Why do markets react badly to good news? Evidence from Fed Funds Futures

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Abstract

It is well known that U.S. monetary policy is well-approximated by a Taylor rule. This suggests a reason why good macroeconomic news sometimes depresses equity returns: good news about the real side of the economy implies tighter future monetary policy. I test this hypothesis by assessing the effect of news on equity returns after controlling for changes in expectations of future monetary policy using Fed Funds Futures data. The results do not support the theory. Furthermore, the negative response of stock markets to unanticipated inflation is unchanged by controlling for changes in monetary policy expectations.

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Several recent papers examine how asset prices respond to the surprise component in macroeconomic news. An emerging puzzle is that equity markets respond differently to non-monetary policy news depending on whether the economy is in a recession or an expansion. Good macroeconomic news tends to depress equity returns during expansions while markets respond favorably to positive surprises during recessions (McQueen and Roley 1993; Boyd, Hu, and Jagannathan 2005; Andersen, Bollerslev, Diebold, and Vega 2005). In aggregate, the coefficient on positive news surprises is therefore often found to be small although occasionally significant (Rigobon and Sack 2006). One theory is that this asymmetric response is because good news during an expansion primarily conveys information about the future of the risk-free rate.

I test this hypothesis by assessing the response of equity returns to macroeconomic news after controlling for changes in the market's expectation of future Federal Reserve policy. I incorporate a market-based measure of changes in expectations of the future risk-free rate in a standard event study framework to examine the effect of seven major news announcements on returns. Using real-time measures of the news surprises, I first assess how market expectations of the future Federal Funds rate change as a result of each of the surprises. I then assess how returns respond to each kind of surprise using changes in the expected Fed Funds rate as a control variable.

I find no evidence that changes in market expectations of future monetary policy explain the weak response of equity markets to good news about real activity. The results contrast with the conclusions drawn by Boyd, Hu, and Jagannathan (2005). Based on the reaction of bond prices to news, Boyd, Hu, and Jagannathan suggest that the negative reaction of the stock market to positive employment news during expansions results from changes in expectations of the risk-free rate. However, bond yields are not in general weighted averages of expected future short-rates (see, for example, Diebold, Rudebusch, and Arouba 2006) as predicted by the expectations hypothesis. It is therefore necessary to directly assess the effect of news on expected future short-rates.

Section 1 discusses the different channels through which macroeconomic surprises may affect returns. Section 2 assesses the effect of news surprises on expectations of future monetary policy. Section 3 examines the effect of news on equity and bond returns after controlling for the effect of the news on expectations of future monetary policy.

1 Theoretical Framework

As is well-known, U.S. monetary policy is well approximated by a foreward-looking Taylor rule. That is, the Federal Reserve responds to increases in expected output or expected inflation above trend by increasing the Fed Funds rate. Letting R_t^F be the Fed Funds rate, π_t and Y_t be some measures of inflation and real activity at date t with π and Y their steady-state levels, the market expectation for R_{t+j}^F can be described by

$$E_t R_{t+j}^F = \phi_\pi E_t(\pi_{t+j} - \pi) + \phi_Y E_t\left(Y_{t+j} - Y\right)$$

Suppose information relevant to either $E_t\pi_{t+j}$ or $E_t Y_{t+j}$ arrives at date $\tau \in (t, t+j)$. It immediately follows that

$$E_\tau R_{t+j}^F - E_t R_{t+j}^F = \phi_\pi\left(E_\tau\pi_{t+j} - E_t\pi_{t+j}\right) + \phi_Y\left(E_\tau Y_{t+j} - E_t Y_{t+j}\right)$$

Macroeconomic news surprises that contain information about either π_{t+j} or Y_{t+j} will thus raise market expectations for the future risk-free rate.

I consider two broad classes of indicators: indicators with information primarily about the real side of the economy (i.e., information relevant to expectations of Y_{t+j}) and those with information about the nominal side of the economy (i.e., information relevant to expectations of π_{t+j}). As a result of the information structure above, each indicator will in general contain information about two or more of factors that affect equity returns. Good news about the real side of the economy implies higher future risk-free rates and higher cash flows. According

to general equilibrium asset pricing models where the price of an asset is the sum of its expected future discounted dividends, good news about future cash flows should increase equity returns. The cash flow and Fed Funds channel thus work in opposite direction for all broad measures of real U.S. economic activity.

News about the nominal side of the economy includes information about both future inflation and future monetary policy. Higher than expected inflation should decrease equity returns as a result of the increase in the expected risk-free rate. Furthermore, several explanations for the negative correlation between inflation and stock returns do not center on the link between inflation and monetary policy. See Goto and Valkanov (2002) or Ritter and Warr (2002) for reviews of this literature.

2 The Effect of News on Monetary Policy Expectations

Market efficiency implies that markets should only react to the unanticipated component in macroeconomic news announcements; by the time of the news release, prices already incorporate the anticipated component of the news. The right measure of news is thus the deviation of the indicator from the market's consensus forecast for it.

I normalize the surprise component of each news announcement by dividing by the standard deviation of the news surprise in the sample as in Balduzzi, Elton, and Green (2001) and Andersen, Bollerslev, Diebold, and Vega (2003, 2005). That is, for each indicator k, the surprise is given by

$$S_{k,t} = \frac{A_{k,t} - E_{k,t}}{\hat{\sigma} k}$$

where $A_{k,t}$ is the actual real-time value of indicator k announced at date t, $E_{k,t}$ is the consensus forecast for the indicator, and $\hat{\sigma}_k$ is the sample standard deviation of $A_{k,t} - E_{k,t}$. The negative of the unemployment surprise is used such that a decrease in the unemployment rate is recorded as a positive news surprise.

The group of indicators that primarily contain information about the real side of the economy includes the Unemployment Rate, New Home Sales, Advance GDP, Consumer

Confidence, and Capacity Utilization. The second group consists of core CPI and core PPI.

I follow Kuttner (2001) in using Fed Funds futures rates to gauge markets' expectation for future monetary policy. The sample consists of daily data from October 18th, 1991 through October 20th, 2006. These contracts are available for between five and thirteen months in advance of month m for the sample period. These contracts provide a measure of not only the current stance of monetary policy but the market's expectation for future monetary policy. Hamilton (2007) performs several econometric tests on Fed Funds Futures and finds that they are excellent predictors of future monetary policy. Hamilton's econometric tests are partly in response to recent work by Piazzesi and Swanson (2006) who argue that Fed Funds Futures are a biased measure of market expectation of Federal Reserve policy. In any case, Fed Funds Futures contracts are the best available daily measure of monetary policy expectations.

Letting $R_t^{f,m}$ denote the Fed Funds futures contract settling $m = 1, .., 6$, full months ahead, the change between date t and $t-1$ in the market's expectation for the risk-free rate m full months ahead is

$$E_t R_m - E_{t-1} R_m = R_t^{f,m} - R_{t-1}^{f,m}.$$

The effect of the surprise on the market's expectation of the Fed Funds rate m months ahead is then estimated for indicator k using

$$R_t^{f,m} - R_{t-1}^{f,m} = \alpha_0 + \alpha_1 S_{k,t} + \varepsilon_t. \tag{2.1}$$

Table 1 contains the results from estimating this equation for each of the indicators. With the exception of Advance GDP, all the regressions have the expected signs and are significant at almost all horizons with the greatest effects being seen in the 6 month ahead contracts. The signs on Advance GDP are always positive but never significant. The lack of significance is likely due to the small sample size since it is the only indicator sampled at the quarterly rather than monthly frequency.

3 The Effect of News on Returns

The data consist of four stock indices: the Dow Jones Composite Average, the NASDAQ Composite, the NYSE Composite, and the S&P 500 Composite. I assess the effect of news surprises on government T-bill and bonds using 90-day, six-month, one year, five-year, and ten-year yields.

I estimate

$$R_t = \gamma + \beta^* S_{k,t} + \sum_{m=1}^{6} \delta_m \left(R_t^{f,m} - R_{t-1}^{f,m} \right) + \varepsilon_t \tag{3.1}$$

and

$$R_t = \gamma + \beta^* S_{k,t} + \delta_3 \left(R_t^{f,3} - R_{t-1}^{f,3} \right) + \varepsilon_t. \tag{3.2}$$

For equities, $R_t = \frac{P_t^{close} - P_{t-1}^{close}}{P_{t-1}^{close}}$ where P_t^{close} is the price of the asset at the end of day t. For T-bills and bonds, $R_t = Yield_t - Yield_{t-1}$.

I compare the estimates from (3.1) and (3.2) with the results from estimating

$$R_t = \gamma + \beta S_{k,t} + \upsilon_t. \tag{3.3}$$

Table 2 shows the results of estimating equations (3.2) and (3.3) for equity markets; the results from estimating equation (3.1) were quite similar to those from (3.2). β^* and β are substantively the same for all seven indicators. There is thus no evidence to support the notion that equity markets' response to macroeconomic news is mediated through changes in monetary policy expectations.

The only news that consistently has significant effects is core CPI news. This is consistent with the results of Rigobon and Sack (2006). However, the evidence here rules out the possibility that equity markets respond badly to inflation surprises simply because they imply higher future interest rates.

It is tempting to think that this result is an artifact of illiquidity in the Fed Funds Futures market. However, table 3 illustrates that including changes in the Fed Funds Futures

rate explains the bulk of the response of government bond and T-bill markets: most of the coefficients on the news variables become insignificant after the inclusion of changes in monetary policy expectations with the exception of those on unemployment. Thus, the problem does not appear to lie with using Fed Funds Futures as an indicator of monetary policy.[1]

Taken together, the results are perplexing: the results from the Fed Funds Futures market clearly demonstrate that markets understand the Federal Reserve's Policy rule. The results from bill and bond markets indicate that markets rapidly assimilate the anticipated change in monetary policy. I leave the question of why monetary policy expectations do not appear to mediate the response of equity markets for future research.

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Data Appendix

The Fed Funds Futures data is taken from Thomson Financial's Datastream database. The series codes are CFF1191, CFF1291,...., CFF0407. I take the asset price data from the Global Financial Database. Both the consensus forecast and the actual real-time value of the indicators are from the MMS Survey and were purchased from Haver Analytic.

[1] The significantly negative response of yields to positive news about unemployment at longer maturities is puzzling. I therefore considered whether the same effect was present when using nonfarm payroll employment data, which is released at the same time as the unemployment rate. After controlling for changes in the Fed Funds rate the effect of nonfarm payroll employment surprises on longer term yields is indeed positive, consistent with the view that the slope of the yield curve increases with robust economic growth. The negative effect of positive news on unemployment is thus likely a statistical anomaly.

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Table 1: The Effect of Surprises on Expectations of Future Monetary Policy

Indicator	1-mo. ahead	2-mo.	3-mo.	4-mo.	5-mo.	6-mo.
Unemployment	**0.0133**	**0.0188**	**0.025**	**0.0252**	**0.0296**	**0.0313**
	(3.17)	(4.41)	(5.04)	(4.48)	(4.76)	(4.54)
New Home Sales	**0.0046**	**0.0067**	**0.0066**	**0.0078**	**0.0109**	**0.0120**
	(3.46)	(3.94)	(3.40)	(3.25)	(3.89)	(4.01)
GDP Advance	0.0033	0.0039	0.0060	0.0052	0.0065	0.0065
	(1.20)	(1.01)	(1.18)	(0.93)	(0.96)	(0.84)
Consumer Confidence	**0.0033**	**0.0086**	**0.0111**	**0.0122**	**0.0141**	**0.0152**
	(2.15)	(3.80)	(4.86)	(4.65)	(4.77)	(4.57)
Capacity Utilization	**0.0067**	**0.0088**	**0.0103**	**0.012**	**0.0126**	**0.0145**
	(3.94)	(4.56)	(4.51)	(4.48)	(4.10)	(4.21)
Core CPI	**0.0053**	**0.0083**	**0.0089**	**0.0116**	**0.0128**	**0.0158**
	(2.94)	(3.48)	(3.22)	(3.53)	(3.49)	(3.93)
Core PPI	**0.0040**	**0.0053**	0.0053	**0.0069**	0.0059	0.0058
	(2.05)	(2.35)	(1.95)	(2.22)	(1.55)	(1.51)

Notes: a) The numbers in the table are the α coefficients from estimating equation (2.1) for each of the m month ahead Fed Funds Futures contracts for each of the indicators. b) T-statistics are in parentheses. c) Bold-faced numbers denote significance at the 5% level.

Table 2: News Effects on Equity Returns

Indicator	Dow		Nasdaq		NYSE		S&P500	
	β	β^*	β	β^*	β	β^*	β	β^*
Unemp.	−0.157	0.083	−0.169	−0.263	−0.322	0.147	−0.380	−0.030
	(−0.20)	(0.10)	(−0.13)	(−0.18)	(−0.43)	(0.18)	(−0.44)	(−0.99)
New Homes	−0.478	−0.543	0.576	−0.106	−0.368	−0.569	−0.251	−0.546
	(−0.79)	(−0.72)	(0.49)	(−0.09)	(−0.57)	(−0.85)	(−0.34)	(−0.72)
GDP Adv.	1.284	1.626	1.217	1.259	0.701	1.100	0.776	1.122
	(1.03)	(1.31)	(0.59)	(0.60)	(0.54)	(0.87)	(0.53)	(0.77)
Cons. Conf.	0.292	0.194	**2.344**	1.940	0.124	0.018	0.367	0.188
	(0.44)	(0.27)	(2.02)	(1.56)	(0.19)	(0.03)	(0.48)	(0.23)
Cap. Util.	0.111	0.416	1.387	1.367	0.609	0.836	0.963	1.193
	(0.14)	(0.51)	(1.17)	(1.09)	(0.82)	(1.07)	(1.17)	(1.38)
Core CPI	**−3.331**	**−3.054**	**−4.249**	**−4.289**	**−3.008**	**−2.755**	**−3.264**	**−3.051**
	(−4.47)	(−4.00)	(−3.77)	(−3.69)	(−4.23)	(−3.77)	(−4.12)	(−3.74)
Core PPI	−0.903	−0.871	−1.790	−1.883	−1.130	−1.112	−1.396	−1.393
	(−1.30)	(−1.23)	(−1.67)	(−1.74)	(−1.60)	(−1.56)	(−1.81)	(−1.78)

Note: The numbers in the table are the coefficients ($x1000$) on the news surprises from estimating equations (3.3) and (3.2) for each of the indicators. See also notes to table 1.

Table 3: News Effects on Government Bill and Bond Yields

Indicator	90-Day T-Bill		6-Month T-Bill		1-Year		5-Year		10-Year	
	β	β^*	β	β^*	β	β^*	β	β^*	β	β^*
Unemp.	**4.12**	−0.66	**5.56**	−0.87	**5.04**	−2.77	2.18	**−3.84**	1.55	**−2.62**
	(3.29)	(-0.68)	(3.71)	(-0.86)	(2.52)	(-1.82)	(1.19)	(-2.43)	(1.17)	(-2.23)
New Homes	**2.17**	0.21	**2.40**	0.10	2.66	−0.42	**2.84**	0.59	**2.57**	0.98
	(2.23)	(0.26)	(2.33)	(0.12)	(1.96)	(-0.40)	(2.79)	(0.75)	(3.28)	(1.53)
GDP Adv.	**2.68**	2.00	**3.84**	**2.73**	5.09	2.38	3.30	1.59	2.46	1.04
	(2.12)	(1.73)	(3.15)	(3.34)	(1.92)	(1.48)	(1.47)	(0.88)	(1.31)	(0.69)
Cons. Conf.	**1.84**	−0.11	**3.29**	1.05	**4.57**	1.80	**4.70**	**2.27**	**3.86**	**1.79**
	(2.18)	(-0.14)	(4.10)	(1.47)	(4.18)	(1.79)	(5.11)	(2.73)	(5.02)	(2.60)
Cap. Util.	**2.74**	−0.32	**2.84**	−0.13	**4.19**	−0.00	**3.53**	0.27	**2.69**	0.49
	(2.80)	(-0.42)	(3.38)	(-0.23)	(2.90)	(-0.00)	(3.00)	(0.27)	(3.28)	(0.70)
Core CPI	1.62	−0.74	**2.32**	−0.02	**4.19**	1.31	**4.60**	**2.10**	**3.28**	1.47
	(1.52)	(-0.92)	(2.44)	(-0.03)	(3.52)	(1.55)	(4.13)	(2.47)	(3.64)	(1.98)
Core PPI	0.97	−0.06	1.34	0.06	2.26	0.46	1.48	−0.00	**1.75**	0.73
	(1.09)	(-0.08)	(1.55)	(0.11)	(1.57)	(0.41)	(1.23)	(0.00)	(2.01)	(1.04)

See notes to tables 1 and 2.