The impact of economic news on expected changes in monetary policy

John S. Lapp, Douglas K. Pearce*

Department of Economics, Poole College of Management, North Carolina State University, Raleigh, NC 27695-8110, United States

Article info

Article history:
Received 29 September 2011
Accepted 27 January 2012
Available online xxxx

JEL Classification:
E44
E52

Keywords:
Fed funds futures
Economic news
Monetary policy

Abstract

Asset prices may react to news through changes in expected monetary policy. We examine whether economic news directly affects expected changes in monetary policy, measured by changes in federal funds rate futures prices. Because these prices depend on monthly averages of the effective funds rate, the timing of FOMC meetings relative to news announcements is important and we derive a method of weighting the news that incorporates this timing. We find that the market raises (lowers) its expected change in the funds rate target after news that inflation was higher (lower) than expected or employment was stronger (weaker) than expected.

© 2012 Elsevier Inc. All rights reserved.

1. Introduction

It is well-known that "news about changing economic conditions" affects asset prices. Empirical work largely supports the prediction that asset prices quickly respond to news, although identified news events (the arrival of news observed by the researcher) typically explain only a small fraction of asset price changes. While there are many studies of the effects of news on asset prices, there is still no consensus on why the news causes such changes.1 The Bernanke/Kuttner conjecture that news about economic conditions affects expectations of future policy, which we test in this paper, bears on the question of why economic news affects asset prices.

Researchers generally assume that the news causes agents to revise their expectations of the future values of the fundamental variables that affect asset prices. But as Faust et al. (2007) point out, agents may also factor in the likely response of the Federal Reserve. For example, news that inflation was higher than expected is thought to raise the expected inflation rate, which should cause nominal interest rates to rise via the Fisher Effect. However, it may be that the market expects monetary policy to respond to the inflation surprise and raise interest rates directly. The importance of these alternative mechanisms can be seen by considering the response of exchange rates to news of unexpected inflation. In this case, an increase in expected inflation would cause the domestic currency to depreciate while the prospect of tighter monetary policy would cause it to appreciate. Andersen et al. (2003, p. 59) note that

A positive U.S. inflation surprise would tend to produce dollar depreciation (e.g. when the U.S. central bank reaction function assigns relatively low weight to the level of inflation), whereas in other interpretations it would produce dollar appreciation (e.g. when the U.S. central bank reaction function shows strong preference for low inflation, as in Taylor (1993))

* Corresponding author. Tel.: +1 919 513 2880; fax: +1 919 515 7873.
E-mail addresses: John.Lapp@ncsu.edu (J.S. Lapp), Doug.Pearce@ncsu.edu (D.K. Pearce).

1 The literature in this area is large. Recent papers include Faust et al. (2007), Andersen et al. (2007), Balduzzi et al. (2001) and Neeley and Dey (2010).

0164-0704/$ - see front matter © 2012 Elsevier Inc. All rights reserved.
doi:10.1016/j.jmacro.2012.01.009
In this paper we isolate the influence of news on expected changes in monetary policy by investigating how news changes the market’s expectation of the federal funds rate target. Previous work shows that short-run changes in federal funds rate futures prices are an appropriate measure of the market’s short-run expectations of Fed policy moves.2 We use these short-run changes as our dependent variable and estimate models relating changes in federal funds futures prices to standard measures of economic news. Since the data provide strong evidence that economic news affects expected monetary policy we explore various aspects of the effects. We consider how rapidly federal funds futures prices react to news, the symmetry of responses to positive and negative news, the possible dependency of the effects on the state of the economy, and the stability of the relationships over time.

The paper is organized as follows. Section 2 briefly reviews past work on news and asset prices. Section 3 shows how the timing of FOMC meetings must be taken into account when specifying how news affects expected monetary policy changes and describes our data. Section 4 presents our empirical specifications and our estimated results and section 5 concludes.

2. Past work on news and asset prices

Much of the empirical work connecting economic news to asset price changes was made possible by the availability of survey data on forecasts of economic announcements. Researchers generally find that asset prices respond very quickly to news as measured by the unexpected component of these economic announcements.3 Engel and Frankel (1984), among others, argued that the connection between news and asset prices depends on the effects of news on expected monetary policy. The literature supports the hypothesis that changes in expected monetary policy, as measured by the change in federal funds futures rates, affect asset prices. Andersen et al. (2003) find that the dollar appreciates after the FOMC announces an increase in its target rate while Faust et al. (2007) report that a positive change in the federal funds futures interest rate is followed by an appreciation of the dollar. Hamilton (2008) reviews and updates work showing that nominal interest rates are positively related to daily changes in the federal funds futures rate.

It remains to be shown that there is a meaningful connection between economic news and expected changes in monetary policy. Two earlier papers also investigate this issue. Burger (2004), using daily data, finds that expected monetary policy, as measured by the federal funds futures rate, responds to economic news events. More recently, Taylor (2010) looks at how higher frequency federal funds futures data react to news. These two papers ignore the timing of FOMC policy decisions and the arrival of news. Our approach differs from these by recognizing that a policy change in the target federal funds rate affects the federal funds futures market by affecting the expected average effective federal funds rate for the month.4 News can only affect the federal funds futures rate for a given month if the news arrives before the FOMC meets. Moreover, this effect is smaller the later in the month the policy change occurs. For example, we would not expect a news event to affect the current-month federal funds futures contract price if the event took place in a month in which there was no scheduled FOMC meeting or if the event occurred after that month’s FOMC meeting. We would expect a small effect on the federal funds futures contract price if the FOMC meets late in the month and, therefore, any decision will only affect the effective federal funds rate for a small part of the month. Burger (2004) and Taylor (2010) use specifications that implicitly assume that surprises have the same effects on futures prices regardless of the timing of FOMC meetings.5

Since we find evidence that economic news affects federal funds futures rates it is worth noting that previous studies have explored the details of the connection between news and asset prices. For example, Andersen et al. (2003), Aggarwal and Schirm (1998), and Sheehan and Wohar (1995) report evidence of asymmetric responses to positive and negative news while Faust et al. (2007) find that the effect of some news events changes over time. Papers have also examined whether the state of the economy affects the impact of news on asset prices. McQueen and Roley (1993), Adams et al. (2004), Boyd et al. (2005), and Andersen et al. (2007) report evidence that stock price responses to news depend on whether the economy is in an expansion or contraction. The latter paper attributes the negative response of stock prices to news that the economy is stronger than expected, when the economy is already in an expansion, to an expectation that monetary policy will raise real rates and hence the rate of discount of future cash flows. Given these findings, we explore whether the effects of news on expected changes in monetary policy also reflect these patterns.

3. Data

3.1. Measuring changes in expected monetary policy

We use daily and higher frequency fed funds futures prices to extract our measure of expected monetary policy. These futures contracts are based on the average daily effective futures rate for all calendar days in the month, using the previous

---

2 See Bundick (2007), Hamilton (2008) and Hamilton et al. (2011). Piazzesi and Swanson (2008) argue that some adjustment to the change in futures prices must be made to account for risk premiums for monthly measures of expected monetary policy, but that changes in daily futures prices, as used in our paper, should adequately difference out risk premiums that change little over short intervals.


4 This is explained in Section 3.

5 Hamilton et al. (2011) also use federal funds futures data and economic news variables but explore how these data can be used to estimate a Taylor-type rule for expected monetary policy.
We consider three futures contracts: the current-month contract, the one-month ahead contract, and the two-months ahead contract. That is for all business days in, say, October, we use the prices of the fed funds futures contracts that are based on the averages for all days in October (current month), in November (one-month ahead), and in December (two-months ahead). We are interested in the effect that news announcements have on the changes in these prices, which we assume are noisy measures of the market’s expected changes in the Fed’s target for the funds rate at FOMC meetings occurring over these horizons.9

Our approach follows Hamilton (2008). We assume that the fed funds futures rate for day d of the current month for the current-month contract, denoted $f_{0,d}$, is the market’s expectation of the average daily effective funds rate for the current month with $f_{1,d}$ and $f_{2,d}$ denoting similar expectations for the contracts for one- and two-months ahead:

$$f_{0,d} = E_d(\bar{ff}_0)$$
$$f_{1,d} = E_d(\bar{ff}_1)$$
$$f_{2,d} = E_d(\bar{ff}_2)$$

where $\bar{ff}_m$ is the average effective funds rate in month m:

$$\bar{ff}_0 = M_0^{-1} \sum_{i=1}^{M_0} \epsilon_{ff,0,i}$$
$$\bar{ff}_1 = M_1^{-1} \sum_{i=1}^{M_1} \epsilon_{ff,1,i}$$
$$\bar{ff}_2 = M_2^{-1} \sum_{i=1}^{M_2} \epsilon_{ff,2,i}$$

$M_0, M_1, and M_2$ are the number of days in the current month, one-month ahead, and two-months ahead and $\epsilon_{ff,m,i}$ is the actual effective funds rate for day i in month m.

We assume that the observed funds rate on any day i is the sum of the Fed’s target for that day (FF) plus a random error (u), which we assume is serially uncorrelated and has an expected value of zero:

$$\epsilon_{ff,m,i} = FF_{m,i} + u_{m,i}$$

We also assume that market participants believe that the Fed’s target for the funds rate will only be changed at scheduled FOMC meetings.5 Therefore,

$$f_{0,d} = M_0^{-1} \sum_{i=1}^{M_0} E_d(FF_{0,i})$$
$$f_{1,d} = M_1^{-1} \sum_{i=1}^{M_1} E_d(FF_{1,i})$$
$$f_{2,d} = M_2^{-1} \sum_{i=1}^{M_2} E_d(FF_{2,i})$$

Given the above assumptions, the effects of news on the fed funds futures rates should depend on the timing of the FOMC meetings. Take the current-month contract for example. If there is no FOMC meeting in the current month or if the news happens after the FOMC meeting has occurred, the news should have no effect on the futures rate because the news cannot affect the Fed’s target for the remainder of the current month. If there is a meeting on, say, the 16th of a 30-day month and the news happens prior to the meeting, then the change in the futures rate will reflect the expected effect on the target divided by 2, since the new target applies to half of the days of the month. Note that we cannot identify separately the effect of news on the probability of a change in the target and the effect on the size of the change in the target. If our results imply that the news event increases the expected target by 2.5 basis points, this would be consistent with the news raising the probability of a change by 10% along with an expected change in the target of 25 basis points or with the news raising the probability by 5% along with an expected change in the target of 50 basis points.

---

6 See Kuttner (2001) and Hamilton et al. (2011) for details on these contracts.

7 The monthly average effective funds rate for our time period differs, in absolute value, from the monthly average target by an average of 2.8 basis points.

8 The quoted futures price can be converted into an interest rate measure as follows: $f = (100 – \text{price})$ so that a price of 96.2 implies an average daily effective funds rate of 3.8%.

9 Of the 50 changes in the fed funds rate target over our sample period, 5 occurred between formal FOMC meetings when the FOMC conducted a conference call. The dates of these unscheduled changes are October 15, 1998, January 3, 2001, April 18, 2001, September 17, 2001 and January 22, 2008. Conference calls are not usually known ahead of time. Data on changes in the Fed’s target for the funds rate are from the St. Louis Fed’s web site.

---

Please cite this article in press as: Lapp, J.S., Pearce, D.K. The impact of economic news on expected changes in monetary policy. Journal of Macroeconomics (2012), doi:10.1016/j.jmacro.2012.01.009
Because we are investigating the effects on the current-month contract, the one-month ahead contract, and the two-months ahead contract, we need to consider the possible patterns of FOMC meetings over any three-month horizon. There are five possible meeting patterns:

1. meeting this month, meeting next month, meeting two-months ahead,
2. meeting, meeting, no meeting,
3. meeting, no meeting, meeting,
4. no meeting, meeting, meeting,
5. no meeting, meeting, no meeting.

The effect of news may be spread over the current and future contracts, as posited by models using a partial-adjustment version of the Taylor rule. This requires an additional assumption for our approach, namely that the effect of news on future target changes does not depend on the sequence of FOMC meetings. For example, suppose news on inflation causes the FOMC to raise its target by 75 basis points. We assume that the FOMC spreads the changes over the next three meetings independently of the timing of those meetings. If it wants to spread the increase evenly, it will raise the target 25 basis points at each meeting even if this takes four months, that is that the next three meetings occur over the next four months. We assume that this would not change if the meetings were over the next three months.

Given our assumptions, we can now model how news should affect the fed funds futures rate on different contracts depending on the timing of meetings. We have derived the effect of news on each contract month’s futures rate as follows:

\[ \Delta f_{0,d} = \beta_0 X_{0,d} + u_{0,d} \]  
(9)

where

\[ X_{0,d} = [(M0 - D0 + 1)/M0]I_0 N_d \]

(9a)

\[ I_0 = 1 \text{ if } d \leq D0 \quad \text{and } I_0 = 0 \text{ if } d > D0 \quad (D0 = 0 \text{ if no meeting in the month}). \]

(9b)

\[ \beta_0 \] is the effect of a unit change in \( N \) on the expected fed funds target announced at the meeting to be held on \( D0 \).

Similarly,

\[ \Delta f_{1,d} = \beta_0 X_{0,d} + \beta_1 X_{1,d} + u_{1,d} \]  
(10)

where

\[ X_{0,d} = I_0 N_d \]

(10a)

\[ X_{1,d} = [(M1 - D1 + 1)/M1]I_1 N_d \quad \text{and } I_1 = 1 \text{ if } D1 > 0; I_1 = 0 \text{ if there is no meeting in the month ahead} \]

(10b)

\[ \beta_1 \] is the effect of a unit change in \( N \) on the expected fed funds target announced at the meeting to be held on \( D1 \).

\[ \Delta f_{2,d} = \beta_0 X_{0,d} + \beta_1 X_{1,d} + \beta_2 X_{2,d} + u_{2,d} \]  
(11)

where

\[ X_{0,d} = I_0 N_d \]

(11a)

\[ X_{1,d} = I_1 N_d \]

(11b)

\[ X_{2,d} = [(M2 - D2 + 1)/M2]I_2 N_d \quad \text{and } I_2 = 1 \text{ if } D2 > 0; I_2 = 0 \text{ if there is no meeting in two months ahead} \]

(11c)

\[ \beta_2 \] is the effect of a unit change in \( N \) on the expected fed funds target announced at the meeting to be held on \( D2 \).

We estimate models similar to Eqs. (9)–(11) but allow for multiple news events on day \( d \).

We start our data on January 2, 1995 and end on March 28, 2008. These dates correspond to the period for which we have daily and higher frequency data on fed funds futures prices.

3.2. Measuring economic news

We measure news in the same way as many previous studies, namely as the difference between the actual announcements and the median forecasts from a survey of money market participants. Previous work has shown that these survey forecasts appear unbiased and competitive with other forecasts. Moreover, they are usually publicized so that market

---

10 Over our sample, there is never a case where two months go by without a scheduled meeting.
11 Appendix A gives the derivations.
12 All news announcements are in the morning while the FOMC decisions are announced in the afternoon.
13 The futures data were purchased from the Chicago Mercantile Exchange.
14 Money Market Services initially conducted the surveys. The survey data are currently maintained and sold by Haver Analytics.
15 See for example, Pearce and Roley (1985).
participants are aware of "average opinion". The news announcements occur prior to the close of the fed funds futures market. Table 1 gives the announcements we consider, their units and timing, and associated descriptive statistics for the unexpected, or news, components for our sample period.16

4. Empirical specifications and results

4.1. The basic model

We begin by estimating models based on Eqs. (9)-(11) using end-of-day data for the change in the futures rate. Thirteen news announcements are included in each equation.17 For the current-month contracts, there is one set of daily weights applied to all news items:

$$\Delta f_{0,t} = \sum \beta_{0,i} w_{00,t} N_{i,t} + \varepsilon_{0,t}$$

(12)

where $\Delta f_{0,t} =$ the change in the current-month fed funds futures rate

$$w_{00,t} = \begin{cases} (M_0 - D_0 + 1)/M_0 & \text{if } D_0 > 0 \\
0 & \text{otherwise \ (i.e. no meeting in the month)} \end{cases}$$

(12a)

$N_{i,t} =$ the unexpected component of the announced value of economic variable $i$ measured in standard deviation units.18

For the one-month ahead contracts the news items appear twice, with different weights as given in Eqs. (10) and (10a):

$$\Delta f_{1,t} = \sum \beta_{0,i} w_{01,t} N_{i,t} + \sum \beta_{1,i} w_{11,t} N_{i,t} + \varepsilon_{1,t}$$

(13)

where

$$w_{01,t} = I_0$$

(13a)

$$w_{11,t} = \begin{cases} (M_1 - D_1 + 1)/M_1 & \text{if } D_1 > 0, 0 \text{ otherwise \ (i.e. no meeting that month)} \\
0 & \text{no meeting in the month} \end{cases}$$

(13b)

Similarly, for the two-months ahead contracts the news items appear three times, with different weights as given in Eqs. (11), (11a), and (11b):

$$\Delta f_{2,t} = \sum \beta_{0,i} w_{02,t} N_{i,t} + \sum \beta_{1,i} w_{12,t} N_{i,t} + \sum \beta_{2,i} w_{22,t} N_{i,t} + \varepsilon_{2,t}$$

(14)

where

16 There is one missing observation for expectations: the January 1996 survey forecast for durable goods orders. The reported estimates set this news event to zero. Assuming that the news was the error from an ARIMA model estimated using prior announcements had no significant effect on the results. There are also two weeks at the end of 1995 without announcements on initial unemployment claims or personal income changes due to the federal government partial closure so we set those events to zero.

17 Core CPI and CPI announcements are made at the same time. We report results using core CPI, but not standard CPI. If we use the standard CPI we get similar results to using the core CPI but when both are included the core CPI surprise is usually significant and the standard CPI surprise is never significant. The simple correlation coefficient for the two surprises is .42, significant at the .001 level.

18 Before adjusting for timing we measure the news as news = (announcement − survey median forecast)/standard deviation of forecast error.

Table 1


<table>
<thead>
<tr>
<th>News event</th>
<th>Units</th>
<th>Time</th>
<th>Mean, std. dev.</th>
<th>Maximum, minimum</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPI</td>
<td>Percentage change</td>
<td>8:30 am</td>
<td>-0.021, 0.129</td>
<td>0.3, -0.5</td>
<td>159</td>
</tr>
<tr>
<td>Core CPI</td>
<td>Percentage change</td>
<td>8:30 am</td>
<td>-0.015, 0.091</td>
<td>0.2, -0.3</td>
<td>159</td>
</tr>
<tr>
<td>PPI</td>
<td>Percentage change</td>
<td>8:30 am</td>
<td>0.001, 0.439</td>
<td>1.7, -1.2</td>
<td>159</td>
</tr>
<tr>
<td>Civilian unemployment rate</td>
<td>Level in percentage points</td>
<td>8:30 am</td>
<td>-0.039, 0.136</td>
<td>0.3, -3</td>
<td>159</td>
</tr>
<tr>
<td>Change in nonfarm payrolls</td>
<td>Thousands</td>
<td>8:30 am</td>
<td>-0.1977, 0.10476</td>
<td>0.408, -0.328</td>
<td>159</td>
</tr>
<tr>
<td>Initial unemployment claims</td>
<td>Thousands</td>
<td>8:30 am</td>
<td>-0.165, 18.582</td>
<td>85.00, -167.00</td>
<td>687</td>
</tr>
<tr>
<td>Industrial production</td>
<td>Percentage change</td>
<td>9:15 am</td>
<td>-0.001, 0.296</td>
<td>0.9, -7</td>
<td>159</td>
</tr>
<tr>
<td>Retail sales</td>
<td>Percentage change</td>
<td>8:30 am</td>
<td>0.000, 0.605</td>
<td>5.00, -1.80</td>
<td>159</td>
</tr>
<tr>
<td>Housing starts</td>
<td>Millions of units</td>
<td>8:30 am</td>
<td>0.010, 0.088</td>
<td>0.246, -0.273</td>
<td>158</td>
</tr>
<tr>
<td>Durable goods orders</td>
<td>Percentage change</td>
<td>8:30 am</td>
<td>-0.090, 2.711</td>
<td>10.80, -7.60</td>
<td>159</td>
</tr>
<tr>
<td>Personal income</td>
<td>Percentage change</td>
<td>8:30 am</td>
<td>0.047, 0.236</td>
<td>1.4, -60</td>
<td>159</td>
</tr>
<tr>
<td>Trade deficit</td>
<td>$ Billions</td>
<td>8:30 am</td>
<td>-0.112, 2.385</td>
<td>7.30, -9.10</td>
<td>159</td>
</tr>
<tr>
<td>Index of leading indicators</td>
<td>Percentage change</td>
<td>10:00 am</td>
<td>-0.011, 0.166</td>
<td>0.70, -0.50</td>
<td>159</td>
</tr>
<tr>
<td>Index of consumer confidence</td>
<td>Percentage change</td>
<td>10:00 am</td>
<td>0.609, 4.782</td>
<td>13.20, -13.00</td>
<td>159</td>
</tr>
</tbody>
</table>

Notes: News events are the unexpected components of announcements measured by the announced value less the expected value taken from the MMS surveys. The percentage changes are for month-over-month changes.
and the have, by themselves, only a small effect on the market’s probability of target rate changes. Since a typical change in the target is 25 or 50 basis points, the estimates suggest that these individual news events by about .6 and .7 basis points, respectively. The other surprises appear to have no significant effect on the current-month about 2.4 basis points. A positive, one-standard deviation surprise in nonfarm payrolls raises the expected target by about

Statistically significant coefficients at the .01 levels. 

Notes: Standard errors are in parentheses.

Cross-equation restrictions $2(39) = 50.83$

Table 2

<table>
<thead>
<tr>
<th>News Variable</th>
<th>Current-month contract $b_0$</th>
<th>One-month ahead contract $b_0$</th>
<th>One-month ahead contract $b_1$</th>
<th>Two-months ahead contract $b_0$</th>
<th>Two-months ahead contract $b_1$</th>
<th>Two-months ahead contract $b_2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core CPI</td>
<td>.0241 (.0055)**</td>
<td>.0138 (.0030)**</td>
<td>.0025 (.0020)</td>
<td>.0164 (.0038)**</td>
<td>.0025 (.0013)**</td>
<td>-.0003 (.0029)</td>
</tr>
<tr>
<td>PPI</td>
<td>.0093 (.0061)</td>
<td>.0118 (.0030)**</td>
<td>.0036 (.0022)**</td>
<td>.0096 (.0042)**</td>
<td>.0017 (.0014)</td>
<td>.0038 (.0040)</td>
</tr>
<tr>
<td>Unemployment rate</td>
<td>-.0061 (.0033)**</td>
<td>-.0076 (.0023)**</td>
<td>-.0111 (.0025)**</td>
<td>-.0050 (.0031)</td>
<td>-.0117 (.0018)**</td>
<td>-.0069 (.0027)**</td>
</tr>
<tr>
<td>Nonfarm payrolls</td>
<td>.0156 (.0034)**</td>
<td>.0151 (.0023)**</td>
<td>.0117 (.0024)**</td>
<td>.0163 (.0031)**</td>
<td>.0143 (.0017)**</td>
<td>.0090 (.0030)**</td>
</tr>
<tr>
<td>Unemployment claims</td>
<td>-.0068 (.0030)**</td>
<td>-.0047 (.0016)**</td>
<td>-.0014 (.0008)**</td>
<td>-.0042 (.0021)**</td>
<td>-.0020 (.008)**</td>
<td>-.0121 (.0014)</td>
</tr>
<tr>
<td>Industrial production</td>
<td>.0091 (.0053)</td>
<td>.0076 (.0025)**</td>
<td>.0029 (.0024)</td>
<td>.0072 (.0034)**</td>
<td>.0030 (.0017)</td>
<td>.0017 (.0033)</td>
</tr>
<tr>
<td>Retail sales</td>
<td>.0078 (.0066)</td>
<td>.0080 (.0036)**</td>
<td>.0058 (.0021)**</td>
<td>.0097 (.0047)**</td>
<td>.0060 (.0017)**</td>
<td>.0003 (.0038)</td>
</tr>
<tr>
<td>Housing starts</td>
<td>.0047 (.0064)</td>
<td>.0037 (.0029)</td>
<td>.0021 (.0022)</td>
<td>-.0022 (.0039)</td>
<td>.0006 (.0015)</td>
<td>.0058 (.0028)**</td>
</tr>
<tr>
<td>Durable goods orders</td>
<td>.0019 (.0426)</td>
<td>.0055 (.0552)</td>
<td>.0047 (.0022)**</td>
<td>.0085 (.0063)</td>
<td>.0043 (.015)**</td>
<td>.0038 (.026)**</td>
</tr>
<tr>
<td>Personal income</td>
<td>.0038 (.0046)</td>
<td>.0016 (.036)</td>
<td>.0002 (.017)</td>
<td>.0054 (.0045)</td>
<td>.0023 (.0016)</td>
<td>-.0197 (.0027)**</td>
</tr>
<tr>
<td>Trade deficit</td>
<td>.0047 (.0059)</td>
<td>.0020 (.031)</td>
<td>-.0081 (.024)**</td>
<td>.0041 (.042)</td>
<td>-.0002 (.014)</td>
<td>-.030 (.0039)</td>
</tr>
<tr>
<td>Leading indicators</td>
<td>.0071 (.0069)</td>
<td>.0017 (.026)</td>
<td>.0058 (.025)**</td>
<td>-.0008 (.037)</td>
<td>.0018 (.0015)</td>
<td>.0094 (.0034)**</td>
</tr>
<tr>
<td>Consumer confidence</td>
<td>-.0169 (.0309)</td>
<td>.0011 (.0447)</td>
<td>.0040 (.022)</td>
<td>.0014 (.0058)</td>
<td>.0035 (.015)**</td>
<td>.0047 (.0020)**</td>
</tr>
<tr>
<td>Constant</td>
<td>.0008 (.0003)**</td>
<td>-.0017 (.0004)**</td>
<td></td>
<td></td>
<td></td>
<td>-.019 (.0005)**</td>
</tr>
</tbody>
</table>

Cross-equation restrictions $2(39) = 50.83$

We estimate Eqs. (12)–(14) by the seemingly unrelated regressions (SUR) method because unobserved shocks are likely to affect the three contracts contemporaneously and because this allows us to test the cross-equation constraints implied by our model. As formulated, the model assumes that the $b_0$ coefficients for each news event are equal across the three equations and the $b_1$ coefficients are equal across the last two equations.

Table 2 presents the SUR estimates of the model for all business days in our sample. For the rate on the current-month contract, five news events appear statistically significant with the anticipated signs. A positive, one-standard deviation surprise in core CPI inflation, assuming a current-month FOMC meeting after this news event, raises the expected target by about 2.4 basis points. A positive, one-standard deviation surprise in nonfarm payrolls raises the expected target by about 1.6 basis points while a positive, one-standard deviation surprise to industrial production raises the target by about .9 basis points. A one standard deviation decrease in the unemployment rate or in initial unemployment claims increases the target by about .6 and .7 basis points, respectively. The other surprises appear to have no significant effect on the current-month contract. Since a typical change in the target is 25 or 50 basis points, the estimates suggest that these individual news events have, by themselves, only a small effect on the market’s probability of target rate changes.

For the one-month ahead contracts, the results are similar in that the $b_0$ estimates that were significant for the current-month contracts are still statistically significant, but the effect of the core CPI surprise is smaller and the PPI surprise and the retail sales surprise are now significant. More news events appear significant with respect to their effects on the expected FOMC decision for meetings that occur in the next month, that is the $b_1$ coefficients from the one-month ahead contracts. The estimates for the one-month ahead contracts imply that, when both the $b_0$s and $b_1$s are significant, the effects of surprises on the expected change in the funds rate target for a current-month FOMC meeting (the $b_0$s) are larger than the effects on the expected target change at the FOMC meeting to be held one-month ahead (the $b_1$s), with the exception of the unemployment rate surprise. Several surprises – durable goods, the trade deficit, leading indicators, and consumer confidence – appear, however, to affect the market’s expectation of the FOMC’s decision one-month ahead but not the current-month decision.

For the two-months ahead contracts, the results are similar to those for the one-month ahead contract. The most robust finding is that the monthly payroll announcements significantly affect the market's expectation of target rate changes for meetings that occur in each month. Inflation surprises appear to affect the market’s expectation of rate changes for meetings that occur in the current month and one-month ahead. Table 2 also reports the joint test of all the cross-equation constraints,

19 For all the samples, the Breusch-Pagan test indicates that the hypothesis that the error terms across the three equations are independent is strongly rejected.
20 In the unrestricted basic model, there are 13 news coefficients for the current month's contract, 26 coefficients for the one-month ahead contracts, and 39 coefficients for the two-months ahead contracts.
that is the $b_0$’s and the $\beta_1$’s are identical across contracts. The constraints cannot be rejected at the 5-percent level but would be rejected at the 10 percent level.21

Table 3 gives the total change in the expected FOMC target for the one-month ahead and two-months ahead contracts. The second column gives the total expected change ($b_0 + \beta_1$) in the target for a one-standard deviation surprise for each announcement assuming that there are meetings in both the current and next month, using the daily data on one-month ahead contracts. The next four columns give the total estimated changes in the target for one-standard deviation surprises depending on the pattern of meetings, using daily data on the two-months ahead contracts. If there are meetings in the current and both subsequent months, the total effect would be ($b_0 + \beta_1 + \beta_2$). If there are meetings only in the current and next month the estimated total effect would be ($b_0 + \beta_1$) and so on. For example, a positive one-standard deviation increase in the core CPI is estimated to increase the expected targets implicit in the one-month ahead futures prices by a total of about 1.6 basis points while a positive one-standard deviation surprise in nonfarm payrolls is estimated to increase the targets by a total of about 2.7 basis points. Similarly, a positive one-standard deviation increase in the core CPI (nonfarm payrolls) is estimated to increase the expected targets implicit in the two-months ahead futures prices by a total of about 1.9 (4) basis points if there are meetings in all three months. If there is not a meeting in the current month, the estimated effect is only .25 basis points and is not significant. The effect on the implied funds rate is of the same scale as the effects on market interest rates of news events reported by Balduzzi et al. (2001). For example, they found that a positive one-standard deviation surprise in nonfarm payrolls raised the three-month Treasury bill rate by about 6 basis points. While they interpret this to mean that the stronger economy increases inflation expectations, our results suggest that about two-thirds of the effect works through an expectation of tighter monetary policy.22

Comparing our results with those reported in Taylor (2010), who regressed changes in the fed futures contracts from 30 min prior to the announcements to 60 min after the announcements on the un-weighted surprises, the qualitative results are similar in having the largest effects from payroll and unemployment surprises but we obtain larger point estimates of the effects.23 We also find more evidence of responses to core CPI surprises. These differences are not surprising because we are estimating responses conditional on the timing of the surprise relative to FOMC meetings while Taylor estimates unconditional responses. For example, he finds for the one-month ahead contract that the response in the implied interest rate of a one standard deviation payroll surprise is about .4 basis points while our estimate is about 1.4 basis points if there is a meeting in the current month after the payroll announcement and about 1.7 basis points if there are meetings in both the current and next month.

His estimates average this effect and the smaller effect if there were no meeting in the current month and one in the next month that appeared late in the month. In other words we are estimating the market’s expectation of changes in the FOMC targets at scheduled meetings while Taylor is estimating the average change disregarding the timing of the announcements. When he uses the four-months ahead contract, he gets estimates of the response to payroll surprises that are similar to our estimates assuming meetings in all three months. Our finding that the core CPI surprises have a substantial effect on the market’s expectation of target rate changes while he does not also probably reflects our use of weighted surprises. The CPI is announced rather late in the month. Thus it will often occur after the FOMC meeting and hence should have no effect on the current-month contract or, if it occurs prior to the FOMC meeting, that meeting must be near the end of the month and will have a relatively small effect on the current-month average funds rate. We take this into account and so our conditional estimate will be larger.

Daily changes in the fed funds futures prices may yield imprecise estimates of the effects of news relative to estimates using higher frequency data given all the other information besides our measured news that may affect the market’s expectation of Fed policy. In order to evaluate this issue, we also estimated models using changes for 5-min intervals. Table 4 reports the estimates where the dependent variable is the change in the implied funds rate for the 5 min after the announcements. Because the announcements are not at the same time, the tabled results are for three separate regressions: one for the ten 8:30 a.m. ET announcements, one for the 9:15 a.m. ET announcement, and one for the two 10:00 a.m. ET announcements. (See Table 1.)

Comparing the point estimates for this shorter interval to those for the daily changes (Table 2), we find that most of the news events that are significant for the 5-min intervals are also significant for the daily data. Estimates with daily data generally produce substantially larger effects. For example the immediate impact of a core CPI surprise on the current-month contracts is about 10 times larger for daily data, while the effects of labor market surprises are about one and one-half times as large for daily data. Not surprisingly, the standard errors for the short-interval estimated coefficients are substantially smaller. The effects on one-month ahead and two-months ahead contracts are also similar but usually larger for daily data, suggesting that this market takes a little time to respond to surprises.

To see if there were statistically significant responses after the first 15 min, we also estimated the model for the change in the implied funds rate for the interval from 15 min after the announcements to 6 h after the announcements. For all three contracts, the joint hypothesis that the news events do not affect the futures market after 15 min is easily rejected. The individually significant coefficients are mainly those for the inflation surprises, consistent with our finding larger daily effects of

---

21 We re-estimated the model omitting the 5 days when the FOMC made a target change at an unscheduled meetings. Table B.1 in appendix B reports these results. The estimates are very similar to those in Table 2. We also re-estimated the model omitting all days when there was a regularly scheduled FOMC meeting and these results, reported in Table B.2 in appendix B, are also very similar to the results of Table 2.

22 Balduzzi et al. (2001) use the percentage change in the T-bill’s price. They find that a one standard-deviation surprise in nonfarm payrolls would lower the T-bill price by about .014 percent which is roughly a rise in the annual yield of about 6 basis points.

23 Taylor’s dependent variable is the change from 30 minutes before to sixty minutes after on days when there are announcements less the change over the same time period on days when there are no announcements. We use the more common approach of including all days including those on which no news occurs. Tests for possible heteroskedasticity indicate that we cannot reject the hypothesis of homoskedastic errors.

Please cite this article in press as: Lapp, J.S., Pearce, D.K. The impact of economic news on expected changes in monetary policy. Journal of Macroeconomics (2012), doi:10.1016/j.jmacro.2012.01.009
inflation surprises than the initial 5-min effects. For the current-month contract, the estimated response of the market's expected change in the funds target at the current-month meeting to a one-standard deviation positive surprise in the core CPI, over the interval from 15 min after the announcement to 6 h after the announcement, is about 1.8 basis points. A one-standard deviation positive surprise in the PPI raises the expected target by about 1 basis point over the same interval. The corresponding amounts for the one-month ahead contracts are .6 and .8 and 1 and .3 (not significant) for the two-months ahead contract. The two-months ahead contract also indicates more evidence of a delayed response to labor market surprises.24

One reason for the possible lagged response to the news is that the trading in these futures contracts is rather thin, particularly in the early part of our sample. To see if this effect disappears in the later part of the sample, we re-estimated the model for the 15-min to 6 h interval for the first and second halves of the data. The lagged effects are, surprisingly, stronger in the later part of the sample so that the low volume of trading does not appear to be the reason for the slow response.25

To sum up the results from the basic model, several surprises that indicate a stronger than expected economy appear to raise the market's expected fed funds target, depending on the timing of the FOMC meetings. There is evidence that inflation surprises raise the market's expected target if the FOMC meets after the surprise but in the same month as the surprise. The strongest effects are from labor market surprises, which appear to affect the market's expectations of target changes for any meetings that occur over a three-month horizon.

---

24 Table B.3 presents these results in Appendix B.

25 For the 8:30 announcements and the observations from January 2, 2001 to March 28, 2008, we can reject the joint hypothesis of no responses after 15 minutes at the .01 level. Similar to the whole period, in the later period the inflation surprises have large and significant effects even after 15 minutes.
Table 5

<table>
<thead>
<tr>
<th>News variable</th>
<th>Current-month contract (\beta_0)</th>
<th>One-month ahead contract (\beta_1)</th>
<th>One-month ahead contract (\beta_2)</th>
<th>Two-months ahead contract (\beta_0)</th>
<th>Two-months ahead contract (\beta_1)</th>
<th>Two-months ahead contract (\beta_2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core CPI</td>
<td>0.148 (0.086)*</td>
<td>0.0094 (0.042)**</td>
<td>0.0017 (0.0037)</td>
<td>0.0126 (0.0056)*</td>
<td>0.0010 (0.0024)</td>
<td>0.0022 (0.0053)</td>
</tr>
<tr>
<td>PPI</td>
<td>0.0016 (0.013)</td>
<td>0.0004 (0.0064)</td>
<td>0.0039 (0.0049)</td>
<td>0.0070 (0.0085)</td>
<td>0.0001 (0.0003)</td>
<td>0.0077 (0.0073)</td>
</tr>
<tr>
<td>Unemployment rate</td>
<td>0.050 (0.070)</td>
<td>0.0061 (0.037)</td>
<td>0.0015 (0.0037)**</td>
<td>0.0006 (0.0050)</td>
<td>-0.0018 (0.028)**</td>
<td>-0.0023 (0.0041)</td>
</tr>
<tr>
<td>Nonfarm payrolls</td>
<td>0.029 (0.071)***</td>
<td>0.0145 (0.034)**</td>
<td>0.0008 (0.0031)**</td>
<td>0.0011 (0.0045)**</td>
<td>0.0001 (0.0022)**</td>
<td>0.0015 (0.0045)**</td>
</tr>
<tr>
<td>Unemployment claims</td>
<td>0.0093 (0.059)</td>
<td>0.0046 (0.0027)**</td>
<td>0.0021 (0.0010)</td>
<td>0.0039 (0.0033)</td>
<td>0.0001 (0.0010)</td>
<td>0.0015 (0.0022)</td>
</tr>
<tr>
<td>Industrial production</td>
<td>0.0182 (0.028)***</td>
<td>0.0113 (0.033)**</td>
<td>0.0088 (0.0040)**</td>
<td>0.0081 (0.0045)**</td>
<td>0.0065 (0.028)</td>
<td>0.0084 (0.0049)**</td>
</tr>
<tr>
<td>Retail sales</td>
<td>0.050 (0.012)</td>
<td>0.0046 (0.028)</td>
<td>0.0024 (0.0072)</td>
<td>0.0008 (0.0023)</td>
<td>0.0008 (0.0023)</td>
<td>0.0013 (0.0053)</td>
</tr>
<tr>
<td>Housing starts</td>
<td>0.0066 (0.014)</td>
<td>0.0011 (0.0052)</td>
<td>0.0027 (0.0056)</td>
<td>0.0077 (0.0069)</td>
<td>0.0002 (0.0029)</td>
<td>0.0011 (0.0069)</td>
</tr>
<tr>
<td>Durable goods orders</td>
<td>-0.092 (0.062)</td>
<td>-0.0090 (0.077)</td>
<td>-0.0401 (0.0311)</td>
<td>-0.0147 (0.0090)</td>
<td>0.0031 (0.0022)</td>
<td>0.0047 (0.0031)</td>
</tr>
<tr>
<td>Personal income</td>
<td>0.0028 (0.082)</td>
<td>0.0027 (0.064)</td>
<td>-0.0054 (0.0054)</td>
<td>0.0061 (0.0078)</td>
<td>0.0035 (0.0027)</td>
<td>-0.0081 (0.0057)</td>
</tr>
<tr>
<td>Trade deficit</td>
<td>0.0066 (0.026)</td>
<td>0.0063 (0.067)</td>
<td>-0.0279 (0.047)**</td>
<td>-0.0015 (0.0086)</td>
<td>-0.0045 (0.0031)</td>
<td>-0.0066 (0.0065)</td>
</tr>
<tr>
<td>Leading indicators</td>
<td>0.0052 (0.006)</td>
<td>0.0001 (0.044)</td>
<td>0.0021 (0.0053)**</td>
<td>0.0027 (0.0057)</td>
<td>0.0068 (0.0031)**</td>
<td>0.0197 (0.050)**</td>
</tr>
<tr>
<td>Consumer confidence</td>
<td>-0.0159 (0.443)</td>
<td>0.0038 (0.0059)</td>
<td>0.0053 (0.0036)</td>
<td>0.0012 (0.0072)</td>
<td>0.0036 (0.0023)</td>
<td>0.0109 (0.0030)**</td>
</tr>
<tr>
<td>Constant</td>
<td>-0.0015 (0.004)**</td>
<td>-0.0024 (0.006)**</td>
<td>-0.0024 (0.006)**</td>
<td>-0.0027 (0.0007)**</td>
<td>-0.0024 (0.006)**</td>
<td>-0.0027 (0.0007)**</td>
</tr>
</tbody>
</table>

Notes: Standard errors are in parentheses. Number of daily observations \(= 1752\).

* Statistically significant coefficients at the .10 levels.
** Statistically significant coefficients at the .05 levels.
*** Statistically significant coefficients at the .01 levels.

There is little or no evidence that other surprises such as to housing starts, to personal income, or to the trade deficit affected the market’s expectation of target changes. The results of the basic model also provide evidence that futures prices respond slowly to news. Therefore, we use daily closing price changes to investigate how the market’s expectation of FOMC target changes is influenced by such surprises in the following sections.

4.2. Testing for parameter constancy across time

The results reported above are based on the assumption that the market’s beliefs about how news affects the FOMC’s funds rate target are constant throughout the period. To test this assumption we split our sample roughly in half and re-estimate the model for January 2, 1995–December 31, 2001 and January 2, 2002–March 28, 2008.26 A formal test that the 78 parameters were the same across sub-periods rejects the assumption so we present the estimates for each sub-period in Tables 5 and 6.27

Looking first at the results in Table 5 for 1995–2001, we find that surprises to core CPI, nonfarm payrolls, and industrial production affect the market’s expectation of the FOMC target change at a meeting in the current month (the \(\beta_0\)’s) across the three contracts, but there is also evidence from data on the one-month and two-months ahead contracts that surprises to retail sales and initial unemployment claims also affect this expectation.28 If there is a FOMC meeting in the next month, the market’s expectation of changes in the target (the \(\beta_1\)’s) are affected by surprises to unemployment, nonfarm payrolls, industrial production retail sales, the index of leading indicators, and initial unemployment claims but not by inflation surprises. All the coefficients have the expected signs, with news of a stronger economy raising the expected funds rate target and, for the current-month meeting, news of higher inflation raising the expected target.

Table 6 reports the results for the second sub-period, January 2, 2002–March 28, 2008. There are several differences between the results for the two sub-periods. First, core CPI inflation surprises have significantly greater effects on expected target changes in the second sub-period. The results for the current-month contract indicate that a one-standard deviation surprise raises the expected target by about 4 basis points in the second sub-period compared to 1.5 basis points in the first sub-period. Second, PPI inflation surprises are generally significant in the second sub-period, raising the expected target in the current month by about 1.5 basis points, and are never significant in the first sub-period. Third, there is no evidence that surprises to retail sales, industrial production, or the index of leading indicators affects the market’s expectation of funds rate target changes at any meeting in the next two months during the second sub-period.

To summarize, in the latter half of our sample, the only news events that have significant effects on expected target changes are direct measures of surprises in the labor market (unemployment, nonfarm payrolls, and initial unemployment claims) and of surprises in inflation (core CPI, and PPI).29

Please cite this article in press as: Lapp, J.S., Pearce, D.K. The impact of economic news on expected changes in monetary policy. Journal of Macroeconomics (2012), doi:10.1016/j.jmacro.2012.01.009

26 While one might suspect changes in the market’s beliefs when the chairmanship of the Fed changes, we do not have many observations after Bernanke replaced Greenspan.
27 The \(\chi^2\) statistic is 132.48 with 78 degrees of freedom, easily significant at the .01 level.
28 Retail sales surprises are not significant for the current month’s contract but the effect is similar in size but with a p-value of .13.
29 As pointed out by a referee, the efforts of the Fed to make policy more transparent in recent years may have clarified the kind of news to which the Fed pays most attention.
4.3. Do positive surprises have the same effects as negative surprises?

So far we have assumed a linear model in which surprises have symmetric effects on the market’s expectations of future FOMC decisions. This restricts positive and negative surprises to have the same effects.30 To see if the market responds to surprises depending on their sign we augment the model given by Eqs. (12)–(14) by allowing different coefficients for positive and negative news. Thus the model now has 156 surprise coefficients. Given the above results that the market may respond differently to positive and negative surprises depending on their sign we augment the model given by Eqs. (12)–(14) by allowing different coefficients for positive and negative news.

When we allow for asymmetrical effects in each sub-period, we find more evidence of asymmetry in the first sub-period.31 The most consistent finding of asymmetry is for unemployment rate. The coefficient estimates are given in Table B.4 in Appendix B. Andersen et al. (2003) give graphical evidence of asymmetric responses of exchange rates to positive and negative news.

When we examine each of the equality restrictions separately, the hypothesis that the coefficient on the positive surprise equals the coefficient on the negative surprise is rejected in 4 out of 78 cases where the individual hypothesis can be rejected.34 Our overall conclusion is that asymmetric effects are relatively minor and appear to have diminished over time.

30 Aggarwal and Schirm (1998), Andersen et al. (2003), and Sheehan and Wohar (1995) find evidence of asymmetric responses of asset prices to positive and negative news.

31 The \( \chi^2 \) statistic for the joint hypothesis is 124.33 with 78 degrees of freedom, significant at less than the .01 level.

32 The coefficient estimates are given in Table B.4 in Appendix B. Andersen et al. (2003) give graphical evidence of asymmetric responses of exchange rates to news but do not report formal tests.

33 The \( \chi^2 \) statistic is 154.5 with 78 degrees of freedom, significant at the .01 level.

34 For the current month and one-month ahead contracts, negative PPI surprises lower the expected target at the current month’s meeting while positive surprises do not raise the expected target.
4.4. Does the effect of surprises depend on the state of the economy?

It seems plausible that the market would anticipate that the FOMC would respond differently to, say, a surprise decrease in the unemployment rate if the economy is in a recession rather than in an expansion. Previous studies such as McQueen and Roley (1993), Adams et al. (2004), and Boyd et al. (2005) find evidence of such state dependence for the responses of stock prices to economic news.

We examine this issue by again augmenting the basic model, Eqs. (12)–(14), by interacting the surprise variables with dummy variables indicating the state of the economy. Following the approach of McQueen and Roley (1993), we applied the Hodrick–Prescott filter to the unemployment rate over our sample period to obtain a measure of cyclical unemployment. The economy is in the high state if cyclical unemployment is negative and in the lowest quartile, in the low state if cyclical unemployment is positive and in the highest quartile, and in the middle state when cyclical unemployment is in the second and third quartiles. We interact each weighted news variable with dummy variables for the high and low states and test whether the coefficients on the interaction terms are zero.

There is some evidence of state dependence in the market’s reactions to news but it is not pervasive. Allowing for separate coefficients for the three states of the economy, we then test the 78 joint hypotheses that the coefficients are equal across states.35 This hypothesis is rejected in 16 of the 78 cases. The results imply that the market believes the Fed is more likely to raise the target or raise it by more if unexpected inflation occurs or if payroll employment is unexpectedly high when the economy is in the high state. For example, a positive, one-standard-deviation surprise in core CPI inflation raises the expected target for a current-month meeting by 3–6 basis points in the high state, but the same surprise has an insignificant effect when the economy is in the low state.36 A positive, one-standard-deviation surprise in nonfarm payrolls increases the expected target for a current-month meeting by 3–4 basis points when the economy is in the high state but only by about 2 basis points when the economy is in the low state. Thus there is some evidence of asymmetric effects across states of the economy, with the plausible result that market participants expected the Fed to respond more to surprises suggesting higher inflation or a stronger economy when economic activity is relatively high.37

5. Conclusions

There is substantial evidence that economic news moves asset prices. It is less clear whether at least part of the response is due to changes in expected monetary policy. Since price changes in fed funds futures contracts are widely thought to reflect changes in the financial market’s expectations about future FOMC funds rate targets, we examine whether economic news is related to this measure of expected monetary policy. A novelty of our paper is that we pay attention to the timing of FOMC meetings when estimating the effects of news. Because fed funds futures prices reflect monthly averages of daily funds rates, the effect of any news event on these prices should depend on if or when the FOMC meets in a particular month.

We find that, as Bernanke and Kuttner (2005) posited, the market does change its expectation of FOMC moves after certain news events. News that inflation was higher than expected or the employment picture was stronger than expected raises the expected change in the fed funds target, consistent with market participants believing the Fed follows some form of Taylor rule. Surprisingly, we find that the federal funds futures market reacts slowly to some news, particularly news on inflation, with significant effects occurring during the period from 15 min to 6 h after an announcement. Splitting our period of 1995–2008 into two periods reveals that the market placed more weight on inflation surprises in the latter half of our sample. There is only weak evidence that the market reacts differently to positive versus negative surprises and somewhat stronger evidence that the reactions depend on the state of the economy.

We find that paying attention to the timing of the FOMC meetings does increase the estimated effects of news on expected changes in monetary policy. Our results also shed light on the transmission mechanism by which news affects asset prices. We find that several news events have little or no effect on expected monetary policy. Thus if studies find that these news events trigger asset price changes, it must be through a different channel than through changes in expected monetary policy.

Acknowledgments

We thank the Poole College of Management for research support, Haiqing Zheng and Congnan Zhan for research assistance, and Karlyn Mitchell and the referee for helpful comments.

35 For each of the 78 coefficients we test whether the two interaction terms are jointly equal to zero. Table B.5 in appendix B reports the estimated model.
36 For the current month contract, the estimated effect on the target rate in the high state is 6.1 basis points while the estimated effect using one-month and two-months ahead contracts is 3.2 basis points.
37 These results are consistent with the finding of McQueen and Roley (1993) that stock prices fell on news of a stronger economy when the economy was in the high state.
Appendix A. Weighting factors for news events

Assumptions:

1. Market participants expect target rate changes to occur only at scheduled meetings so changes at unscheduled meetings are always unexpected.
2. The effective funds rate for any day is computed using quotes at the end of the day so that FOMC target changes on a particular day will affect the effective funds rate on that day since the FOMC announces target changes at 2:15 ET. If the effective funds rate for each business day is computed using quotes at noon, the weighting factors would change slightly.

We examine changes in the prices of fed funds futures contracts for the current month, one-month ahead, and two-months ahead. There are four possible cases for the timing of FOMC meetings because there are 8 meetings per year and there is never a case where there are two straight months without a meeting:

1. Meeting in current month, meeting in next month, no meeting in second month ahead.
2. Meeting in current month, no meeting in next month, meeting in second month ahead.
3. No meeting in current month, meeting in next month, meeting in second month ahead.
4. No meeting in current month, meeting in next month, no meeting in second month ahead.
5. Meeting in current month, meeting in next month, meeting in second month ahead.

Notation:

\( d \): day of news announcement
\( D_0 \): day of FOMC meeting if there is one in the current month and = 0 if there is no meeting
\( D_1 \): day of FOMC meeting if there is one in the next month and = 0 if there is no meeting
\( D_2 \): day of FOMC meeting if there is one in the second month ahead and = 0 if there is no meeting
\( M_0 \): number of days in current month
\( M_1 \): number of days in next month
\( M_2 \): number of days in second month ahead
\( FF_{-1} \): fed funds target at beginning of current month
\( FF_0 \): fed funds target at end of current month
\( FF_1 \): fed funds target at end of next month
\( FF_2 \): fed funds target at end of second month ahead

If there is no meeting in the current month, then
\( FF_0 = FF_{-1} \)

If there is no meeting in next month, then
\( FF_1 = FF_0 \)

If there is no meeting in second month ahead, then
\( FF_2 = FF_1 \)

Of course if the FOMC decision is not to change the target, the target for the month of the meeting is the same as the previous target.

\( f_{0,d} \): implied interest rate from current-month contract on day \( t \)
\( f_{1,d} \): implied interest rate from next month contract on day \( t \)
\( f_{2,d} \): implied interest rate from second month ahead contract on day \( t \)
\( ff_0 \): average of effective funds rates for current month
\( ff_1 \): average of effective funds rate for next month
\( ff_2 \): average of effective funds rate for second month ahead

The implicit interest rate on the current-month contract is assumed to be the expected average funds rate which is the beginning of the month’s target plus the expected change in the target \((A_0)\), \(E_dA_0\), which is triggered by the news event if the news event occurs on or before the day of the FOMC meeting. We assume below that there is only one news event to keep the notation cleaner.

A.1. For the current-month contract

\[
\begin{align*}
\hat{f}_{0,d} &= E_0FF_0 \\
\hat{f}_{0,d} &= FF_{-1} & \text{if there is no FOMC meeting in the current month} \\
\hat{f}_{0,d} &= [(D_0 + 1)/M_0]FF_{-1} + [(M_0 - D_0 + 1)/M_0][FF_{-1} + E_dA_0] & \text{if there is a FOMC meeting in the current month} \\
\hat{f}_{0,d} - \hat{f}_{0,d-1} &= 0 & \text{if no meeting or } d > D_0 \\
\hat{f}_{0,d} &= [(M_0 - D_0 + 1)/M_0][E_dA_0 - E_{d-1}A_0] & \text{if there is a meeting and } d \leq D_0
\end{align*}
\]
We assume that market participants change their expectation of the change in the target \((\Delta_0)\) based on observed and unobserved (by the econometrician) news or that

\[ E_dA_0 - E_{d-1}A_0 = \beta_0N_d + \varepsilon_{0,d} \quad \text{for } d \leq D0 \]

Thus the change in the expected average funds rate on the day of the news event is

\[ f_{0,d} - f_{0,d-1} = \left[ (M0 - D0 + 1)/M0 \right] \beta_0I_0N_d + u_{0,d} \quad \text{where } I_0 = 1 \quad \text{for } d \leq D0 \]

\[ = 0 \quad \text{for } d > D0 \text{ or no meeting} \]

To estimate the model, we would regress the change in the fed funds futures prices on an appropriately weighted news event:

\[ f_{0,d} - f_{0,d-1} = \beta_0W_{00}N_d + u_{0,d} \quad \text{where } W_{00} = [(M0 - D0 + 1)/M0]I_0 \]

A.2. For the one-month ahead contract

\[ f_{1,d} = FF_0 \quad \text{if there is no meeting in next month} \]

\[ = [(D1 - 1)/M1]FF_0 + [(M1 - D1 + 1)/M1]FF_1 \quad \text{if there is a meeting next month} \]

\[ FF_0 \quad \text{if there is no meeting this month} \]

\[ = FF_{-1} + \Delta_0 \quad \text{if there is a meeting this month} \]

\[ FF_1 \quad \text{if there is a meeting this month but not next month} \]

\[ = FF_{-1} + \Delta_1 \quad \text{if there is no meeting this month but a meeting next month} \]

\[ = FF_{-1} + \Delta_0 + \Delta_1 \quad \text{if there are meetings this month and next month} \]

Suppose there is a meeting this month but not next month

\[ f_{ff} = [(D1 - 1)/M1]FF_0 + [(M1 - D1 + 1)/M1]FF_1 \quad \text{if FOMC hits targets on average} \]

\[ f_{f,1,d} - f_{f,1,d-1} = E_df_{ff} - E_{d-1}f_{ff} \]

\[ = E_d(FF_{-1} + \Delta_0) - E_{d-1}(FF_{-1} + \Delta_0) \]

\[ = E_d\Delta_0 - E_{d-1}\Delta_0 \]

\[ = 0 \quad \text{if } d > D0 \]

\[ = \beta_0N_d + \varepsilon_{0,d} \quad \text{if } d \leq D0 \]

Suppose there is a meeting next month

\[ f_{ff} = [(D1 - 1)/M1]FF_0 + [(M1 - D1 + 1)/M1]FF_1 \quad \text{if FOMC hits targets on average} \]

\[ = [(D1 - 1)/M1]FF_0 + [(M1 - D1 + 1)/M1]FF_1 \quad \text{if FOMC hits targets on average} \]

\[ = FF_0 + [(M1 - D1 + 1)/M1]\Delta_1 \]

\[ = FF_{-1} + [(M1 - D1 + 1)/M1]\Delta_1 \quad \text{if no meeting this month} \]

\[ = FF_{-1} + \Delta_0 + [(M1 - D1 + 1)/M1]\Delta_1 \quad \text{if a meeting this month} \]

\[ E_d(f_{ff}) = FF_{-1} + [(M1 - D1 + 1)/M1]E_d\Delta_1 \quad \text{if no meeting this month} \]

\[ = FF_{-1} + \Delta_0 + [(M1 - D1 + 1)/M1]E_d\Delta_1 \quad \text{if a meeting this month \& } d > D0 \]

\[ = FF_{-1} + E_d\Delta_0 + [(M1 - D1 + 1)/M1]E_d\Delta_1 \quad \text{if a meeting this month \& } d \leq D0 \]

Thus

\[ f_{d} - f_{d-1} = [(M1 - D1 + 1)/M1][E_d\Delta_1 - E_{d-1}\Delta_1] \quad \text{if } d > D0 \text{ or } D0 = 0 \]

\[ = [(M1 - D1 + 1)/M1][\beta_1N_d + \varepsilon_{1,d}] \]

\[ f_{d} - f_{d-1} = E_d\Delta_0 - E_{d-1}\Delta_0 + [(M1 - D1 + 1)/M1][E_d\Delta_1 - E_{d-1}\Delta_1] \quad \text{if } d \leq D0 \text{ \& } D0 > 0 \]

\[ = [\beta_0N_d + \varepsilon_{0,d}] + [(M1 - D1 + 1)/M1][\beta_1N_d + \varepsilon_{1,d}] \]

The regression equation for the one-month ahead forecasts is therefore:

\[ f_{d} - f_{d-1} = \beta_0I_0N_d + [(M1 - D1 + 1)/M1]\beta_1I_1N_d + u_{1,d} \]

\[ = \beta_0W_{01}N_d + \beta_1W_{11}N_d + u_{1,d} \]

where

\[ w_{01} = I_0 \quad I_0 = 1 \quad \text{if } d \leq D0 \text{ and } D0 > 0 \]

\[ = 0 \quad \text{if } d > D0 \text{ or } D0 = 0 \]

\[ w_{11} = [(M1 - D1 + 1)/M1]I_1 \quad I_1 = 1 \quad \text{if } D1 > 0 \]

\[ = 0 \quad \text{if } D1 = 0 \]
For the two-months ahead contract:

\[
f_{2,d} = E_d(ff_2)
\]
\[
= ([D2 - 1]/M2)E_d(FF_1) + ([M2 - D2 + 1]/M2)E_d(FF_2)
\text{ if } D2 > 0
\]
\[
= E_d(FF_1)
\text{ if } D2 = 0
\]

\[
FF_1 = FF_{-1} + A_0 + A_1
\]
\[
FF_2 = FF_{-1} + A_0 + A_1 + A_2
\]

Suppose there is no meeting two months from now \((D2 = 0)\)

\[
f_{2,d} = E_d(FF_1)
\]
\[
f_{2,d-1} = E_{d-1}(FF_1)
\]
\[
f_{2,d} - f_{2,d-1} = E_d(FF_1) - E_{d-1}(FF_1)
\]
\[
= E_d(A_0 + A_1) - E_{d-1}(A_0 + A_1)
\]
\[
= (E_dA_0 - E_{d-1}A_0) + (E_dA_1 - E_{d-1}A_1)
\]

\[
(E_dA_0 - E_{d-1}A_0) = 0 \text{ if } d > D0 \text{ or } D0 = 0
\]
\[
= \beta_0N_d + \epsilon_0,d \text{ if } d \leq D0
\]
\[
(E_dA_1 - E_{d-1}A_1) = 0 \text{ if } D1 = 0
\]
\[
= \beta_1N_d + \epsilon_1,d \text{ if } D1 > 0
\]

so

\[
f_{2,d} - f_{2,d-1} = (\beta_0N_d + \epsilon_0,d)I_0 + (\beta_1N_d + \epsilon_1,d)I_1
\]

\[
I_0 = 1 \text{ if } d \leq D0 \text{ and } D0 > 0
\]
\[
= 0 \text{ if } d > D0 \text{ or } D0 = 0
\]
\[
I_1 = 1 \text{ if } D1 > 0
\]
\[
= 0 \text{ if } D1 = 0
\]

Suppose there is a meeting two months ahead \((D2 > 0)\)

\[
f_{2,d} = ([D2 - 1]/M2)E_d(FF_1) + ([M2 - D2 + 1]/M2)E_d(FF_2)
\]
\[
= ([D2 - 1]/M2)E_d(FF_{-1} + A_0 + A_1) + ([M2 - D2 + 1]/M2)E_d(FF_{-1} + A_0 + A_1 + A_2)
\]
\[
= E_d(A_0 + A_1) + ([M2 - D2 + 1]/M2)E_d(A_2)
\]
\[
f_{2,d-1} = E_{d-1}(FF_{-1} + A_0 + A_1) + ([M2 - D2 + 1]/M2)E_{d-1}(A_2)
\]
\[
f_{2,d} - f_{2,d-1} = [E_d(A_0) - E_{d-1}(A_0)] + [E_d(A_1 - E_{d-1}(A_1)] + ([M2 - D2 + 1]/M2)[E_d(A_2) - E_{d-1}(A_2)]
\]

\[
E_d(A_0) - E_{d-1}(A_0) = 0 \text{ if } d > D0 \text{ or } D0 = 0
\]
\[
= \beta_0N_d + \epsilon_0,d \text{ if } d \leq D0
\]
\[
E_d(A_1) - E_{d-1}(A_1) = 0 \text{ if } D1 = 0
\]
\[
= \beta_1N_d + \epsilon_1,d \text{ if } D1 > 0
\]
\[
E_d(A_2) - E_{d-1}(A_2) = 0 \text{ if } D2 = 0
\]
\[
= \beta_2N_d + \epsilon_2,d \text{ if } D2 > 0
\]

Thus

\[
f_{2,d} - f_{2,d-1} = \beta_0I_0N_d + \beta_1I_1N_d + ([M2 - D2 + 1]/M2)\beta_2I_2N_d + u_{2,d}
\]

where \(I_0\) and \(I_1\) are defined above and \(I_2 = 1 \text{ if } D2 > 0 \text{ and } = 0 \text{ if } D2 = 0\)

A.3. Weighting factors in regressions for each contract

**General regression equation:**

\[
\Delta f_{i,d} = \beta_0X_{0,d} + \beta_1X_{1,d} + \beta_2X_{2,d} + u_{i,d}
\]

where

\[
\Delta f_{0,d} = \beta_0X_{0,d} + \beta_1X_{1,d} + \beta_2X_{2,d} + u_{0,d}
\]

where

\[
X_{0,d} = ([M0 - D0 + 1]/M0)I_0N_d
\]

where \(I_0 = 1 \text{ if } d \leq D0 \text{ and } D0 > 0 \text{ and } I_0 = 0 \text{ if } d > D0 \text{ or } D0 = 0\)

\[
X_{1,d} = 0
\]

\[
X_{2,d} = 0
\]

\[
\Delta f_{1,d} = \beta_0X_{0,d} + \beta_1X_{1,d} + \beta_2X_{2,d} + u_{1,d}
\]

where

\[
X_{0,d} = I_0N_d
\]

\[
X_{1,d} = ([M1 - D1 + 1]/M1)I_1N_d
\]

where \(I_1 = 1 \text{ if } D1 > 0 \text{ and } 0 \text{ otherwise}\

\[
X_{2,d} = 0
\]

\[
\Delta f_{2,d} = \beta_0X_{0,d} + \beta_1X_{1,d} + \beta_2X_{2,d} + u_{2,d}
\]
where
\[
\Delta z_{2,d} = \beta_0 X_{0,d} + \beta_1 X_{1,d} + \beta_2 X_{2,d} + u_{2,d}
\]

\[
X_{0,d} = I_0 N_d
\]

\[
X_{1,d} = I_1 N_d
\]

\[
X_{2,d} = \frac{(M2 - D2 + 1)/M2}I_d N_d \quad \text{and} \quad I_2 = 1 \text{ if } D2 > 0 \quad \text{and} \quad 0 \text{ otherwise}
\]

Appendix B. Supplementary results

See Tables B.1–B.5.

Table B.1
SUR estimates of the effects of news on the expected change in monetary policy using daily data and omitting days with unscheduled FOMC meetings, January 2, 1995–March 28, 2008.

<table>
<thead>
<tr>
<th>News variable</th>
<th>Current-month contact</th>
<th>One-month ahead contract</th>
<th>One-month ahead contract</th>
<th>Two-months ahead contract</th>
<th>Two-months ahead contract</th>
<th>Two-months ahead contract</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(\beta_0)</td>
<td>(\beta_1)</td>
<td>(\beta_1)</td>
<td>(\beta_1)</td>
<td>(\beta_1)</td>
<td>(\beta_1)</td>
</tr>
<tr>
<td>Core CPI</td>
<td>.0252 (.0047)**</td>
<td>.0142 (.0026)**</td>
<td>.0028 (.0019)</td>
<td>.0164 (.0035)**</td>
<td>.0026 (.0013)**</td>
<td>.0006 (.0029)</td>
</tr>
<tr>
<td>PPI</td>
<td>.0099 (.0053)*</td>
<td>.0119 (.0026)**</td>
<td>.0035 (.0020)*</td>
<td>.0094 (.0039)**</td>
<td>.0015 (.0013)</td>
<td>.0045 (.0039)</td>
</tr>
<tr>
<td>Unemployment rate</td>
<td>-.0048 (.0028)**</td>
<td>-.0067 (.0019)</td>
<td>-.0112 (.0023)**</td>
<td>-.0043 (.0029)</td>
<td>-.0118 (.0018)**</td>
<td>-.0067 (.0026)**</td>
</tr>
<tr>
<td>Nonfarm payrolls</td>
<td>.0163 (.0029)**</td>
<td>.0156 (.0020)</td>
<td>.0115 (.0023)**</td>
<td>.0168 (.0029)**</td>
<td>.0014 (.0017)</td>
<td>.0091 (.0029)**</td>
</tr>
<tr>
<td>Unemployment claims</td>
<td>-.0063 (.0026)**</td>
<td>-.0044 (.0014)</td>
<td>-.0017 (.0008)</td>
<td>-.0041 (.0019)**</td>
<td>-.0021 (.0008)**</td>
<td>-.0001 (.0014)</td>
</tr>
<tr>
<td>Industrial production</td>
<td>.0168 (.0025)**</td>
<td>.0089 (.0021)**</td>
<td>.0022 (.0002)</td>
<td>.0079 (.0031)**</td>
<td>.0022 (.0017)</td>
<td>.0003 (.0033)</td>
</tr>
<tr>
<td>Retail sales</td>
<td>.0073 (.0056)</td>
<td>.0078 (.0031)**</td>
<td>.0062 (.0019)**</td>
<td>.0091 (.0043)**</td>
<td>.0062 (.0016)**</td>
<td>.0006 (.0037)</td>
</tr>
<tr>
<td>Housing starts</td>
<td>.0053 (.0054)</td>
<td>.0038 (.0025)</td>
<td>.0016 (.002)</td>
<td>-.0002 (.0036)</td>
<td>.0002 (.0015)</td>
<td>.0029 (.0028)**</td>
</tr>
<tr>
<td>Durable goods orders</td>
<td>-.003 (.0036)</td>
<td>-.0058 (.0044)</td>
<td>-.0044 (.021)**</td>
<td>-.0087 (.058)</td>
<td>.0042 (.014)**</td>
<td>.0036 (.026)</td>
</tr>
<tr>
<td>Personal income</td>
<td>.0041 (.004)</td>
<td>.0019 (.031)</td>
<td>.0002 (.016)</td>
<td>.0057 (.042)</td>
<td>.0023 (.015)</td>
<td>-.0018 (.026)</td>
</tr>
<tr>
<td>Trade deficit</td>
<td>.0057 (.0051)</td>
<td>.0024 (.0027)</td>
<td>-.0007 (.0023)</td>
<td>.0032 (.004)</td>
<td>.0012 (.0015)</td>
<td>-.0007 (.0038)</td>
</tr>
<tr>
<td>Leading indicators</td>
<td>.0056 (.006)</td>
<td>.0012 (.0023)</td>
<td>-.0044 (.0024)</td>
<td>-.0013 (.0035)</td>
<td>.0017 (.0014)</td>
<td>.0093 (.0034)**</td>
</tr>
<tr>
<td>Consumer confidence</td>
<td>-.0281 (.0271)**</td>
<td>-.0005 (.0041)</td>
<td>-.004 (.0021)</td>
<td>.0009 (.0054)</td>
<td>.0035 (.0015)</td>
<td>.0046 (.0020)</td>
</tr>
<tr>
<td>Constant</td>
<td>-.0005 (.0002)**</td>
<td>-.0012 (.0003)**</td>
<td>-.0014 (.0004)**</td>
<td>(\chi^2(39)=34.43)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: Standard errors are in parentheses.
Number of daily observations = 3305.
* Statistically significant coefficients at the .10 levels.
** Statistically significant coefficients at the .05 levels.
*** Statistically significant coefficients at the .01 levels.

Table B.2
SUR estimates of the effects of news on the expected change in monetary policy using daily data and omitting days with unscheduled FOMC meetings, January 2, 1995–March 28, 2008.

<table>
<thead>
<tr>
<th>News variable</th>
<th>Current-month contact</th>
<th>One-month ahead contract</th>
<th>One-month ahead contract</th>
<th>Two-months ahead contract</th>
<th>Two-months ahead contract</th>
<th>Two-months ahead contract</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(\beta_0)</td>
<td>(\beta_0)</td>
<td>(\beta_1)</td>
<td>(\beta_0)</td>
<td>(\beta_1)</td>
<td>(\beta_0)</td>
</tr>
<tr>
<td>Core CPI</td>
<td>.0037 (.0060)**</td>
<td>.0143 (.0030)**</td>
<td>.003 (.0019)</td>
<td>.0065 (.0038)**</td>
<td>.0026 (.0013)**</td>
<td>.0008 (.0029)</td>
</tr>
<tr>
<td>PPI</td>
<td>.0048 (.0071)</td>
<td>.0064 (.0031)**</td>
<td>.0035 (.0021)**</td>
<td>.0042 (.0047)</td>
<td>.0018 (.0013)</td>
<td>.0032 (.0045)**</td>
</tr>
<tr>
<td>Unemployment rate</td>
<td>-.0059 (.0032)**</td>
<td>-.0074 (.0022)**</td>
<td>-.0114 (.0024)**</td>
<td>-.0049 (.003)</td>
<td>-.0119 (.0018)**</td>
<td>-.0069 (.0026)**</td>
</tr>
<tr>
<td>Nonfarm payrolls</td>
<td>.0157 (.0033)**</td>
<td>.0152 (.0022)**</td>
<td>.0116 (.0023)**</td>
<td>.0164 (.0030)**</td>
<td>.0141 (.0017)**</td>
<td>.0088 (.0029)**</td>
</tr>
<tr>
<td>Unemployment claims</td>
<td>-.0068 (.0030)**</td>
<td>-.0047 (.0015)**</td>
<td>-.0015 (.0008)**</td>
<td>-.0045 (.0020)**</td>
<td>-.0002 (.0008)**</td>
<td>-.0008 (.0013)**</td>
</tr>
<tr>
<td>Industrial production</td>
<td>.008 (.0055)</td>
<td>.0068 (.0024)**</td>
<td>.0024 (.0023)**</td>
<td>.0072 (.0034)**</td>
<td>.0029 (.0017)**</td>
<td>.0005 (.0033)**</td>
</tr>
<tr>
<td>Retail sales</td>
<td>.0079 (.0064)</td>
<td>.0079 (.0034)</td>
<td>.0059 (.0020)**</td>
<td>.0096 (.0045)**</td>
<td>.0006 (.0016)**</td>
<td>.0001 (.0036)**</td>
</tr>
<tr>
<td>Housing starts</td>
<td>.0009 (.0099)</td>
<td>.0031 (.0033)</td>
<td>.003 (.0021)</td>
<td>.0032 (.0043)</td>
<td>.0022 (.0016)</td>
<td>.003 (.0029)**</td>
</tr>
<tr>
<td>Durable goods orders</td>
<td>-.0556 (.0535)</td>
<td>-.0041 (.0054)</td>
<td>-.0047 (.021)**</td>
<td>-.0007 (.0067)</td>
<td>.0043 (.0014)**</td>
<td>.0037 (.0025)**</td>
</tr>
<tr>
<td>Personal income</td>
<td>.0037 (.0045)</td>
<td>.0016 (.0035)</td>
<td>.0003 (.0017)</td>
<td>.0055 (.0044)</td>
<td>.0023 (.0015)</td>
<td>-.0018 (.0026)**</td>
</tr>
<tr>
<td>Trade deficit</td>
<td>.0204 (.0112)</td>
<td>.0038 (.0024)</td>
<td>-.0089 (.023)**</td>
<td>.0071 (.049)</td>
<td>.000 (.0015)</td>
<td>-.0051 (.0044)**</td>
</tr>
<tr>
<td>Leading indicators</td>
<td>.0053 (.004)</td>
<td>.0034 (.0026)</td>
<td>.0006 (.0024)**</td>
<td>.0005 (.0036)**</td>
<td>.0016 (.0014)</td>
<td>.0109 (.0034)**</td>
</tr>
<tr>
<td>Consumer confidence</td>
<td>.0593 (.0727)**</td>
<td>.0137 (.0056)**</td>
<td>.004 (.0021)**</td>
<td>.0122 (.0068)**</td>
<td>.0037 (.0015)**</td>
<td>.0043 (.0020)**</td>
</tr>
<tr>
<td>Constant</td>
<td>-.0007 (.0002)**</td>
<td>-.0016 (.0004)**</td>
<td>-.0018 (.0005)**</td>
<td>(\chi^2(39)=60.65**)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: Standard errors are in parentheses.
Number of daily observations = 3201.
* Statistically significant coefficients at the .10 levels.
** Statistically significant coefficients at the .05 levels.
*** Statistically significant coefficients at the .01 levels.

Please cite this article in press as: Lapp, J.S., Pearce, D.K. The impact of economic news on expected changes in monetary policy. Journal of Macroeconomics (2012), doi:10.1016/j.jmacro.2012.01.009
Table B.3
SUR estimates of the effects of news on the expected change in monetary policy measured from 15 min to 6 h after the announcements, January 2, 1995–March 28, 2008.

<table>
<thead>
<tr>
<th>News variable</th>
<th>Current-month contact</th>
<th>One-month ahead contract</th>
<th>One-month ahead contract</th>
<th>Two-months ahead contract</th>
<th>Two-months ahead contract</th>
<th>Two-months ahead contract</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>( \beta_0 )</td>
<td>( \beta_0 )</td>
<td>( \beta_1 )</td>
<td>( \beta_0 )</td>
<td>( \beta_1 )</td>
<td>( \beta_2 )</td>
</tr>
<tr>
<td>Core CPI</td>
<td>( .0184 (.0043)** )</td>
<td>( .0061 (.0023)** )</td>
<td>( -.001 (.002) )</td>
<td>( .0104 (.0030)** )</td>
<td>( -.0008 (.0013) )</td>
<td>( -.0086 (.0031)** )</td>
</tr>
<tr>
<td>PPI</td>
<td>( .0101 (.0048)** )</td>
<td>( .0084 (.0023)** )</td>
<td>( -.0001 (.0021) )</td>
<td>( .0034 (.0035)** )</td>
<td>( -.0010 (.0013) )</td>
<td>( .0052 (.0042)** )</td>
</tr>
<tr>
<td>Unemployment rate</td>
<td>( .0016 (.0026)** )</td>
<td>( -.0011 (.0017) )</td>
<td>( -.0024 (.0022) )</td>
<td>( -.0061 (.0026)** )</td>
<td>( -.0039 (.0017)** )</td>
<td>( .0011 (.0028) )</td>
</tr>
<tr>
<td>Nonfarm payrolls</td>
<td>( -.0012 (.0027) )</td>
<td>( -.0017 (.0018) )</td>
<td>( -.0033 (.0023) )</td>
<td>( -.0064 (.0026)** )</td>
<td>( -.0026 (.0016) )</td>
<td>( .0013 (.0033) )</td>
</tr>
<tr>
<td>Unemployment claims</td>
<td>( -.0029 (.0024)** )</td>
<td>( -.0005 (.0013) )</td>
<td>( -.0008 (.0007) )</td>
<td>( .0015 (.0017) )</td>
<td>( .0001 (.0007) )</td>
<td>( -.0017 (.0015) )</td>
</tr>
<tr>
<td>Industrial production</td>
<td>( -.0002 (.0041) )</td>
<td>( -.0049 (.0019)** )</td>
<td>( -.0041 (.0021)** )</td>
<td>( -.0016 (.0027)** )</td>
<td>( -.0006 (.0015) )</td>
<td>( .0058 (.0034)** )</td>
</tr>
<tr>
<td>Retail sales</td>
<td>( -.0003 (.0051) )</td>
<td>( -.0001 (.0028) )</td>
<td>( .0022 (.0018) )</td>
<td>( .0008 (.0037) )</td>
<td>( .00002 (.0015) )</td>
<td>( .0013 (.004) )</td>
</tr>
<tr>
<td>Housing starts</td>
<td>( .0046 (.005) )</td>
<td>( .0004 (.0023)** )</td>
<td>( .0002 (0) )</td>
<td>( .0015 (.0032) )</td>
<td>( -.00003 (.0015) )</td>
<td>( .0059 (.0030)** )</td>
</tr>
<tr>
<td>Durable goods orders</td>
<td>( -.0058 (.0033)** )</td>
<td>( .0004 (.0040) )</td>
<td>( -.0023 (.0021) )</td>
<td>( -.0003 (.0049) )</td>
<td>( -.0015 (.0014) )</td>
<td>( .0034 (.0028) )</td>
</tr>
<tr>
<td>Personal income</td>
<td>( .0039 (.0036) )</td>
<td>( .0015 (.0028) )</td>
<td>( -.0001 (.0016) )</td>
<td>( .0035 (.0036) )</td>
<td>( .00008 (.0015) )</td>
<td>( .0014 (.0028) )</td>
</tr>
<tr>
<td>Trade deficit</td>
<td>( .0062 (.0047) )</td>
<td>( .0023 (.0024) )</td>
<td>( -.0010 (.0023)** )</td>
<td>( .0069 (.0036)** )</td>
<td>( -.0026 (.0014) )</td>
<td>( -.0056 (.0042)** )</td>
</tr>
<tr>
<td>Leading indicators</td>
<td>( -.0102 (.0050)** )</td>
<td>( -.0026 (.0019) )</td>
<td>( .0019 (.0021) )</td>
<td>( -.0069 (.0027)** )</td>
<td>( .011 (.0012) )</td>
<td>( .0062 (.0032)** )</td>
</tr>
<tr>
<td>Consumer confidence</td>
<td>( -.0399 (.0224)** )</td>
<td>( -.0019 (.032) )</td>
<td>( .0003 (.0018) )</td>
<td>( -.0025 (.0039)** )</td>
<td>( -.0009 (.0013) )</td>
<td>( .0023 (.0019) )</td>
</tr>
</tbody>
</table>
| Joint test that all coefficients are zero \( \chi^2 (10) = 27.50** \) \( \chi^2 (20) = 57.26*** \) \( \chi^2 (30) = 70.43*** \)

Notes: Standard errors are in parentheses. Number of daily observations = 3301.

Joint test is for the 10 announcements made at 8:30 am.
* Statistically significant coefficients at the .10 levels.
** Statistically significant coefficients at the .05 levels.
*** Statistically significant coefficients at the .01 levels.

---

Table B.4

<table>
<thead>
<tr>
<th>News variable</th>
<th>Current month contact</th>
<th>One-month ahead contract</th>
<th>One-month ahead contract</th>
<th>Two-months ahead contract</th>
<th>Two-months ahead contract</th>
<th>Two-months ahead contract</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>( \beta_0 )</td>
<td>( \beta_0 )</td>
<td>( \beta_1 )</td>
<td>( \beta_0 )</td>
<td>( \beta_1 )</td>
<td>( \beta_2 )</td>
</tr>
<tr>
<td>Core CPI</td>
<td>( .030** )</td>
<td>( .016** )</td>
<td>( .014** )</td>
<td>( .012** )</td>
<td>( .001 )</td>
<td>( .005 )</td>
</tr>
<tr>
<td>PPI</td>
<td>( .012 )</td>
<td>( .003 )</td>
<td>( .017** )</td>
<td>( .030 )</td>
<td>( .002 )</td>
<td>( .005 )</td>
</tr>
<tr>
<td>Unemployment rate</td>
<td>( -.0004 )</td>
<td>( -.014** )</td>
<td>( -.004 )</td>
<td>( -.033 ** )</td>
<td>( -.0001 )</td>
<td>( -.031*** )</td>
</tr>
<tr>
<td>Nonfarm payrolls</td>
<td>( .014*** )</td>
<td>( .012 )</td>
<td>( .013** )</td>
<td>( .015 )</td>
<td>( .005 )</td>
<td>( .016** )</td>
</tr>
<tr>
<td>Unemployment claims</td>
<td>( -.004 )</td>
<td>( -.011** )</td>
<td>( -.001 )</td>
<td>( -.013** )</td>
<td>( -.003 )</td>
<td>( -.001 )</td>
</tr>
<tr>
<td>Industrial production</td>
<td>( -.003 )</td>
<td>( .016** )</td>
<td>( .004 )</td>
<td>( .010** )</td>
<td>( .006 )</td>
<td>( -.002 )</td>
</tr>
<tr>
<td>Retail sales</td>
<td>( -.004 )</td>
<td>( .031** )</td>
<td>( .001 )</td>
<td>( .017** )</td>
<td>( .010 )</td>
<td>( .023** )</td>
</tr>
<tr>
<td>Housing starts</td>
<td>( .002 )</td>
<td>( .006 )</td>
<td>( .006 )</td>
<td>( .002 )</td>
<td>( .003 )</td>
<td>( -.003 )</td>
</tr>
<tr>
<td>Durable goods orders</td>
<td>( .031 )</td>
<td>( -.019 )</td>
<td>( -.005 )</td>
<td>( -.007 )</td>
<td>( .006 )</td>
<td>( .002 )</td>
</tr>
<tr>
<td>Personal income</td>
<td>( .001 )</td>
<td>( .008 )</td>
<td>( .001 )</td>
<td>( .003 )</td>
<td>( .001 )</td>
<td>( .005 )</td>
</tr>
<tr>
<td>Trade deficit</td>
<td>( .006 )</td>
<td>( .004 )</td>
<td>( .002 )</td>
<td>( -.002 )</td>
<td>( -.017*** )</td>
<td>( .001 )</td>
</tr>
<tr>
<td>Leading indicators</td>
<td>( -.005 )</td>
<td>( .013 )</td>
<td>( .004 )</td>
<td>( .0003 )</td>
<td>( .005 )</td>
<td>( .011** )</td>
</tr>
<tr>
<td>Consumer confidence</td>
<td>( -.096** )</td>
<td>( .048 )</td>
<td>( .001 )</td>
<td>( .002 )</td>
<td>( .009** )</td>
<td>( .002 )</td>
</tr>
</tbody>
</table>

Notes: Bold indicates that the hypothesis of equal coefficients for positive and negative news is rejected at .01 or .05 level.

Number of daily observations = 3310.
* Statistically significant coefficients at the .10 levels.
** Statistically significant coefficients at the .05 levels.
*** Statistically significant coefficients at the .01 levels.
Table B.5

<table>
<thead>
<tr>
<th>Core CPI</th>
<th>Unemployment rate</th>
<th>Nonfarm payrolls</th>
<th>PPI</th>
<th>Unemployment claims</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>0.03</td>
<td>-0.02</td>
<td>0.02</td>
<td>-0.01</td>
</tr>
<tr>
<td>Mid</td>
<td>0.02</td>
<td>-0.01</td>
<td>0.01</td>
<td>0.01</td>
</tr>
<tr>
<td>High</td>
<td>0.00</td>
<td>-0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

Notes: Bold indicates that the hypothesis of equal coefficients across states of the economy is rejected at the 0.01 level. *Statistically significant coefficients at the 0.05 level.

High state is when unemployment is low and Low state is when unemployment is high.

Number of daily observations = 3310.

Bold indicates that the hypothesis of equal coefficients across states of the economy is rejected at the 0.01 level.

Number of daily observations = 3310.

High state is when unemployment is low and Low state is when unemployment is high.

*Statistically significant coefficients at the 0.05 level.

High state is when unemployment is low and Low state is when unemployment is high.

Number of daily observations = 3310.

High state is when unemployment is low and Low state is when unemployment is high.

*Statistically significant coefficients at the 0.05 level.
References


