Growth Forecasts and News About Monetary Policy

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Abstract

I study the relationship between GDP growth forecasts by the Blue Chip professionals and news about monetary policy, defined as 30-minute changes in bond yields around scheduled Federal Open Market Committee (FOMC) announcements. I find that professionals’ revisions in one-year-ahead growth expectations predict 15% of variation in the future policy news shocks. A positive GDP growth revision predicts a contractionary policy news shock, a negative GDP growth revision predicts an expansionary policy news shock. Failing to account for this predictability biases the estimates of monetary policy effects on the economy: the orthogonal policy news shock does not affect professionals’ beliefs about the economy and has a more negative impact on future actual GDP, than the raw policy shock. Overall, my results suggest that bond yields are slow to incorporate updates in professionals’ growth expectations.

*JEL codes:* E43, E52, G12, G17

*Keywords:* monetary policy news, growth forecasts, federal funds futures, predictability.
Changes in interest rate futures and bond yields around FOMC announcements are commonly used as measures of monetary policy news (Kuttner 2001, Cochrane and Piazzesi 2002, Gürkaynak, Sack, and Swanson 2005). An assumption for this high-frequency monetary policy identification is that all information that is public prior to an FOMC announcement is already incorporated into bond yields, and, therefore, does not show up in the policy news shocks. I challenge this assumption by investigating whether monetary policy news shocks are indeed unpredictable by market participants in real time. I find that revisions in the Blue Chip analysts’ GDP growth forecasts (available to a certain group of market participants prior to an FOMC announcement) predict monetary policy news shocks with a 15% $R^2$. I show that failing to account for this predictability biases the estimates of monetary policy effects on the economy. The policy news shock, orthogonal to the pre-FOMC growth forecasts revisions, has no effect on professionals’ post-FOMC growth forecasts and has a more negative effect on future actual GDP, than the raw policy news shock.

I illustrate key finding of my paper with the following example. On March 20, 2019, the FOMC decided to keep the interest rate unchanged (within a 2.25–2.5% target), but updated its views about the likely path of interest rates in 2019. According to its newly released FOMC economic projections, eleven of 17 officials expect no target rate increases—up from just two in December 2018.\footnote{FOMC economic projections are released each second FOMC meeting.} As a reaction to this piece of monetary policy news, the 6-month and 1-year Treasury yield dropped by 3 bps (to 2.49% and 2.47%) within 30 minutes after the FOMC announcement. The most recent Blue Chip Economic Indicators issue contained information useful to predict this on-announcement drop in bond yields. The issue released on March 10 indicated a downward revision in professionals’ 2019 GDP growth forecast: 2.4% vs 2.5% in the February 10 issue. I argue that this pre-FOMC downward revision in the Blue Chip GDP growth forecasts was not fully reflected in bond yields, and thus could be used to predict drop in bond yields at the FOMC announcement on March 20.

I define monetary policy news shock as changes in up to one-year interest rate futures in a 30-minute window around scheduled FOMC announcements (see Nakamura and Steinsson 2018). During 1994–2015, an upward revision in the Blue Chip professionals’ one-year GDP growth expectations, released ahead of a scheduled FOMC meeting, predicts a contractionary policy news shock at an upcoming FOMC meeting with a 15% $R^2$. These results are the strongest for the crisis periods, but also hold when I exclude September – December 2001 and September 2008 – December 2015. GDP growth revisions also predict policy news shocks, orthogonalized to the target rate (“future path of policy” factor, see Gürkaynak, Sack, and Swanson 2005), as well as FOMC-announcement changes in a wide variety of interest rates: federal
funds futures, Eurodollar futures, Treasury yields, and TIPS.

I next show the importance of orthogonalizing the monetary policy news shock to the pre-FOMC Blue Chip professionals’ GDP growth revisions. First, I study positive contemporaneous relationship between professionals’ GDP forecast revisions over the month \(t\) and the policy news shock occurring within month \(t\). This relationship was recently documented by Campbell, Evans, Fisher, and Justiniano (2012) and Nakamura and Steinsson (2018), who interpret it as the “Fed’s information effect”: a contractionary monetary policy shock signals the Fed’s private knowledge that the economy is doing well and thereby causes upward revisions in agents’ GDP forecasts. To shed more light on this relationship, I regress the Blue Chip GDP forecast revisions on the two components of the policy news shock: the component, predicted by the pre-FOMC (i.e., \(t - 1\)) GDP forecast revisions, and the orthogonal shock component, defined as a residual from a regression of policy news shock on pre-FOMC GDP revisions. The latter can be interpreted as a “truly unexpected” policy news shock. I find that only the predicted component is significant, while the orthogonal shock component is insignificant. This result indicates that the positive contemporaneous relation between GDP forecast revisions and the policy news shock is driven by the lagged GDP growth revisions. Failing to orthogonalize the policy news shock to the pre-FOMC forecast revisions creates an illusion that policy news shock carries Fed’s information effect and affects professionals’ GDP forecasts. The orthogonal monetary policy news shock has zero correlation with contemporaneous GDP forecast revision and carries no predictability for future GDP growth revisions, suggesting the absence of the Fed’s information effect.

Second, I show that the presence of a predictable component in the monetary policy news shock biases upwards the effects of monetary policy on actual output. The component of contractionary policy news shock, predicted with positive pre-FOMC GDP growth revision, is followed by an increase in actual output. At the same time, the orthogonal component of contractionary policy news shock is followed by a decline in actual output after a couple of years. This result highlights the importance of orthogonalizing contractionary policy news shock to professionals’ pre-FOMC GDP revision, as the raw contractionary policy news shock includes the Fed’s response to the improvement in economic conditions, which is captured by professionals’ upward GDP growth revision. This Fed’s response biases upward the effect of monetary policy shock on future output: the “truly unexpected” contractionary monetary policy shock has a more negative impact on future output, than a raw shock.

The Fed is always reacting to something. I investigate whether proxies of economic and financial developments can predict monetary policy news shocks better than the professionals’ output revisions. I run predictive regressions of policy news shock on a number of macroeco-
nomic and financial variables, which attempt to capture changes in economic conditions. While I find that yield spreads and uncertainty measures have some predictive power for policy news shock (up to 9% $R^2$), none of these variables can beat professionals’ revisions in GDP forecasts. All these variables turn insignificant in the presence of the GDP forecast revisions, which always remain significant. This result suggests that professionals’ revisions in GDP expectations contain some independent information useful to predict the bond market reaction to the FOMC announcement.

Finally, I show that revisions in the Blue Chip GDP growth forecasts are useful to predict not only FOMC-announcement changes in bond yields, but also monthly changes in the expected path of monetary policy. I run predictive regressions of forecast errors in the fed funds futures and find that the GDP growth forecast revisions predict forecast errors in 2-month through 6-month fed funds futures with a 7% through 28% $R^2$. This predictability holds after controlling for the proxies of risk premia in the fed funds futures (employment growth, corporate spread and treasury spread, as documented by Piazzesi and Swanson 2008). These results indicate that the fed funds futures prices consistently lag to incorporate information available in Blue Chip professionals’ GDP growth forecasts.

Overall, my paper has two key messages. First, bond markets are slow to incorporate information available to Blue Chip professionals. As a result, the FOMC announcement changes in interest rates are not orthogonal to all information, available prior to the FOMC announcement: only 85% of the variation is truly unexpected by all market participants, while 15% of the variation is a delayed reaction to the information contained in the Blue Chip professionals’ GDP growth forecasts. Second, orthogonalizing policy news shocks to the GDP forecasts revisions is important for studying the effects of the Fed’s actions on the economy. The orthogonal contractionary policy news shock (1) has neutral effect on the professionals’ beliefs about the economy, and (2) has a more negative effect on the future actual growth, than the raw policy news shock.
1. Key Variables

1.1 Monetary Policy News Shocks

I use monetary policy news shocks only on the pre-scheduled FOMC announcements. There are eight pre-scheduled FOMC announcements per year. Each two announcements are about 45 days apart from each other. I use two versions of monetary policy shocks:

(1) $MP_{shock}^{NS}$ is the average change in five interest rate futures from 10 minutes before the FOMC announcement to 20 minutes after it. These five interest rate futures are: the first and third month federal funds futures, and 3-month eurodollar interest rates at horizons of two, three and four quarters. I use the series constructed by Nakamura and Steinsson (2018), kindly available on Emy Nakamura’s web-site for January 1995–March 2014. Their policy news shock is rescaled such that its effect on the 1-year nominal Treasury yield is equal to one.

(2) $MP_{shock}^{GSS}$ uses the same 30-minute changes in the five interest rate futures, but orthogonalizes all series to the change in the current federal funds rate target before taking the average. This is a "future path of policy" factor, constructed by Gürkaynak, Sack, and Swanson (2005). Eric Swanson kindly shared a time series of this factor for January 1994–December 2015. Their shock series is normalized to have a unit standard deviation over the whole sample, making the scale of these shocks uncomparable to $MP_{shock}^{NS}$. I multiply the series by the standard deviation of $MP_{shock}^{NS}$ (3.6) to make the scales of the two shocks comparable. The correlation between $MP_{shock}^{NS}$ and $MP_{shock}^{GSS}$ is 75%. Panel A of Figure 1 shows the time series of the two monetary policy shocks. Both shock series have zero autocorrelation: the $R^2$ from AR(1) regressions is below 1%, the $t$-stats are -0.57 and -0.95.  

I also use daily changes in Fed funds futures, Eurodollar futures, Treasury yields and TIPS on the pre-scheduled FOMC days. The FOMC-day changes in these instruments are not as precise as the changes in a 30-minute window surrounding FOMC announcements, especially for the days with a macroeconomic announcement in the morning of an FOMC day, but are still reasonably good proxies to measure the Fed’s impact, as important macroannouncements happen in less than 20% of FOMC announcement days.

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2I exclude unscheduled announcements on 18 April 1994 (+25 bps), 15 October 1998 (-25 bps), 3 January 2001 (-50 bps), 18 April 2001 (-50 bps), 17 September 2001 (-50 bps), 10 August 2007 (0 bps), 17 August 2007 (0 bps), 22 January 2008 (-75 bps), 11 March 2008 (0 bps), 8 October 2008 (-50 bps). Note that I put in brackets the actual target rate changes on those meetings, not unexpected changes in yields.

3This result is different when including shocks on 10 unscheduled meetings: $MP_{shock}^{GSS}$ exhibit an AR(1) $t$-stat of -2.1 and the $R^2$ of 1.5%.
Panel A. Monetary policy shocks

Panel B. Professionals’ revisions in one-year output growth

Figure 1: Time Series Plots of Main Variables. The series in Panel A is at the FOMC frequency. The series in Panel B is at monthly frequency.
Figure 2: Sample Timeline for GDP Growth Revision Period before FOMC meetings. This timeline illustrates the time period captured with monthly GDP growth revision, $\Delta \tilde{y}_{t-1}$ (in blue). I use this revision to predict an FOMC announcement shock occurring during period $t$ (in dark red).

1.2 Macroeconomic Expectations

I use data on survey expectations of future quarterly changes in key macro variables from Blue Chip Economic Indicators. Blue Chip carries out a survey during the 5th-7th day of every month soliciting forecasts of these variables for up to the next 8 quarters. The forecasts are released among subscribers on the 10th day of every month (or the next working day if the 10th day is a weekend day). The forecasts are available for four quarters ahead for late year surveys and for seven quarters ahead for early year surveys. For my main results I use forecasts of quarter-to-quarter GDP growth for the current quarter and the next three quarters, $\tilde{y}^{Q0}$, $\tilde{y}^{Q1}$, $\tilde{y}^{Q2}$, and $\tilde{y}^{Q3}$. I denote the average across these forecasts as $\tilde{y}$. A monthly change in this number, $\Delta \tilde{y}$, is a professionals’ revision to a year-ahead GDP growth forecast. Panel B of Figure 1 shows the time series of $\Delta \tilde{y}$.

2. Forecasting Monetary Policy Shocks With Revisions in Professionals’ GDP Expectations

In this section I show that revisions in professionals’ GDP expectations available prior to an FOMC announcement predict monetary policy news shocks and changes in different bond yields with an up to 16% $R^2$.

2.1 Regression Evidence

For each scheduled FOMC announcement, I use the most recently available monthly revision to Blue Chip professionals’ year-ahead GDP forecast. For instance, for an FOMC announcement on August 13, 2002, I use the Blue Chip forecast revision available as of August 10, 2002. The
year ahead forecast period is June 2002–May 2003. The forecast revision captures a change in GDP growth expectations for this period from July 5-7th to August 5-7th. Figure 2 illustrates the timeline for this example.⁴

<table>
<thead>
<tr>
<th></th>
<th>Full sample</th>
<th>Non-crisis</th>
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<tr>
<td>Panel A. Predicting $MPshock_t^{NS}$</td>
<td></td>
<td></td>
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<tr>
<td>$\Delta \tilde{y}_{t-1}$</td>
<td>6.7 [4.5] 14.9 154</td>
<td>7.6 [2.8] 9.1 105</td>
</tr>
<tr>
<td>$\Delta \tilde{y}_{t-1}^{Q0}$</td>
<td>2.4 [3.6] 10.1 154</td>
<td>2.5 [2.0] 5.3 105</td>
</tr>
<tr>
<td>$\Delta \tilde{y}_{t-1}^{Q1}$</td>
<td>5.4 [4.7] 15.2 154</td>
<td>5.9 [2.7] 8.3 105</td>
</tr>
<tr>
<td>$\Delta \tilde{y}_{t-1}^{Q2}$</td>
<td>7.8 [3.0] 10.6 154</td>
<td>6.6 [1.9] 5.4 105</td>
</tr>
<tr>
<td>$\Delta \tilde{y}_{t-1}^{Q3}$</td>
<td>5.9 [1.4] 3.1 154</td>
<td>6.5 [1.6] 2.9 105</td>
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|                    | Panel B. Predicting $MPshock_t^{GSS}$ |            |
|                    |             |            |
| $\Delta \tilde{y}_{t-1}$ | 5.9 [3.7] 10.9 175 | 10.0 [4.0] 16.0 113 |
| $\Delta \tilde{y}_{t-1}^{Q0}$ | 2.1 [2.7] 7.5 175 | 3.7 [3.1] 11.8 113 |
| $\Delta \tilde{y}_{t-1}^{Q1}$ | 4.5 [3.9] 10.0 175 | 7.6 [4.1] 14.1 113 |
| $\Delta \tilde{y}_{t-1}^{Q2}$ | 6.1 [3.1] 6.1 175 | 6.0 [2.2] 4.4 113 |
| $\Delta \tilde{y}_{t-1}^{Q3}$ | 7.3 [2.5] 4.4 175 | 8.4 [2.6] 5.0 113 |

Table 1: Predicting Monetary Policy Shocks with Professionals’ Revisions in Output Expectations. Table shows the results from running predictive regressions $MPshock_t = a + b\Delta \tilde{y}_{t-1} + \epsilon_t$ for the two versions of $MPshock$ and five versions of output expectations. $MPshock_t^{NS}$ is a change in five interest rate futures from 10 minutes before the FOMC announcement to 20 minutes after it, constructed by Nakamura and Steinsson (2018). These five interest rate futures are: the first and third month federal funds futures, and 3-month eurodollar interest rates at horizons of two, three and four quarters. $MPshock_t^{GSS}$ uses the same 30-minute changes in the five interest rate futures, but orthogonalizes all series to the change in the current federal funds rate target before taking the average. This is a "future path of policy" factor, constructed by Gürkaynak, Sack, and Swanson (2005). The independent variable is the pre-FOMC month-to-month revision in Blue Chip professionals’ output growth expectations for the year ahead, $\Delta \tilde{y}_{t-1}$, and for each quarter separately: current quarter, $\Delta \tilde{y}_{t-1}^{Q0}$, next quarter, $\Delta \tilde{y}_{t-1}^{Q1}$, second quarter $\Delta \tilde{y}_{t-1}^{Q2}$, and the third quarter, $\Delta \tilde{y}_{t-1}^{Q3}$. All regressions use scheduled FOMC meetings only. The $R^2$ are in %. $N$ denotes the number of meetings used in each regression. Full sample for $MPshock_t^{NS}$ is 1995-2015, full sample for $MPshock_t^{GSS}$ is 1994-2015.

I run single predictive regressions of monetary policy shocks on the most recent revision in

⁴For an FOMC announcement on July 6, 1995, I use the Blue Chip forecast revision available as of June 12, 1995, as July Blue Chip issue was released only on July 10, 1995 and thus was not yet available to the market participants. The forecast horizon for this example would be June 1995–May 1996. Note, that I fix the forecast period for each FOMC announcement.
professionals’ year-ahead GDP forecasts,

\[ MP_{\text{shock}}_t = a + b\Delta\tilde{y}_{t-1} + \varepsilon_t \]  \hspace{1cm} (1)

Table 1 reports results from running these predictive regressions. An upward pre-FOMC revision in GDP growth expectations predicts a contractionary \( MP_{\text{shock}}^{NS} \) with a 15\% \( R^2 \) and \( MP_{\text{shock}}^{GSS} \) with 11\% \( R^2 \). An upward revision in the year-ahead average quarterly growth forecast by 1\% predicts a 7 bps contractionary monetary policy shock. The \( t \)-stats are close to 4. Most of predictability comes for the revision to the next-quarter growth forecast, as the \( R^2 \) for \( \Delta\tilde{y}_{t-1}^{Q1} \) is the largest. Revisions to \( \Delta\tilde{y}_{t-1}^{Q3} \) matter the least.

The right part of the table shows the results for excluding two crisis periods (September–December 2001 and September–December 2008) and zero-lower bound period (ZLB, January 2009–December 2015). The \( R^2 \) for \( MP_{\text{shock}}^{NS} \) went down to 9\%, the \( R^2 \) for \( MP_{\text{shock}}^{GSS} \) increased to 16\%.

Figure 3 illustrates the \( MP_{\text{shock}}^{NS} \) predictive results for the full (Panel A) and non-crisis (Panel B) sub-samples. Three obvious data points are driving the predictive relationship in Panel A are Nov 6, 2001, Dec 16, 2008, and Oct 29, 2008. In each of these three pre-scheduled meetings, the Fed was responding to the crisis events. Abrupt worsening in economic conditions was reflected in downward revisions in professionals’ GDP growth forecasts and was followed by expansionary monetary policy shocks. Excluding the crisis periods and the ZLB period in Panel B shows that the predictive relationship for \( MP_{\text{shock}}^{NS} \) is not driven by the outliers.

Figure 4 plots the slope coefficients from rolling window predictive regressions of \( MP_{\text{shock}}^{NS} \) with a window equal to 32 FOMC meetings (4 years). The coefficient is consistently positive and is statistically significant for the most of the sample period. The pre-FOMC GDP growth revisions get disconnected from the \( MP_{\text{shock}}^{NS} \) during the ZLB period, when FOMC-announcement shocks of up to one-year yields are close to zero.

2.2 Predictability for Single Bond Instruments

I focus on the predictability of the FOMC-day changes in a wide set of yields: fed funds futures and eurodollar futures used to compute \( MP_{\text{shock}} \), short-term level and slope, Treasury yields, real and nominal interest rates, and breakeven inflation (measured using TIPS). I compute short-term level and slope yield factors by taking the first two principal components across the yields implied with the 1-month to 6-month Fed funds futures and 2-quarter to 4-quarter Eurodollar futures. Due to the presence of other events during the FOMC announcement day (a macroan-
Figure 3: Revisions in professionals’ GDP growth expectations vs subsequent $MP_{Shock}^{NS}$. I plot $\Delta \bar{y}_{t-1}$ against $MP_{Shock}^{NS}_t$. The regression results corresponding to this plot are reported in the first row of Table 1. The monetary policy shock is from Nakamura and Steinsson (2018). The full sample is 1995-2014.
Figure 4: **Rolling window predictive regressions of $MPshock^N$**. I run rolling window predictive regressions of $MPshock^N$ (Panel A) and $MPshock^{GSS}$ (Panel B) on the pre-FOMC revisions in GDP expectations with a window equal to 32 FOMC meetings (4 years). The first estimation is in 1998. The solid line is the slope coefficient and the dotted line is a 1.95 standard error band for the coefficient.
nouncement in the morning of 20% of FOMC announcement days may cause a non-Fed related jump in yields), the FOMC-day changes are less precise than 30-minute changes in yields used in the previous subsections.

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<td></td>
<td>$b$</td>
<td>$t$-stat</td>
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<tr>
<td>1M Fed funds futures</td>
<td>4.4</td>
<td>[1.8]</td>
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<tr>
<td>3M Fed funds futures</td>
<td>6.3</td>
<td>[3.4]</td>
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<tr>
<td>6M Fed funds futures</td>
<td>8.4</td>
<td>[4.5]</td>
</tr>
<tr>
<td>2Q ED futures</td>
<td>13.8</td>
<td>[3.2]</td>
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<tr>
<td>3Q ED futures</td>
<td>12.4</td>
<td>[3.4]</td>
</tr>
<tr>
<td>4Q ED futures</td>
<td>12.4</td>
<td>[3.5]</td>
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<tr>
<td>Short-term level</td>
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<td>[4.2]</td>
</tr>
<tr>
<td>Short-term slope</td>
<td>-0.3</td>
<td>[-0.8]</td>
</tr>
<tr>
<td>2Y Treasury Yield</td>
<td>7.0</td>
<td>[2.8]</td>
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<tr>
<td>5Y Treasury Yield</td>
<td>10.2</td>
<td>[2.7]</td>
</tr>
<tr>
<td>10Y TIPS nominal</td>
<td>10.0</td>
<td>[2.8]</td>
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<tr>
<td>10Y TIPS real</td>
<td>9.7</td>
<td>[2.4]</td>
</tr>
<tr>
<td>10Y TIPS inflation</td>
<td>0.5</td>
<td>[0.3]</td>
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Table 2: Predicting Changes in Interest Rates on FOMC Announcement Day. Table shows the results from running predictive regressions $\Delta i_t^{FOMC} = a + b \Delta \bar{y}_{t-1} + \varepsilon_t$. The independent variable is the pre-FOMC month-to-month revision in Blue Chip professionals’ output growth expectations for the year ahead. Short-term level and slope is the first and second principal component across yields implied with fed funds futures and eurodollar futures. All regressions use scheduled FOMC meetings only. The $R^2$ are in %. $N$ denotes the number of meetings used in each regression.

Table 2 reports the results from running single predictive regressions of FOMC-day changes in the yields on the pre-FOMC revision in professionals’ year-ahead GDP forecasts,

$$\Delta i_t^{FOMC} = a + b \Delta \bar{y}_{t-1} + \varepsilon_t \quad (2)$$

The predictability is weak for the shortest fed funds futures – especially when excluding the crisis and ZLB periods. The results are the strongest for the yields implied with the 6-month Fed funds futures and 2-quarter Eurodollar futures: 10% and 7% $R^2$ for the full sample. All the predictability comes from the change in the level of up-to-1 year yields, as the predictability for the short-term slope is zero. There is also no predictability for the long-term slope (10-year minus 1-year yield), unreported. GDP growth forecast revisions also predict changes in 2-year to 10-year yields. The results for the TIPS indicate that the forecast revisions predict
Figure 5: Trading Strategy. The strategy trades equally-weighted portfolio of 1M, 3M, 6M fed funds futures, 2Q, 3Q, and 4Q Eurodollar futures on the pre-scheduled FOMC announcement. The strategy bets on contractionary (expansionary) monetary policy shock, if the pre-FOMC revisions in professionals GDP expectations, $\Delta \tilde{y}_{t-1}$, are positive (negative).

FOMC-day changes in the real rate, while the breakeven inflation predictability is close to zero.

2.3 Trading Strategy

Time to build a trading strategy based on my predictability results! I use an equally-weighted portfolio of 1M, 3M, 6M fed funds futures, 2Q, 3Q, and 4Q Eurodollar futures. This portfolio is the short-term level yield factor. My strategy bets on an interest rates increase at an FOMC announcement, if Blue Chip professionals have revised their 1-year GDP expectations upwards in the most recent release. The strategy bets on an interest rates decrease, if Blue Chip professionals recently revised their GDP expectations downwards. Figure 5 plots cumulative basis points earned from employing such trading strategy. The strategy delivers a 15 bps mean annualized return with a $3.5 \ t$-stat and 0.75 Sharpe ratio. With eight pre-scheduled FOMC announcement days a year, the strategy implies going long or short the interest rate portfolio 176 times in total.
3. Implications of Predictability in Policy News Shocks

My key result that professionals’ GDP revisions predict monetary policy news shocks has important implications for studying the effects of monetary policy on the economy. I show that the presence of the predictable component of the policy news shock biases upwards the effects of Fed’s actions on the economy: the policy news shock, orthogonal to the pre-FOMC growth forecasts revisions, has no effect on professionals’ post-FOMC growth forecasts and has a more negative effect on future actual GDP, than the raw policy news shock.

3.1 Effects of Policy News Shocks on Future Output

For comparison purposes, I construct monthly monetary policy shocks by assigning zeros to the months with no scheduled FOMC meeting. The months with unscheduled meetings also get zeros, as I excluded them from my analysis. I use regression (1) to decompose $MP\text{shock}^{NS}$ into two components: (1) component, predicted with professionals’ GDP revisions, $MP\text{shock}_t = 0.4 + 4.2\Delta\hat{y}_{t-1}$, (2) the orthogonal shock component, defined as the regression residuals, $MP\text{shock}^+ = \varepsilon_t$.

To calculate the impulse response of actual output for horizon $h$, I run single regressions of future changes in actual industrial production growth, $Y_{t+h} - Y_t$, on the raw monetary policy shock and on each of the two shock components. Figure 6 plots slope coefficients from running these regressions. The response of raw monetary policy shock on future output (Panel A) is positive and statistically insignificant during the first 24 months, turns negative after that, and gets statistically significant 40 months after the shock. The effect of the predictable component of the monetary policy shock (Panel B) is significantly positive starting from the first month after the shock and turns insignificant after 12 months. An upward revision in professionals’ growth forecast predicts improvement in actual growth in the following year. On the other hand, the effect of the orthogonal component of the policy news shock (Panel C) substantially differs from the latter: it is negative and statistically insignificant during the first 32 months, turns significantly negative afterwards.

This finding highlights the importance of orthogonalizing policy news shocks to professionals’ GDP forecast revisions, as the raw contractionary policy news shock includes the Fed’s response to the improvement in economic conditions, captured by the revisions of professionals’ GDP forecasts. Upward revisions in GDP forecasts are followed by an increase in actual

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5 Note, that the regression coefficient is different from 6.7, reported in the first row of Table 1, since I run monthly regressions, as opposed to FOMC-frequency ones.
Figure 6: **Response of Industrial Production.** The Figure plots impulse responses of industrial production to $M P_{shock}^{NS}$ (Panel A) and its two components. The first component is predicted with professionals' GDP revisions (Panel B) and the second component is orthogonal to professionals' GDP revisions (Panel C). Dotted lines depict 2 standard error bands. I calculate Newey-West standard errors with the number of lags equal to the overlap plus 5. The sample is from 1995–2014.

Industrial production, thereby biasing upward the effect of contractionary policy news shock. The policy news shock, truly unexpected by all market participants, has a more negative impact on future output, than the raw policy news shock: the initial response turns statistically significantly negative 8 months earlier than after the raw policy news shocks.\(^6\)

### 3.2 Effects of Policy News Shock on Professionals’ GDP Expectations

Here I study positive contemporaneous relation between Blue Chip professionals’ GDP forecast revisions over the month $t$ and the policy news shock occurring within month $t$. This relation was recently documented by Campbell, Evans, Fisher, and Justiniano (2012) and Nakamura and Steinsson (2018), who interpret it as the "Fed's information effect": a contractionary monetary policy shock signals the Fed's private knowledge that the economy is doing well and thereby causes upward revisions in agents’ GDP forecasts. To shed more light on this relation, first, I look at the response of professionals’ revisions in GDP forecasts to the two components of policy news shock.

Figure 7 plots the response of professionals’ GDP expectations to the policy news shock and its two components during a year after the FOMC announcement. The positive response in Panel A suggests that professionals revise upwards their GDP expectations following a raw\(^6\) The results for decomposing $M P_{shock}^{GSS}$ are similar (unreported).
Figure 7: **Response of Professionals’ GDP Expectations.** The Figure plots impulse responses of professionals’ revisions in 1-year GDP expectations to $MPshock^{NS}$ (Panel A) and its two components (Panels B and C). Dotted lines depict 2 standard error bands. I calculate Newey-West standard errors with the number of lags equal to the overlap plus 5. The sample is from 1995–2014.

contractionary policy news shock. The results in the other two panels suggests that this positive response is entirely driven by the component of the policy news shock, predicted with past GDP growth revisions (see **Panel B**). The orthogonal policy news shock component has no effect on the professionals’ GDP growth forecasts (see **Panel C**).

The latter result questions causality between $MPshock_t$ and revisions in contemporaneous Blue Chip professionals’ GDP growth forecasts, $\Delta \tilde{y}_t$. Another way to illustrate that this positive relation is driven by pre-FOMC announcement GDP growth revisions, $\tilde{y}_{t-1}$, is to run the following FOMC-frequency regressions:

\[ \Delta \tilde{y}_t = a + bMPshock_t + \varepsilon_t \]  
\[ \Delta \tilde{y}_t = a + b\Delta \tilde{y}_{t-1} + \varepsilon_t \]  
\[ \Delta \tilde{y}_t = a + bMPshock_t + c\Delta \tilde{y}_{t-1} + \varepsilon_t \]

Table 3 reports the regression results for $MPshock^{NS}$ and $MPshock^{GSS}$. In single regressions (3), see **Panel A**, monetary policy new shocks are positively and significantly related to contemporaneous professionals’ forecast revisions ($t\text{-stat}=3$, $R^2=5\%$). This finding is consistent with Nakamura and Steinsson (2018), who interpret this contemporaneous relationship as an evidence of the Fed’s contractionary monetary policy action affecting professionals’ beliefs about the economy as they revise their GDP expectations upwards. The last row of **Panel A** reports the results for regression (4): revisions positively forecast future revisions ($R^2=24\%$). The rigidity in consensus forecasts was documented in Coibion and Gorodnichenko (2015),
who find that GDP and inflation consensus forecast revisions forecast future announcement errors.

Panel B of Table 3 shows the results from running double regressions (5) for the two versions of monetary policy shocks. Monetary policy news shocks turn statistically insignificant ($t$-stat=0.5 and 0.1) in the presence of the pre-FOMC $\Delta \hat{y}_{t-1}$. The $t$-stats for past revisions are around 4 and the $R^2$ are less than 1% higher than 24% for single regressions with past revisions. This result indicates that the contemporaneous relation between $MP_{shock}$ and $\Delta \hat{y}_t$ is driven by $\Delta \hat{y}_{t-1}$, which forecasts both $MP_{shock}$ and $\Delta \hat{y}_t$. Failing to orthogonalize the policy news shock to the pre-FOMC forecast revisions creates an illusion that policy news shocks carry Fed’s information effect and cause revisions in professionals’ GDP forecasts. The orthogonal monetary policy news shock has zero correlation with contemporaneous GDP forecast revisions and no predictability of future revisions, suggesting the neutrality of the Fed’s actions for the professional’s beliefs about the economy.

### Table 3: Revisions in Professionals’ GDP Expectations

I run regressions of revisions in professionals’ GDP expectations in the months of FOMC meetings on the monetary policy shocks and pre-FOMC revisions. The $R^2$ are in %. $N$ denotes the number of meetings used in each regression. Full sample for $MP_{shock}^{NS}$ is 1995-2015, full sample for $MP_{shock}^{GSS}$ is 1994-2015.

<table>
<thead>
<tr>
<th></th>
<th>$t$-stat</th>
<th>$R^2$</th>
<th>$N$</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Panel A. Single regressions of $\Delta \hat{y}_t$</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$MP_{shock}^{NS}$</td>
<td>1.4 [3.0]</td>
<td>5.2</td>
<td>154</td>
</tr>
<tr>
<td>$MP_{shock}^{GSS}$</td>
<td>1.0 [3.1]</td>
<td>2.9</td>
<td>175</td>
</tr>
<tr>
<td>$\Delta \hat{y}_{t-1}$</td>
<td>0.5 [5.0]</td>
<td>24.3</td>
<td>175</td>
</tr>
<tr>
<td><strong>Panel B. Double regressions of $\Delta \hat{y}_t$</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$MP_{shock}^{NS}$</td>
<td>0.3 [0.5]</td>
<td>24.8</td>
<td>154</td>
</tr>
<tr>
<td>$\Delta \hat{y}_{t-1}$</td>
<td>0.5 [3.9]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$MP_{shock}^{GSS}$</td>
<td>0.0 [0.1]</td>
<td>24.3</td>
<td>175</td>
</tr>
<tr>
<td>$\Delta \hat{y}_{t-1}$</td>
<td>0.5 [4.5]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4. Horse Races of Monetary Policy News Shock Predictability

My main results indicate that professionals’ pre-FOMC announcement revisions in GDP expectations partially predict monetary policy news shocks. How unique is the role of professionals’
GDP growth revisions for the policy news real-time predictability? Do public economic and financial variables predict policy news shock? This section documents that while some financial variables help to predict future monetary policy news shock, the professionals’ revisions still contain independent information for forecasting the Fed’s action.

I test whether predictive information contained in professionals’ revisions of GDP expectations can be captured by (1) macroeconomic variables, (2) financial variables, (3) revisions to Blue Chip professionals’ forecasts of other macrovariables. For macroeconomic variables, I use real-time first-release observations from Philadelphia Fed. For financial variables, I use the levels as of two days prior to each scheduled FOMC meeting and changes from the two days after a prior FOMC meeting to two days prior to this FOMC meeting.

For each variable $X$, I run single and double predictive regressions of $MP_{shock}^{NS}$:

$$MP_{shock}^t = a + bX_{t-1} + \varepsilon_t$$

(6)

$$MP_{shock}^t = a + bX_{t-1} + b\Delta\tilde{y}_{t-1} + \varepsilon_t$$

(7)

Table 4 reports the results, see Panel A for single regressions, Panel B for double regressions with professionals’ revisions. None of the macroeconomic variables is statistically significant at 5% level. Several financial variables are statistically significant: levels and changes in 6M Treasury yield spread ($R^2=6.1\%$ and 6.9%), yield spread between BAA and AAA corporate bonds (8.8% and 2.3%), levels of the VIX index (6.1%), and changes in economic policy uncertainty (3.6%). Revisions in Blue Chip year-ahead expectations of industrial production, unemployment, and 3-month Treasury yield also predict monetary policy shocks: $R^2=9.0\%$, 6.6%, 13.3%.

Panel B reports the results from double regressions with the pre-FOMC revisions in GDP expectations. The revisions are significant in all regressions, while none of the other variables survive. These findings are similar when excluding crisis periods, when adding more lags of macro and financial variables, or when predicting $MP_{shock}^{GSS}$ instead of $MP_{shock}^{NS}$ (unreported). I conclude that professionals’ GDP revisions contain some important information about future monetary policy news shocks, that is not captured by other variables, considered in my analysis.

5. Forecasting Monthly Forecasts Errors in Fed Funds Futures

I show that predictive power of Blue Chip professionals’ GDP growth revisions extends to the days outside FOMC announcements. Piazzesi and Swanson (2008) document that fed funds futures exhibit the risk premia, proxied by employment growth, corporate spreads, and treasury spreads. They show that these proxies forecast 2-month through 6-month fed funds futures excess returns (minus forecast errors in fed funds futures in my setting) with a 10% through 39% $R^2$.\(^7\)

To what extent do fed funds funds futures predict actual fed funds rate? I denote the yield

\(^7\)Piazzesi and Swanson (2008) do not find predictability for high-frequency monetary policy shocks, measured as unexpected daily changes in 1-month fed funds futures on an FOMC announcement. They conclude that these monetary shocks are not contaminated by time-varying risk premia, as they “difference out” risk premia that are moving at lower, business-cycle frequencies.
Figure 8: Revisions in Professionals’ GDP Forecasts and Forecast Errors in Fed Funds Futures. The Figure plots monthly revisions in professionals year-ahead GDP forecasts in month $t$, and $t+3$ forecast errors for 3-month-ahead fed funds futures, $FE_{t+3}$.

A positive (negative) $FE_{t+n}$ value indicates that the actual fed funds rate value turns out to be higher (lower) than the rate implied by the fed funds futures contract. I use middle of the month $f_t^{(n)}$ data in order to match the latest Blue Chip GDP forecasts data, which is available on the 10-12th day of each month. The results for end-of-the-month $f_t^{(n)}$ are similar (unreported). To make forecast errors for different $n$ comparable, multiply $FE_{t+n}$ in (8) by $12/n$.

Figure 8 plots forecast errors for a 3-month-ahead fed funds futures, $FE_{t+3}^{(3)}$. The forecast errors are the largest for the two crisis periods periods, 2000-2001 and 2007-2008. In those periods, the fed funds futures were implying a higher fed funds rate, than it was realized in the following months, resulting in large negative forecast errors. Blue line plots monthly revisions in Blue Chip professionals’ year-ahead GDP forecasts in month $t$. The correlation between the month $t$ revisions and $t+3$ forecast errors in 3-month fed funds futures is as high as 53%!

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8Piazzesi and Swanson (2008) define excess returns on the fed funds futures as $f_t^{(n)} - r_{t+n}$. I flip the definition to match the analysis in the first part of my paper, which is focused on predicting changes in yields rather than changes in bond prices.
The relationship between the two series is the strongest in 2000-2001 and 2007-2008, when professionals were doing large downward revisions in their GDP forecasts. These downward revisions were not instantaneously incorporated by fed funds futures prices and were predicting the forecast errors in fed funds futures.

Table 5: Predicting Forecast Errors in Fed Funds Futures. I run monthly predictive regressions of $n$-month forecast errors in fed funds futures: regression (8) in Panel A, regression regression (9) in Panel B, and regression regression (10) in Panel C. I calculate Newey-West standard errors with the number of lags equal to $n + 2$. The sample is from 1994–2015.

To investigate the predictive power of monthly revisions in professionals’ GDP forecasts, $\Delta \tilde{y}_t$, more formally, I run the following regressions of 2-month through 6-month forecast errors...
in fed funds futures:

\[ FE_{t+n}^{(n)} = a^{(n)} + b^{(n)} \Delta \tilde{y}_t + \varepsilon_{t+n}^{(n)}, \]  
\[ FE_{t+n}^{(n)} = a^{(n)} + b^{(n)} X_t + \varepsilon_{t+n}^{(n)}, \]  
\[ FE_{t+n}^{(n)} = a^{(n)} + b^{(n)} X_t + b^{(n)} \Delta \tilde{y}_t + \varepsilon_{t+n}^{(n)}, \]

where \( X_t \) is a vector of fed funds futures rate itself, real-time year-on-year employment growth rate, spread of BBB-rated corporate bond yield over 10-year Treasury yield, and spread of 6-month Treasury yield over the federal funds rate. Piazzesi and Swanson (2008) document that these four variables are useful for forecasting fed funds futures excess returns. Both \( X_t \) and \( \Delta \tilde{y}_t \) are known to financial markets in the middle of month \( t \). The correlations between the \( \Delta \tilde{y}_t \) and \( X_t \) variables are below 0.5, with the largest numbers for corporate bond spread (-0.45) and Treasury spread (0.32).

Panel A of Table 5 reports the forecasting results from single regressions (9). Revisions to GDP growth forecasts is a significant predictor for forecast errors on all contracts. The \( R^2 \) varies from 8% for the 2-month contract to 28% for the 3-month contract and 21% for the 6-month contract. Panel B reports the forecasting results for \( X_t \). Both corporate and treasury spread are statistically significant for contracts with three months or more to maturity. The \( R^2 \) varies from 8% for the 2-month contract to 27% for the 3-month contract and 38% for the 6-month contract.

Panel C reports the results for the regressions with both \( X_t \) and \( \Delta \tilde{y}_t \). Revisions to GDP growth forecasts are statistically significant in the presence of all other forecasting variables \((t\text{-stats above 3})\). Compared to the results in Panel B, the predictive \( R^2 \) improves to 13% for the 2-month contract, to 39% for the 3-month contract, and to 42% for the 6-month contract. The largest incremental increase in the \( R^2 \) is for the 3-month contract: 12%. The lowest incremental increase in the \( R^2 \) is for the 6-month contract: 4%.

Overall, the results in this section indicate that revisions to professionals’ GDP forecasts help to predict monthly forecast errors on the fed funds futures contracts, suggesting that the revisions to professionals’ GDP forecasts should be considered as an additional component of risk premia in the fed funds futures prices.

### 6. Concluding Remarks

I document that Blue Chip professionals’ revisions to GDP growth expectations predict monetary policy news shocks and changes in interest rates on the FOMC announcements with an
up to 15% $R^2$. I show that ignoring this predictability biases upwards the effects of monetary policy shocks on the economy. The policy news shock, orthogonal to the pre-FOMC announcement growth revisions, does not cause upward revisions in growth forecasts and has a more negative effect on the future actual GDP growth, than the raw policy news shock. My results suggest that (1) bond market prices fail to incorporate all information available prior to FOMC announcements, resulting in predictable yield reaction to the Fed’s actions, (2) Fed’s "private information effect" (that a monetary policy news shock affects professionals’ beliefs about the economy) dissipates after controlling for lagged information contained in professionals’ GDP growth revisions.
References


