fees	0.354	
	(1.07)	
Constant	0.992***	1.368***
	(5.32)	(8.20)
Observation	297	297
R^2	0.416	0.369

The dependent variables are the excess return of money market funds. Columns (1) and (2) consider after-fee and before-fee fund performance, respectively. *Correctness* is the fraction of correct forecasts for each manager. *Log(Size)* is the logarithm value of fund total net asset value. *Age* is the maximum age of the fund measured in quarters. *Fees* is the management fee of the fund. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

panel regression model separately for bond funds and money market funds:

$$\text{perform}_{t+1}^i = c_1 parti_t^i + c_2 parti_t^i \times correct_t^i + X_t^i + \chi^i + \epsilon_{t+1}^i,$$

Importantly, we include fund-manager fixed-effect χ^i as an independent variable, hence ruling out general managerial ability. The dependent variable perform_{t+1}^i in the next period, which is the fund performance measured by CAPM or Fama-French three factor alphas for bond funds and excess returns for money market funds. We first estimate monthly alphas, then use them to construct quarterly alphas.[30] $parti_t^i$ is the participation dummy, which is equal to one if and only if a manager reports the monetary policy forecast. $parti_t^i \times correct_t^i$ is the indicator of a correct forecast (i.e., $correct_t^i = 1$) *conditional* on reporting a monetary policy forecast. X_t^i is a set of control variables. As management fee is a fund fixed-effect, it is not included as a control variable.

The coefficient on $parti_t^i \times correct_t^i$, c_2, is of interest, as it measures the difference in fund

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[30]We choose this way instead of estimating quarterly alphas directly due to the small number of observations for funds that exist for less than two years.

Table 11: Forecast skill and fund performance: bond funds

	(1) CAPM	(2) CAPM	(3) Fama-French	(4) Fama-French
	After Fee	Before Fee	After Fee	Before Fee
Correctness	0.860*	0.904**	0.040	0.028
	(1.91)	(1.99)	(0.04)	(0.03)
Log(Size)	0.517***	0.454***	0.022	0.042
	(4.88)	(4.36)	(0.08)	(0.16)
Age	-0.009	0.007	-0.021	-0.026
	(-0.76)	(0.65)	(-0.74)	(-1.03)
Expense Ratio	0.336	0.288	5.510***	5.525***
	(0.90)	(0.77)	(5.95)	(5.97)
Fees	0.848		-1.582	
	(1.36)		(-1.02)	
Constant	-1.100	0.207	2.225	1.816
	(-1.30)	(0.28)	(1.06)	(1.02)
Observation	823	823	823	823
R^2	0.033	0.029	0.047	0.044

The dependent variables are the measures of yearly fund performance for bond funds (in percentage point). Columns (1)(2) and (3)(4) report the result when fund performance is calculated from CAPM and Fama-French three-factor model, respectively. Columns (1) and (3) consider after-fee fund performance, while columns (2) and (4) consider before-fee fund performance. *Correctness* is the fraction of correct forecasts for each manager. *Log(Size)* is the logarithm value of fund total net asset value. *Age* is the maximum age of the fund measured in quarters. *Fees* is the management fee of the fund. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

performance between reporting a correct forecast and reporting an incorrect forecast. Results for bond funds are reported in Table (14). Columns (1)(2) and (3)(4) report the results when risk-adjusted return is computed from CAPM and a Fama-French three-factor model, respectively. As management fee is part of the fund fixed effect, we do not need to distinguish between before-fee and after-fee fund performance in our panel regressions. For all specifications, a correct forecast generates a superior fund performance compared to an incorrect forecast. The estimates are economically large: conditional on reporting a monetary policy forecast, forecasting monetary policy stances correctly increases fund performance by 1.43- and 1.79-percent on a yearly basis for the CAPM and three-factor Fama-French model, respectively. The findings support the hypothesis that a more accurate forecast or devoting more attention to monetary policy *causes* superior fund performance.

The results for money market funds are displayed in Table 15.[31] Column (1) reports the full sample results, which show that correct forecasts do not play a statistically significant role in

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[31]Tables B4 and B5 in the appendix display the results for equity funds and mixed funds, respectively.

Table 12: Forecast skill and fund performance: mixed funds

	(1) CAPM	(2) CAPM	(3) Fama-French	(4) Fama-French
	After Fee	Before Fee	After Fee	Before Fee
Correctness	-1.179**	-1.243**	-0.322	-0.185
	(-2.17)	(-2.30)	(-0.44)	(-0.25)
Log(Size)	0.353**	0.366**	0.350*	0.321
	(2.30)	(2.39)	(1.67)	(1.54)
Age	-0.023*	-0.030***	-0.067***	-0.050***
	(-1.74)	(-2.65)	(-3.76)	(-3.20)
Expense Ratio	-0.002	-0.002	-0.002	-0.003
	(-0.58)	(-0.52)	(-0.43)	(-0.53)
Fees	-1.547***		0.199	
	(-3.50)		(0.33)	
Constant	4.337***	3.686***	2.208	3.642***
	(4.03)	(3.92)	(1.50)	(2.84)
Observation	1,296	1,296	1,296	1,296
R^2	0.028	0.012	0.014	0.008

The dependent variables are the measures of yearly fund performance for mixed funds (in percentage point). Columns (1)(2) and (3)(4) report the result when fund performance is calculated from CAPM and Fama-French three-factor model, respectively. Columns (1) and (3) consider after-fee fund performance, while columns (2) and (4) consider before-fee fund performance. *Correctness* is the fraction of correct forecasts for each manager. *log(Size)* is the logarithm value of fund total net asset value. *Age* is the maximum age of the fund measured in quarters. *Fees* is the management fee of the fund. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

money market fund returns. The finding suggests that the cross-sectional positive correlation between money market fund returns and forecast skill might be driven by unobserved managerial skill which is correlated with both fund performance and the measure of forecast skill.

Columns (2) and (3) in Table 15 present results for two sub-samples, pre-2013 Q2 and post-2013 Q2, respectively. The results show that correct forecasts improve fund performance before 2013 Q2. However, the effect becomes statistically insignificant after 2013 Q2. Motivation for this exercise is that the PBoC accelerated liberalization of interest rates after 2013 Q2.

Generally speaking, interest rate liberalization is a process of the PBoC's transition from imposing interest rates through administrative orders to influencing market rates by managing its own balance sheet. In the process, the PBoC has been widening the range (around the benchmark interest rates) in which the deposit and lending interest rates are allowed to float.[32] 2013 Q2 is a critical moment for interest rate liberalization as most lending rates of the banking sector (except mortgage rates) were fully liberalized in that month.[33]

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[32]Liu et al. (2020) studies China's interest rate liberalization and its macroeconomic effects in a DSGE model.

[33]In comparison, the PBoC is more cautious in liberalizing the deposit rates by gradually lifting the deposit

Table 13: Forecast skill and fund performance: equity funds

	(1) CAPM	(2) CAPM	(3) Fama-French	(4) Fama-French
	After Fee	Before Fee	After Fee	Before Fee
Correctness	3.163*	2.763	2.017	2.003
	(1.69)	(1.48)	(1.17)	(1.17)
Log(Size)	-0.800	-0.605	-1.020**	-1.016**
	(-1.49)	(-1.15)	(-2.05)	(-2.11)
Age	0.055	0.080*	0.021	0.022
	(1.22)	(1.91)	(0.52)	(0.57)
Expense Ratio	101.463	122.721*	90.812	91.319
	(1.47)	(1.81)	(1.43)	(1.47)
Fees	-8.627*		-1.165	
	(-1.76)		(-0.26)	
Observation	137	137	137	137
R^2	0.086	0.063	0.068	0.069

The dependent variables are the measures of yearly fund performance for equity funds (in percentage point). Columns (1)(2) and (3)(4) report the result when fund performance is calculated from CAPM and Fama-French three-factor model, respectively. Columns (1) and (3) consider after-fee fund performance, while columns (2) and (4) consider before-fee fund performance. *Correctness* is the fraction of correct forecasts for each manager. *Size* is the logarithm value of fund total net asset value. *Age* is the maximum age of the fund measured in quarters. *Fees* is the management fee of the fund. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

While the benchmark policy interest rates, particularly the benchmark deposit rate, might still serve as an important monetary policy instrument after 2013 Q2, it became less relevant to money market fund performance, as market interest rates, on which money market fund performances are based, no longer are closely anchored to the benchmark interest rates. To show this point, Figure 5 plots the 3-month benchmark deposit rate (blue line), the weighted-average of the 3-month inter-bank offered rates (red line), and the return on the money market fund index (green line). Before 2013 Q2, the inter-bank offered rate and the money market fund index return closely comove with the benchmark deposit rate. However, this pattern collapsed after 2013 Q2 due to the interest rate liberalization.[34] Specifically, using the Bai-Perron test, we identify August 2013 as a structural break point for the linear relationship between the two variables. July 2013 and November 2013 are the 2.5% and 97.5% interval points, respectively.

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rate ceiling, until completely removing it in Oct 2015 for commercial banks and agricultural credit unions.

[34]An alternative explanation is that the MMF market has become increasingly efficient (by incorporate investors' expectations more quickly) in the late 2010s due to the growing trade size (Easley and O'hara (1987) theoretically shows the effect of trade size on market efficiency).

Table 14: Forecast correctness and fund performance: bond funds

	(1) CAPM	(2) CAPM	(3) Fama-French	(4) Fama-French
Participated	1.159***	0.630**	1.082***	0.418*
	(4.22)	(2.34)	(4.00)	(1.66)
Participated and Correct		1.431***		1.793***
		(3.45)		(4.27)
Lag Log(Size)	0.292*	0.295*	0.262	0.266
	(1.79)	(1.81)	(1.49)	(1.52)
Lag Inflow	0.000*	0.000*	0.000*	0.000*
	(1.79)	(1.77)	(1.88)	(1.85)
Lag Age	-0.107***	-0.104***	-0.097***	-0.093***
	(-6.66)	(-6.50)	(-6.28)	(-6.08)
Expense Ratio	0.081	0.083	-0.057	-0.054
	(0.95)	(0.98)	(-1.27)	(-1.20)
Monetary Policy	1.642***	1.556***	1.822***	1.714***
	(6.94)	(6.78)	(6.82)	(6.65)
Constant	0.654	0.627	-0.294	-0.328
	(0.61)	(0.58)	(-0.25)	(-0.28)
Fund FE	Yes	Yes	Yes	Yes
Observation	14,904	14,904	14,904	14,904
R^2	0.200	0.201	0.163	0.165

The dependent variables are the measures of yearly fund performance for bond funds (in percentage point). *Participated* is a dummy variable that is equal to 1 if the manager reports the monetary policy expectation. *Participated and Correct* is a dummy variable that is equal to 1 if the manager reports a correct forecast. *Lag Log(Size)* is the lagged logarithm value of fund total net asset value. *Lag Age* is the lagged age of the fund measured in quarters. *Lag Inflow* is the lagged net fund inflow. *Monetary Policy* is the monetary policy index, Δmp_t. Standard errors are clustered at the fund level. Data is quarterly from 2008 Q3 to 2019 Q1. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

7 Monetary policy expectations and fund flow

Finally, we examine whether revisions of monetary policy expectations, measured as changes in the consensus forecast, induce systematic fund flow.[35] We first examine whether expected shifts in monetary policy affect the fund inflow to the mutual fund industry by estimating the following regression model:

$$FF_t = \alpha + \gamma E_t \left(\Delta mp_{t+1} \right) + \eta r_t + q_t + \epsilon_t,$$

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[35]Recent works that study the effect of monetary policy on mutual fund flows include Feroli et al. (2014) and Banegas et al. (2016). More broadly, see Cerutti et al. (2019) and Forbes and Warnock (2012) on the role of monetary policy in capital flows, Avdjiev et al. (2018) on movements in capital flows between private and public sector, and Warnock and Warnock (2009) on the effect of capital flows on interest rates.

|	(1) Full	(2) Full	(3) Before 2013	(4) Before 2013	(5) After 2013	(6) After 2013
Participated	0.039	0.069*	-0.018	-0.111*	0.017	0.022
	(1.25)	(1.95)	(-0.34)	(-1.86)	(0.52)	(0.61)
Participated and Correct		-0.075**		0.189**		-0.015
		(-2.14)		(2.56)		(-0.39)
Lag Log(Size)	0.113***	0.113***	-0.075**	-0.063**	0.132***	0.132***
	(6.28)	(6.26)	(-2.45)	(-2.05)	(7.08)	(7.08)
Lag Inflow	0.000***	0.000***	0.000	0.000	0.000***	0.000***
	(4.84)	(4.73)	(0.98)	(0.56)	(4.11)	(4.08)
Lag Age	0.044***	0.044***	0.063***	0.062***	0.018***	0.018***
	(17.89)	(17.72)	(13.21)	(12.89)	(6.53)	(6.51)
Expense Ratio	-0.013	-0.014	-0.710***	-0.716***	-0.000	-0.000
	(-0.29)	(-0.29)	(-4.75)	(-4.85)	(-0.01)	(-0.01)
Monetary Policy	-0.082***	-0.078***	0.329***	0.334***	-0.318***	-0.317***
	(-3.53)	(-3.35)	(12.05)	(12.15)	(-20.48)	(-19.66)
Constant	0.383***	0.388***	0.139	0.069	0.986***	0.985***
	(2.98)	(3.03)	(0.59)	(0.29)	(7.13)	(7.11)
Fund FE	Yes	Yes	Yes	Yes	Yes	Yes
Observation	5,978	5,978	786	786	5,192	5,192
R^2	0.516	0.516	0.432	0.438	0.380	0.380

The dependent variables are the measures of yearly fund performance for money market funds (in percentage point). *Participated* is a dummy variable that is equal to 1 if the manager reports the monetary policy expectation. *Participated and Correct* is a dummy variable that is equal to 1 if the manager reports a correct forecast. *Lag Log(Size)* is the lagged logarithm value of fund total net asset value. *Lag Age* is the lagged age of the fund measured in quarters. *Lag Inflow* is the lagged net fund inflow. *Monetary Policy* is the monetary policy index, Δmp_t. Standard errors are clustered at the fund level. Data is quarterly from 2008 Q3 to 2019 Q1. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

where FF_t is the net fund flow, computed as the rate of change in total number of fund shares; $E_t\left(\Delta mp_{t+1}\right)$ is the consensus forecast; r_t is the market interest rate measured by the weighted average of three-month inter-bank offered rates, which is included to control for the effect of interest rates on fund flow; and q_t is a quarterly dummy that adjusts for potential seasonality of fund flow. The coefficient of interest is γ.

Results are reported in columns (1) and (2) of Table 16. Expectation of an easing (tightening) monetary policy leads to a net inflow (outflow) of funds into the mutual fund industry. The finding is consistent with the yield-chasing behavior of customers: expecting a lower deposit rate, the customers strategically shift from deposit account to mutual fund. The estimate is robust to including the market interest rate as a control variable.

Next we examine how monetary policy expectations induce flows for each type of fund. Results are reported in columns (3)-(10) of Table 16. Inflows into the mutual fund industry are

Figure 5: Interest rate liberalization in China
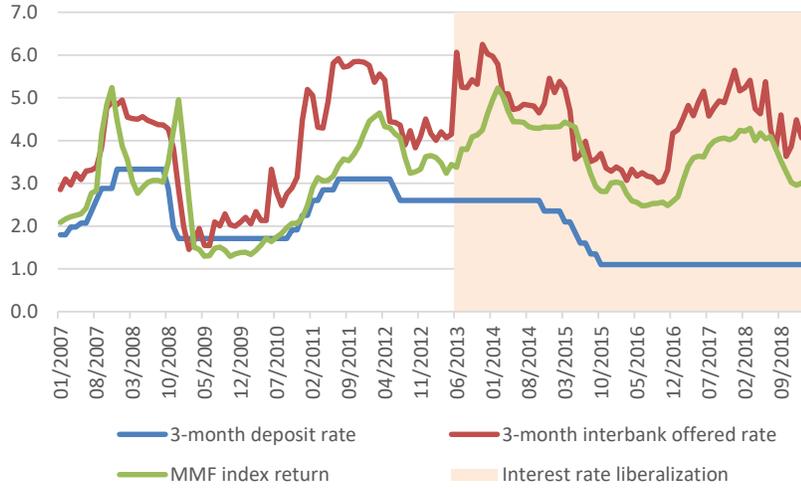
The blue line is the benchmark three-month deposit rate. The red line is the weighted average of three-month inter-bank offered rates. The green line is the weighted average of money market funds return. The patched area indicates post-2013 June, after which the market interest rates are allowed to float in a wider range around the benchmark policy rates.

driven almost entirely by the money market funds (see columns (1)-(2)). Specifically, there is a net inflow (outflow) into money market funds when the market expects an easing (tightening) of monetary policy. This is an interesting and puzzling fact, as it is opposite to the experience in the U.S. market: an increase (decrease) in the Federal Reserve's policy target rate typically induces an inflow (outflow) to the U.S. money market funds.

Table 16: Consensus forecast and fund flow

	All		Equity		Mixed		Bond		MMF	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
$E_t(\Delta mp_{t+1})$	-0.07**	-0.09**	-0.03	-0.03	-0.01	-0.04	-0.00	0.03	-0.38**	-0.45***
	(-1.87)	(-2.05)	(-0.43)	(-0.33)	(-0.11)	(-0.50)	(-0.04)	(0.19)	(-2.50)	(-2.75)
r_t		0.00		-0.02		-0.00		-0.00		0.04
		(0.46)		(-1.11)		(-0.14)		(-0.09)		(1.47)
Constant	0.05**	0.04	0.02	0.09	-0.00	0.01	0.10*	0.10	0.22***	0.11
	(2.62)	(0.95)	(0.54)	(1.20)	(-0.10)	(0.13)	(1.86)	(0.91)	(3.26)	(0.78)
Adj R^2	0.00	0.00	-0.07	-0.08	-0.02	-0.04	-0.08	-0.13	0.31	0.42
Observations	43	43	43	43	43	43	43	43	43	43

The dependent variables are the net inflow rates to each fund type. $E_t(\Delta mp_{t+1})$ is the consensus forecast. r_t is the weighted average of three-month inter-bank offered rates. Data is quarterly from 2008 Q3 to 2019 Q1. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

A possible explanation is that the benchmark deposit rate in China is set by the central bank through the administrative regulation channel, rather than determined by supply and demand

in the credit market. In comparison, the interest rates on instruments held by money market funds are, to a greater extent, endogenously determined by supply and demand in the money market. While an easing monetary policy would lower both the benchmark deposit rate and the interest rates of money market funds, it also widens the interest spread between the two and makes the latter more attractive.[36] Yield-chasing depositors would strategically substitute from bank deposits to money market fund shares.[37]

To test this hypothesis, we estimate the following regression model:

$$i_t^{mmf} - i_t = \alpha + \beta \Delta mp_t + \eta \cdot t + \epsilon_t,$$

where i_t^{mmf} is the return on the money market fund index, i_t is the benchmark three-month deposit rate. We include a time trend to control for the widening trend in the interest spread due to the liberalization (Figure 5). Table 17 shows that easing (tightening) monetary policy widens (shrinks) the interest rate spread between money market funds and the deposit rate, which might explain the negative correlation between money market fund holdings and Δmp_t.

Table 17: Interest rate spread between money market fund and deposit rate

	(1)	(2)
Monetary Policy	-0.62***	-0.32**
	(-3.16)	(-2.23)
Time trend		0.06***
		(3.68)
Constant	0.80***	0.26
	(6.89)	(1.12)
R^2	0.23	0.53
Observation	43	43

The dependent variable is the interest spread between the money market fund index and the benchmark three-month deposit rate in percentage point. *Monetary Policy* is the monetary policy index, Δmp_t. Data is quarterly from 2008 Q3 to 2019 Q1. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Strategic substitution between bank deposit and money market fund shares implies, all else equal, that transmission of Chinese monetary policy to the real economy could be weakened,

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[36]As a complementary explanation, Kalemli-Ozcan (2019) finds that the disconnect between short rates and monetary policy rates in several emerging markets can be driven by changes in risk perception.

[37]Interestingly, we do not observe significant substitution between bank deposits and bond and equity investments. A possible reason is that bond and equity are subject to trading costs, while the trading cost for money market funds is close to zero.

because potential bank borrowers generally do not have access to money-market financing. In contrast, the links between wholesale bank funding and short-term securities markets are much closer in the United States; money market funds are significant investors in both. Hence there is a positive relationship between the Federal Reserve's policy target rate and flows to U.S. money market funds, in contrast to our findings for China.

8 Conclusion

We construct a novel measure of monetary policy expectations by applying a systematic textual analysis of the qualitative discussion in China's fund managers' quarterly reports. We demonstrate that the aggregate index of manager expectations outperforms both market-based and model-based alternative projections. Furthermore, we find that expectations are more accurate for funds that: commit more analytical resources, proxied by fund size; have higher management fees and greater managerial educational background; and are more proximate to Beijing. We also show that fund managers act on their expectations, and that correctly anticipating shifts in Chinese monetary policy improves fund performance. Finally, we document that net inflows into Chinese money-market funds are positively (negatively) associated with near-term prospects for an easing (tightening) of monetary policy.

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Online Appendix: Material not Considered for Publication

A Sample mutual fund quarterly report

In this section, we provide an example of the *Market Outlook* section from a mutual fund quarterly report written in 2015 Q1 by Jianyan Liu, manager of Penghua State Owned Corporte Bond Fund. In 2015 Q1, the fund had a TNA of 70,426,643 RMB. The fund was founded in 2013 Q1 and belongs to the fund family, Penghua Fund Management Co. Ltd.

从经济层面看，一季度我国整体经济情况仍延续低迷，工业生产、固定资产投资等主要经济指标均继续有所下滑，通胀维持低位，经济企稳迹象尚不明显。虽然新常态下我国经济增长将更注重质量，但仍需保持一定的经济增速，因此宏观调控要继续推进稳增长，调控力度也有继续加大的空间和必要。

From an economic perspective, in the first quarter, the economic situation continued to be sluggish. Major economic indicators such as industrial production and fixed capital formation continued to decrease, inflation remained low, and signs of economic stabilization were still ambiguous. Although economic growth in the new normal is more quality-oriented, the growth rate still needs to be maintained above a certain level. Therefore, the macroeconomic policy intervention will continue to serve to boost steady economic growth; there is still room and necessity for further intervention.

2014年下半年以来权益市场持续大幅上涨，虽然对经济稳定有正面作用，但需要关注其泡沫化风险和对实体经济的资金分流，防止过犹不及。[我们认为二季度货币政策将延续宽松]，[存款准备金率等政策仍有下调空间]。

*Since the second half of 2014, the equity market had continued to rise sharply. Although this has a positive effect on economic stability, the risk of overvaluation and the diversion of funds from the real economy is growing, which will negatively affect the economy if it rises too much. [We believe that **monetary policy** will continue to **ease** in the second quarter], [and there is still room for further **easing** such as **decreasing** the **required reserve ratio**].*

当前经济基本面和货币政策方向均有利于债券市场，债券调整压力主要来自于配置资金在大类资产上转移，权益投资的短期高收益表现吸引了巨量社会资金参与，同时新股连续发行，推升了市场利率。我们认为，短期来看权益市场仍会是社会资金的主要参与市场，债券

收益率存在波动风险，但是从中长期看，权益类资产难以长期偏离基本面，市场存在泡沫化风险。因此我们将遵循宏观调控主线，挖掘实际价值，适时适度参与权益投资。

*[The current economic fundamentals and **monetary policy** are conducive to the bond market]. The pressure for bond price adjustment mainly comes from the allocation of funds across major asset types. The short-term high return of the equity market has induced significant fund flow into the stock market; the wave of new stock issuance also boosted the (stock) market rate. We believe that in the short term, the equity market will still be the main market for the investors to participate; the risk of fluctuations in bond yields remains. However, it is unlikely for equity assets to deviate from the fundamentals persistently in the medium and long terms, and there is a risk of bubbling. Therefore, we will follow the main trajectory of macroeconomic policy intervention, tap the real value, and participate in equity investment in a timely and appropriate manner.*

In the above report, the last two semantic units of the second paragraph and the first semantic unit of the last paragraph (highlighted with red color) are effective by containing at least one noun keyword (in bold): ***monetary policy*** ($score = 1$) and ***required reserve ratio*** ($score = -1$). The verb and adjective key words in the first two cases are ***ease*** (score=1), and ***decreasing*** ($score = -1$). ***Easing*** is a phrase with a score of 1. There are no words or phrases in the last case that indicate the direction of monetary policy shifts. Therefore, we focus on the first two cases.

For the first effective semantic unit:

score([We believe that **monetary policy** will continue to **ease** in the second quarter]) = score(***monetary policy***)×score(***ease***)= 1.

For the second effective semantic unit:

score([and there is still room for further **easing** such as **decreasing** the **required reserve ratio**]) = [score(***required reserve ratio***)×score(***decreasing***) + score(***easing***)]/2 = 1.

By taking the average of the scores of the two effective semantic units, it yields that the forecast score for the report is equal to one, indicating that the manager expects the monetary policy to ease.

B   Additional Figures and Tables

Table B1: Summary statistics of fund alpha

	Obs.	Mean	Std.	Median	Min	Max
Panel A: Before Fee						
Equity Fund (CAPM)	69052	0.207	1.467	0.358	-17.66	20.21
Equity Fund (Fama French)	69052	0.264	1.568	0.324	-18.78	35.03
Bond Fund (CAPM)	94336	0.223	0.953	0.158	-38.61	46.94
Bond Fund (Fama French)	94336	0.150	1.690	0.104	-111.62	151.01
Mixed Fund (CAPM)	146312	0.527	1.113	0.411	-6.37	29.52
Mixed Fund (Fama French)	136685	0.188	2.136	0.153	-70.06	101.41
Equity Fund (Excess Return)	48371	0.179	0.092	0.176	-0.20	3.05
Panel B: After Fee						
Equity Fund (CAPM)	69052	0.001	0.015	0.003	-0.18	0.20
Equity Fund (Fama French)	69052	0.002	0.016	0.002	-0.19	0.35
Bond Fund (CAPM)	94336	0.002	0.010	0.001	-0.39	0.47
Bond Fund (Fama French)	94336	0.001	0.017	0.001	-1.12	1.51
Mixed Fund (CAPM)	146312	0.004	0.011	0.003	-0.07	0.29
Mixed Fund (Fama French)	136685	0.001	0.021	0.000	-0.70	1.01
Equity Fund (Excess Return)	48371	0.001	0.001	0.001	-0.00	0.03

This table reports the summary statistics of CAPM and Fama-French three factor model alphas for equity funds, bond funds, mixed funds, and money market funds. All alphas are monthly in percentage points.

Figure B1: Consensus forecast and weight of short-term asset holding
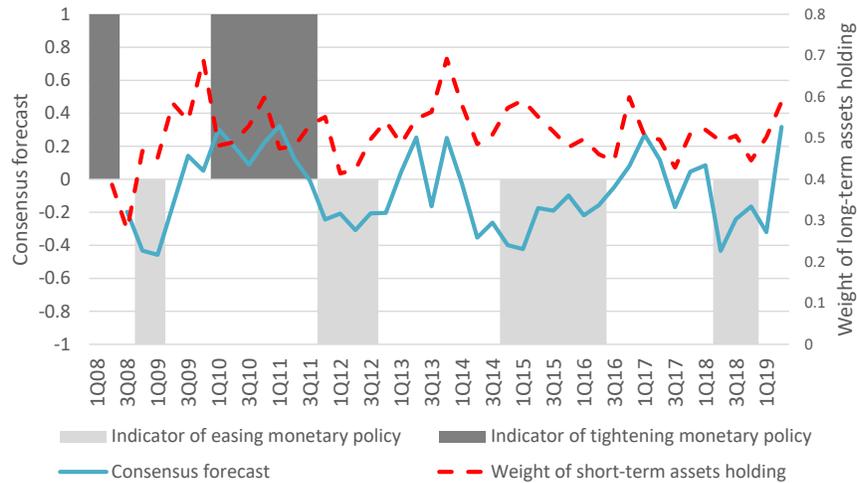
Time series. The dashed curve displays the money market fund consensus forecast measured as the mean of forecast score across money market fund managers. The solid curve is the average weight of short-term asset holding weighted by fund size. Short-term asset is defined as assets with maturities less than 60 days. The shaded columns are the monetary policy index. The darkly shaded columns indicate the tightening monetary policy periods. The lightly shaded columns indicate the easing monetary policy periods. Monetary policy is unchanged in the periods with no columns.

Figure B2: Distribution of forecast correctness
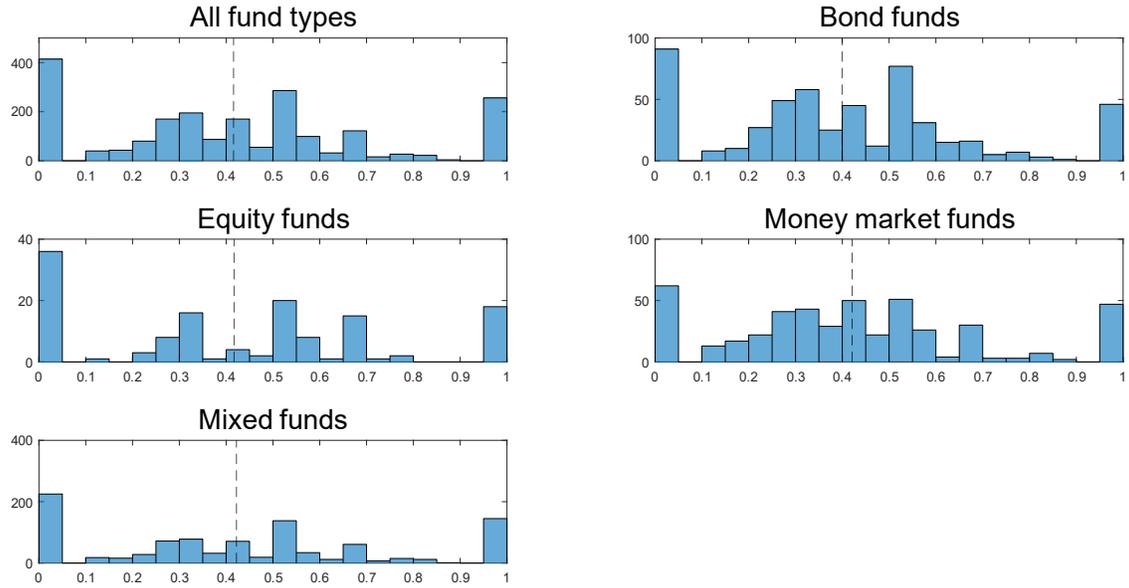
Each plot shows the cross-sectional distribution of forecast correctness for each fund type, respectively. Forecast correctness measures the fraction of time that a mutual fund manager anticipates monetary policy shifts correctly.

Table B2: Implied forward rates predict shifts in monetary policy stances

	(1)	(2)	(3)	(4)
$F_{t,3}^6 - i_{t,3}$	0.01	-0.27		
	(0.01)	(-0.73)		
$F_{t,6}^{12} - i_{t,6}$			1.79**	0.74
			(2.10)	(1.15)
Δmp_t		0.72***		0.68***
		(6.57)		(6.04)
Constant	-0.21	-0.02	-0.51***	-0.19
	(-1.60)	(-0.21)	(-2.88)	(-1.37)
R^2	0.00	0.49	0.08	0.50
Observation	43	43	43	43

The dependent variable is the monetary policy index in the subsequent quarter. $F_{t,3}^6 - i_{t,3}$ is the the spread between the implied 3-6 month forward rate and 3-month treasury rate. $F_{t,6}^{12} - i_{t,6}$ is the the spread between the implied 6-12 month forward rate and 6-month treasury rate. Δmp_t is the monetary policy index. Data is quarterly from 2008 Q3 to 2019 Q1. t-statistics are in the parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table B3: Bankers' consensus forecast and monetary policy

	(1)	(2)	(3)	(4)
Dependent variable	Δmp_{t+1}	ΔM_{t+1}	$\Delta M_{t+1} - \Delta M_t$	$I\left(\Delta M_{t+1} - \Delta M_t\right)$
$E_t\left(\Delta mp_{t+1}^{banker}\right)$	1.03***	0.02	-0.01	-0.47
	(2.74)	(0.69)	(-1.25)	(-0.83)
Constant	-0.17	-0.13***	0.00	0.30*
	(-1.46)	(-17.96)	(1.04)	(1.74)
Adj R^2	0.17	-0.02	0.01	-0.01
Observation	34	34	34	34

The dependent variable for Columns (1) (2) (3) (4) is the monetary policy index, year-over-year growth rate of M2, the first-order difference of M2 growth, and the discrete index of the the first-order difference of M2 growth, respectively. The independent variable $E_t\left(\Delta mp_{t+1}^{banker}\right)$ is the consensus forecast. Data is quarterly from 2008 Q3 to 2019 Q1. t-statistics are in the parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table B4: Forecast correctness and fund performance: equity funds

	(1) CAPM	(2) CAPM	(3) Fama-French	(4) Fama-French
Participated	-1.516***	-1.200**	-0.589	0.020
	(-2.87)	(-2.18)	(-1.23)	(0.04)
Participated and Correct		-0.811		-1.557***
		(-1.25)		(-2.69)
Lag Log(Size)	-0.473	-0.464	0.218	0.236
	(-1.09)	(-1.07)	(0.66)	(0.71)
Lag Inflow	0.000	0.000	0.000	0.000
	(1.20)	(1.22)	(1.17)	(1.18)
Lag Age	0.221***	0.220***	0.058**	0.057**
	(5.41)	(5.40)	(2.39)	(2.35)
Expense Ratio	-0.144	-0.143	-0.303	-0.300
	(-0.83)	(-0.83)	(-1.01)	(-1.01)
Monetary Policy	-1.598***	-1.578***	-2.622***	-2.585***
	(-6.03)	(-5.96)	(-8.51)	(-8.40)
Constant	1.870	1.810	0.581	0.467
	(0.63)	(0.61)	(0.27)	(0.21)
Fund FE	Yes	Yes	Yes	Yes
Observation	12,056	12,056	12,056	12,056
R^2	0.302	0.302	0.251	0.251

The dependent variables are the measures of yearly fund performance for bond funds (in percentage point). *Participated* is a dummy variable that is equal to 1 if the manager reports the monetary policy expectation. *Participated and Correct* is a dummy variable that is equal to 1 if the manager reports a correct forecast. *Lag Log(Size)* is the lagged logarithm value of fund total net asset value. *Lag Age* is the lagged age of the fund measured in quarters. *Lag Inflow* is the lagged net fund inflow. *Monetary Policy* is the monetary policy index, Δmp_t. Standard errors are clustered at the fund level. Data is quarterly from 2008 Q3 to 2019 Q1. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table B5: Forecast correctness and fund performance: mixed funds

	(1) CAPM	(2) CAPM	(3) Fama-French	(4) Fama-French
Participated	0.513*	0.647**	2.029***	2.078***
	(1.94)	(2.17)	(4.52)	(4.43)
Participated and Correct		-0.335		-0.125
		(-0.86)		(-0.13)
Lag Log(Size)	0.723***	0.725***	1.003***	1.003***
	(3.42)	(3.43)	(3.46)	(3.46)
Lag Inflow	0.001***	0.001***	0.000**	0.000**
	(5.87)	(5.88)	(2.28)	(2.28)
Lag Age	0.002	0.001	0.260***	0.260***
	(0.09)	(0.07)	(11.78)	(11.72)
Expense Ratio	-0.035	-0.035	-0.011	-0.011
	(-1.51)	(-1.51)	(-0.19)	(-0.19)
Monetary Policy	0.766***	0.776***	-3.429***	-3.425***
	(4.48)	(4.58)	(-12.45)	(-12.03)
Constant	-0.526	-0.535	-10.368***	-10.371***
	(-0.35)	(-0.35)	(-5.05)	(-5.05)
Fund FE	Yes	Yes	Yes	Yes
Observation	31,901	31,901	30,955	30,955
R^2	0.251	0.251	0.191	0.191

The dependent variables are the measures of yearly fund performance for bond funds (in percentage point). *Participated* is a dummy variable that is equal to 1 if the manager reports the monetary policy expectation. *Participated and Correct* is a dummy variable that is equal to 1 if the manager reports a correct forecast. *Lag Log(Size)* is the lagged logarithm value of fund total net asset value. *Lag Age* is the lagged age of the fund measured in quarters. *Lag Inflow* is the lagged net fund inflow. *Monetary Policy* is the monetary policy index, Δmp_t. Standard errors are clustered at the fund level. Data is quarterly from 2008 Q3 to 2019 Q1. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table B6: Historical Forecast correctness and fund size

	(1)	(2)
Historical Correctness	0.126*	0.111*
	(1.93)	(1.66)
Historical CAPM Alpha	15.737***	
	(8.38)	
Historical Fama-French Alpha		3.357**
		(2.26)
Lag Age	-0.226***	-0.206***
	(-9.69)	(-8.68)
Monetary Policy	0.065***	0.074***
	(5.27)	(5.85)
Fund FE	Yes	Yes
Observation	43,278	43,278
R^2	0.792	0.788

The dependent variables are cumulative fund inflows. *Historical Correctness* is mean correctness of the previous forecasts. *Participated and Correct* is a dummy variable that is equal to 1 if the manager reports a correct forecast. *Historical Fama-French Alpha* is mean of historical the Fama-French Alphas. *Historical CAPM Alpha* is mean of historical the CAPM Alphas. *Monetary Policy* is the monetary policy index, Δmp_t. Standard errors are clustered at the fund level. Data is quarterly from 2008 Q3 to 2019 Q1. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.