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Saving the Bed from the Fed

Abstract

We estimate the reaction of the United States hotel and restaurant industries to the monetary policy actions of the U.S. Federal Reserve. We find that a portfolio of hotel industry stocks react strongly to unexpected changes in the federal funds target rate. Specifically, for a hypothetical surprise 25-basis-point rate cut, the value-weighted hotel industry stock portfolio registers a one-day gain of 245 basis points (or 2.45 percent). This response is 78-percent stronger than that of the overall equity market in the U.S. In addition, the price impact is stronger at times of policy reversals. On the other hand, the restaurant industry is not as responsive to unexpected changes in the monetary policy. To “save the bed from the Fed,” investors should first recognize the sensitivity of hotel stocks to changes in Fed policy and then engage in appropriate risk management activities, including hedging portfolio risk in the futures market.

Keywords

U.S. monetary policy, Federal Reserve, hotel stock, portfolio risk

Disciplines

Business | Hospitality Administration and Management

Comments

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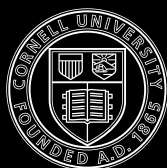
Saving the Bed from the Fed

Cornell Hospitality Report
Vol. 12 No. 8, July 2012

by Levon Goukasian, Ph.D., and Qingzhong Ma, Ph.D.

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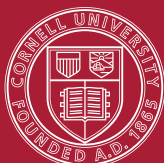
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Saving the Bed from the Fed

by Levon Goukasian and Qingzhong Ma

EXECUTIVE SUMMARY

We estimate the reaction of the United States hotel and restaurant industries to the monetary policy actions of the U.S. Federal Reserve. We find that a portfolio of hotel industry stocks react strongly to unexpected changes in the federal funds target rate. Specifically, for a hypothetical surprise 25-basis-point rate cut, the value-weighted hotel industry stock portfolio registers a one-day gain of 245 basis points (or 2.45 percent). This response is 78-percent stronger than that of the overall equity market in the U.S. In addition, the price impact is stronger at times of policy reversals. On the other hand, the restaurant industry is not as responsive to unexpected changes in the monetary policy. To “save the bed from the Fed,” investors should first recognize the sensitivity of hotel stocks to changes in Fed policy and then engage in appropriate risk management activities, including hedging portfolio risk in the futures market.



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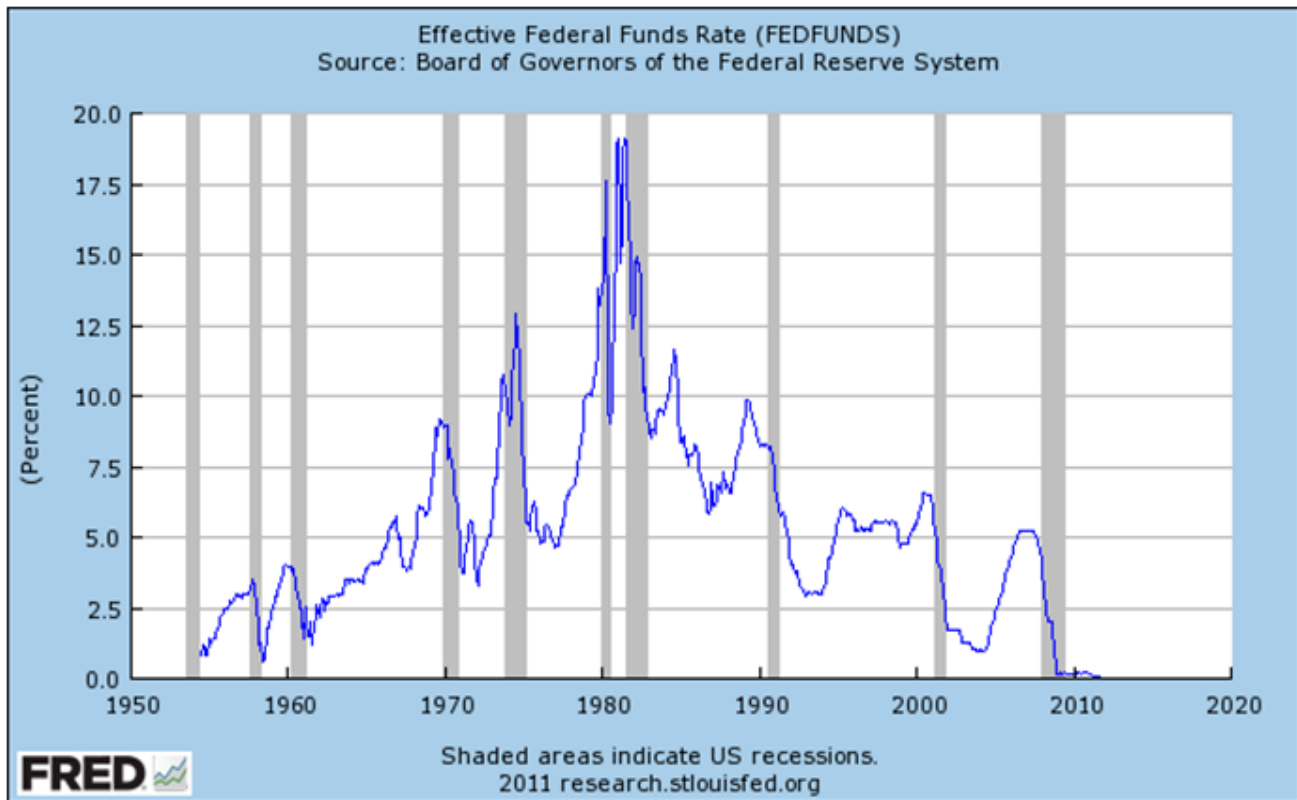
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In interest rates of all maturities remain at unprecedentedly low levels as we write this. Anyone slightly aware of the American economic history, however, understands that interest rates move in concert with business cycles, and those rates will eventually increase, even given the current uneven economic environment. Exhibit 1 (overleaf) illustrates the movements in the federal funds rate, as highlighted during recessionary periods over the past 57 years. The questions we address here are: What will happen to the value of hospitality securities when interest rates rise, as they inevitably will? How can one protect hospitality assets (that is, hotel beds) from the interest rate risks (when the Federal Reserve announces interest rate increases)? Specifically, we examine how exogenous shocks to one of the drivers of the monetary policy—the Fed funds rate—affect hospitality securities’ values. The findings reported here have implications for current owners and potential future investors interested in hospitality businesses.

Effective Fed Funds rate, July 1954–October 2011



Theoretical Underpinning

Chief among the potential risks that might adversely affect the value of hospitality investments are economic trends (notably, recessions) and financial risk. Economic trends drive both sales volume and economic policy. Given their high fixed costs, hotels and restaurants rely on volume to cover those fixed costs and make profits. When the economy is in a downturn, hotels and restaurants take heavy hits as consumers cut down on their travelling and dine in restaurants less often. Likewise, increases in interest rates may have an impact on consumers' borrowing and spending behavior, which directly affect the earnings of the companies in the hospitality industry.

More critically for the price of hotel securities, the hotel industry's debt-heavy capital structure imposes financial risks to the companies in that industry, especially for companies that are loaded with floating-rate debt. Interest rate increases limit the companies' ability to service their debt obligations. If that translates into a reduction in their creditworthiness it may mean losses for investors. Interest rate changes can directly affect firms' cost of capital through changing liquidity conditions.¹ Interest

¹ R. Goyenko and A. Ukhov, "Stock and Bond Market Liquidity: A Long-Run Empirical Analysis," *Journal of Financial and Quantitative Analysis*, Vol. 44 (2009), pp. 189-212; and R. Goyenko, A. Subrahmanyan, and A. Ukhov, "The Term Structure of Bond Market Liquidity and its Implications for Expected Bond Returns," *Journal of Financial and Quantitative Analysis*, Vol. 46 (2011), pp. 111-139.

rate changes also affect the companies' valuation, which in turn affect the market for corporate control.² Thus, hotel and restaurant stock prices respond to interest rate changes, representing one of the sources of risks to which hospitality investors are exposed—the risk of the monetary policy changes. In particular, it is the reaction of the industry to the unexpected portion of the changes in the monetary policy that is of interest in this study, because, according to the efficient market hypothesis, the expected portion of the change would already have been reflected in the stock prices prior to the announcement of the change.

Methodology

In this article, we measure the reaction of lodging and restaurant stock prices to the Federal Reserve's announcements on the federal funds target rate (FFTR), which reflects monetary policy actions. The FFTR is the base interest rate set by the Fed as a tool to implement its monetary policy, and it is the overnight rate the member banks use as a benchmark to borrow and lend to meet the reserve requirements imposed by the Fed. The changes in this benchmark rate have far-reaching consequences and normally affect the interest rates of all maturities—both for individual borrowers and for corporations.

We analyze the period from January 1994 through December 2005, in which there are a total of 100 announcements by the Fed about the FFTR.³ While monetary policies, such as increasing or decreasing the Fed funds rates, are responses to current economic situations, the economy usually reacts to monetary policies, directly or indirectly. Bernanke

² For studies on the market for corporate control and market valuation and economic condition, see, for example: A. Shleifer, and R.W. Vishny, "Stock Market Driven Acquisitions," *Journal of Financial Economics*, Vol. 70 (2003), pp. 295–311; Qingzhong Ma, David A. Whidbee, and Athena Zhang, "Value, Valuation, and the Long-run Performance of Merged Firms," *Journal of Corporate Finance*, Vol. 17 (2011), pp. 1–17; Qingzhong Ma and Andrey D. Ukhov, "Valuation of Takeover Targets and the Market for Corporate Control throughout the Business Cycle," *Insurance Markets and Companies: Analyses and Actuarial Computations*, Vol. 2 (2011), pp. 38–48. For the market for corporate control in hospitality industries, see: Linda Canina, Jin-Young Kim, and Qingzhong Ma, "What We Know about M&A Success: A Research Agenda for the Lodging Industry," *Cornell Hospitality Quarterly*, Vol. 51, No. 1 (February 2010), pp. 81–101; and Qingzhong Ma, Athena Zhang, and Namir Chowdhury "Stock Performance of Acquiring Listed and Unlisted Lodging Assets," *Cornell Hospitality Quarterly*, Vol. 52 (2011), pp. 291–301.

³ We could have also included events of Fed rate changes announced before January 1994. These observations, however, are not as "clean" as those after January 1994 because of the lags between FOMC meetings and the actual announcement. For details, see: Benjamin S. Bernanke and K.N. Kuttner, "What Explains the Stock Market's Reaction to Federal Reserve Policy?," *Journal of Finance*, Vol. 60 (2005), pp. 1221–1257; and K.N. Kuttner, "Monetary Policy Surprises and Interest Rates: Evidence from the Fed Funds Futures Market," *Journal of Monetary Economics*, Vol. 47 (2001), pp. 523–544. For this reason our study focuses on the post-1994 events.

and Kuttner argue that the most direct and immediate effects of monetary policy actions, such as changes in the Fed rate, are on the financial markets.⁴ They report that the value-weighted equity market in the U.S. registers roughly a 1-percent one-day gain in response to a hypothetical unexpected 25-basis-point (0.25 percent) rate decrease.

We follow the approaches used by Kuttner and by Bernanke and Kuttner and estimate the reaction of value-weighted portfolios in the hospitality industry to the FFTR changes, announced after every Federal Open Market Committee (FOMC) meeting. On average, when the Fed announces an unexpected decrease in the FFTR, stock prices increase on the announcement date, and an unexpected rate increase leads to a stock price decrease.

The empirical analysis of our paper is an "event study," in which the events are the FOMC meetings. Estimating the impact of the announcements on stocks is not straightforward due to the fact that, under the efficient market hypothesis, any new information (regarding anticipated moves) is already reflected in market prices long before policy decisions are made and implemented. Since the expected portion of the rate change is already priced in, the market reacts only to the unexpected portion of the news on the announcement date. Therefore, to measure the impact of the policy on the prices, we need to measure the unexpected part of the monetary policy action. To measure this "surprise" change, we employ the method proposed by Kuttner to construct a dataset of unexpected changes in the FFTR.⁵ We then break the changes in the monetary policy actions down to two components—expected and unexpected—and study the impact of each on stock prices. Note that even if there were no changes made to FFTR, the market could have expected a change in one direction or another. Consequently, we study these no-change instances for reaction to the unexpected portion of the rate announcement, just as if the rate had been changed unexpectedly.

We measure the unexpected component of the rate changes by estimating both the expected and unexpected portions of the changes in the Fed funds target rate, using the front-month and month-out 30-day Federal funds futures prices. These 30-day Federal funds futures are traded

⁴ Bernanke and Kuttner, *op.cit.*

⁵ K.N. Kuttner, K. N. Monetary Policy Surprises and Interest Rates: Evidence from the Fed Funds Futures Market," *Journal of Monetary Economics*, Vol. 47 (2001), pp. 523–544. The same method is used in: Bernanke and Kuttner, *op.cit.*; L. Goukasian and I. Cialenco, "The Reaction of Term Structure of Interest Rates to the Monetary Policy Actions," *Journal of Fixed Income*, Vol. 16 (2006), pp. 76–91; L. Goukasian, and L.K. Whitney, "Does the Stock Market Underreact to the Monetary Policy Actions?," Working Paper, Pepperdine University, 2006; and Goukasian, L. and M. Majbouri, "The Reaction of Real Estate-Related Industries to the Monetary Policy Actions," *Real Estate Economics*, Vol. 38, No. 2 (2010), pp. 355–398.

Sample Federal Reserve rate change announcements

FOMC dates	3-Jan-01	6-Nov-02	25-Jun-03
<i>Rate change (bps)</i>			
Actual Chg	-50	-50	-25
Expected chg	-12	-31	-40
Surprise chg	-38	-19	+15
<i>Stock and portfolio returns (%)</i>			
Hotel	6.36	0.31	-0.10
Restaurant	1.48	0.79	-0.87
Marriott (MAR)	8.66	0.18	-0.60

Note: all numbers are in basis points.

in the Chicago Board of Trade (CBOT). We use the futures prices before and after the event, and after appropriate scaling we estimate the unexpected portion of the FFTR change. Then, since we know what the actual change in the rate is, we can derive the expected portion of the rate change.

Assume the event is on the $(t+1)^{\text{th}}$ day of a month that has N days. Denote the FFTR before an event by i^- , and by i^+ after the event. That is, i^- is an average for t days and i^+ is the average for $N-t$ days. Let P_- and P_0 be the futures prices before and after the event. The futures prices are 100 minus the average FFTR for the month. Thus, we have

$$P_- = 100 - \left(\frac{t}{N} i^- + \frac{N-t}{N} E_-(i^+) \right) + \varepsilon^- \quad (1)$$

where ε^- is the premium for the futures contract as of the event day, before the rate changes; and $E_-(i^+)$ is the expectation of the rate after the event, conditional on the information available before the event.

On the day of the rate change (the FOMC meeting), the rate for the rest of the month is known, and we have

$$P_0 = 100 - \left(\frac{t}{N} i^- + \frac{N-t}{N} i^+ \right) + \varepsilon^0 \quad (2)$$

Using the conventional way of measuring the surprise (unexpected) rate change as:

$$\Delta i^S = i^+ - E_-(i^+),$$

and combining equations (1) and (2) above, we get

$$\Delta i^S = \frac{t}{N-t} (P_- - P_0) + \frac{t}{N-t} (\varepsilon^0 - \varepsilon^-) \quad (3)$$

Thus, assuming that the premia ε^0 and ε^- are not sufficiently significant to have an impact on the policy, we find the surprise portion of the rate change from (3) to be:⁶

$$\Delta i^S = \frac{t}{N-t} (P_- - P_0) \quad (4)$$

where P_0 is the current-month futures price on day $t + 1$ and P_- is the current-month futures price on day t .⁷ The expected portion of the rate change will be the difference between the actual change and the surprise, or

$$\Delta i^E = \Delta i - \Delta i^S \quad (5)$$

where $\Delta i = i^+ - i^-$.

Calculation Examples

The following three examples of FOMC announcements illustrate how we calculate rate changes and the corresponding stock and portfolio returns, using portfolios of hotel and restaurant stocks and one large hotel company stock, that of Marriott International. As shown in Exhibit 2, on January 03,

⁶ Because we use daily data on the Fed futures, the daily premia, and thus $\varepsilon^0 - \varepsilon^-$, for such a small time interval are expected to be negligible.

When the event day is on the first day of a month, we take the open and close prices of futures on the day to find the surprise change in rates. If the event day is on the last day of the month, we take the one-month-out futures prices on the last day of the previous month and the current-month prices on the first day of the month to find the surprise change in the Fed funds target rate.

⁷ When the Fed funds rate change occurs on the first day of the month, we use "next-month" futures rate on the last day of previous month for P_- . Moreover, when t is a day that is at the end of the month, $N - t$ becomes small and so the proxy becomes exponentially larger. Therefore, for events that fall on the last three days of the month we use the un-scaled change in the one-month futures rate instead of the spot month rate.

EXHIBIT 3

Descriptive statistics of Fed funds rates

FOMC days	NON-FOMC Days	FFTR changes	No changes in FFTR
98	2	45	55

Note: The full sample consists of 100 observations from January 1994 to December 2005. We excluded September 17, 2001 from the sample. All numbers for rates are in basis points.

2001, the Fed announced a rate cut of 50 bps. The futures data shows that the expected rate cut was 12 bps, resulting in a surprise cut of 38 bps. On that day, the value-weighted hotel portfolio earned a 6.36 percent return, while the restaurant portfolio return was 1.48 percent. The stock return for Marriott (ticker symbol MAR) was 8.66 percent. The situation on November 6, 2002, is similar. On June 25, 2003, the actual rate cut was 25 bps while the expectation was a 40 bps cut, leading to the surprise of a rate 15 bps higher than anticipated. The asset portfolios reacted negatively. The hotel portfolio value decreased by 0.10 percent, the restaurant portfolio by 0.87 percent, and Marriott by 0.60 percent.

Sample and Data

One of the significant steps in collecting data on FFTR changes is to determine the exact dates when changes actually occurred, or, even more important, when they were announced to the public. Starting in January 1994, the Fed announces its decision concerning any changes in the FFTR on the day of the FOMC meeting when the decision is made. The announcement is generally made at about 2:15 PM Eastern Time. As a result, both the futures market and the stock market are aware of and respond to the new policy on the day when changes are made and announced. We accounted carefully for one exception to this pattern, on October 15, 1998. This is the only date in our study when an announcement was made after the futures market was closed. To accommodate for this singular occurrence, we use the opening price on October 16th and the closing rate on the 15th to measure the expected and unexpected portion of the monetary policy.

Exhibit 3 reports the descriptive statistics for 100 FFTR observations. All but two of the 100 observations occurred on FOMC days. Fifty-five of 100 observations involved no changes in the FFTR, and the other 45 days saw FFTR changes. The distribution of the actual rate changes is shown in Exhibit 4. As can be seen, the Fed took extreme actions of cutting or increasing the rate by 50 bps or more fourteen times. In the other 86 cases there was either no change or a modest change of no more than 25 bps.

As we said above, we used the 30-day Fed funds futures traded on CBOT for prices of front-month and one-month-

EXHIBIT 4

Distribution of changes in the FFTR, in basis points

FFTR change	Number of observations
-50	9
-25	10
0	55
25	21
50	4
75	1

out futures on average effective FFTR for the month under consideration (in which the event occurred). We use these futures prices, as obtained from Bloomberg, to estimate the unexpected changes in the FFTR.

We use a dataset of prices for all the stocks in the lodging and restaurant industries, as identified by the U.S. Department of Labor SIC Division Structure (SIC code 7011 for lodging; 5812 for restaurants). We then extract the daily returns for these stocks from the Center for Research in Security Prices (CRSP) at the University of Chicago through Wharton Research Data Services (WRDS). For the event days in our sample we form three value-weighted portfolios, one for all hospitality stocks, one for hotel stocks, and one for restaurant stocks. We use all the available stocks' information on the day of the events, including those that subsequently were delisted, or those that started to trade after 1994, to fully capture the response of the industries to the unexpected changes in the policy.

Results

As discussed before, stock markets are forward looking and incorporate as much new information as possible into prices. Therefore, expectations of upcoming rate changes (or changes in monetary policy) would have already been reflected in stock prices before an FOMC meeting and the accompanying announcement. As actual rate changes do not always coincide with market expectations, the market

Regressions—the base case

	Market	Combined Hotels and Restaurants	Hotel	Restaurant
Expected chg (standard error)	0.06	0.23	-0.38	0.45
	(0.30)	(0.45)	(0.56)	(0.54)
Surprise chg (standard error)	-5.48***	-4.74**	-9.79***	-3.17*
	(1.42)	(1.57)	(2.37)	(1.47)
Constant (standard error)	14.87*	15.24	20.40	13.19
	(7.12)	(10.67)	(12.45)	(11.85)
Adj. R-squared	0.296	0.109	0.318	0.035

Notes: The sample includes 100 announcements about the FFTR from January 1994 to December 2005. The dependent variable for the combined regression is the value-weighted portfolio return of all stocks in hotel and restaurant industries (SIC codes 7011 or 5812) on the announcement day. The dependent variable for the model “Hotel” is the value-weighted portfolio return of all stocks in the hotel industry (SIC code 7011) on the announcement day. The dependent variable for the model “Restaurant” is the value-weighted portfolio return of all stocks in the restaurant industry (SIC code 5812) on the announcement day. “Expected chg” is the expected rate change derived from Federal Funds Futures prices on the announcement day. “Surprise chg” is the surprise range change on the announcement day. For each independent variable in a model, we report its regression coefficient with its robust heteroskedastic standard errors in the parentheses. Levels of statistical significance are as follows: *** = 0.1%, ** = 1%, * = 5%, and + = 10%. We also did the data analysis by excluding outliers. To determine the outliers, Cook’s D influence statistic was estimated for each observation in the whole sample regressions. * Observations for which this statistic was larger than 0.3 where excluded to result in 98 observations for the hotels, 100 for restaurants, and 99 for the overall market. The results are qualitatively similar and available from the authors upon request.

reacts to the surprise (unexpected) component of the news on the rate changes. Therefore, to understand the effects of monetary policy decisions on stock prices, and to accurately measure them, we need to examine the stocks’ responses to the unexpected changes in the FFTR. To estimate the responses, we ran the following regression:

$$R_t = \alpha + \beta^e \Delta I_t^e + \beta^s \Delta I_t^s + \varepsilon_t \quad (6)$$

where R_t is the value-weighted return of the industry portfolio under consideration, ΔI_t^e is the expected change in the FFTR, and ΔI_t^s is the unexpected change in the FFTR, and ε_t is the error term.

Exhibit 5 reports the results of the regressions of the value-weighted returns of the three hospitality industry portfolios and the stock market as a whole on the expected and unexpected changes in the FFTR. We also examine the reaction of the overall equity market to the changes in FFTR.⁸ As expected, hospitality-related stock portfolios’ responses to the expected change in the FFTR are not statistically significant. However, the responses to the surprise change in the rate are significant for all three portfolios. Notably, the coefficient of the surprise for the hotel industry is larger (in magnitude) than that of the overall market, which in turn is larger than that of the restaurant industry.

The regression coefficient suggests that the reaction is economically significant. The result indicates that, for a hypothetical 25-basis-point surprise rate cut, the hospitality

industry portfolio as a whole will roughly register a one-day gain of 119 basis points (0.25×4.74) or 1.19 percent. This is a strong reaction, considering the fact that these are daily returns. This is similar to the overall market, which registers an increase of 137 basis points (1.37%). The reaction to such a cut is even stronger for the hotel industry alone, with a one-day gain of 245 basis points, while the restaurant industry’s response is relatively weaker. These results undoubtedly reflect the hotel industry’s greater dependence on debt financing and greater fixed costs than restaurants.⁹ Thus, the hotel industry responds the same way as the overall market to monetary policy changes, but the magnitude is higher, on average about 78-percent stronger. To the extent the response reflects the underlying risk, the overall results are consistent with the conventional wisdom that the hotel industry represents a riskier investment than other industries on average.

Differential Impacts

Several further questions arise regarding the asymmetries in the responses of the stock prices to the rate changes. It is interesting to learn about the reaction when the Fed reverses its policy from expansion to contraction (or vice versa), or when the unexpected portion of the rate change in the FFTR was positive or when it was negative.

The first possibility is that positive or negative surprises may cause different impacts on the market and, thus, result in different market reactions. We study the impact of the sign of surprises by introducing a dummy variable that is one if

⁸ We use CRSP value-weighted index (data obtained from CRSP through WRDS) as a proxy for the overall equity market and measure the impact of the monetary policy on this index.

⁹ The average leverage of hotel industry over the time period of 1994–2005 is 60 percent, compared to the restaurants’ average of 50 percent.

EXHIBIT 6
The effect of asymmetric surprises in Fed funds announcements

	Market	Combined Hotels and Restaurants	Hotel	Restaurant
Expected chg (standard error)	0.15	0.29	-0.26	0.49
	(0.24)	(0.44)	(0.47)	(0.54)
Surprise chg (standard error)	-7.36***	-6.24***	-12.63***	-3.92*
	(1.60)	(1.73)	(2.50)	(1.75)
x Positive surprise (standard error)	7.03**	5.58	10.60*	2.82
	(2.55)	(3.52)	(4.48)	(3.66)
Constant (standard error)	-0.55	2.98	-2.88	7.00
	(8.15)	(12.47)	(14.53)	(13.61)
Adj. R-squared	0.353	0.148	0.377	0.059

Notes: The sample includes 100 announcements about the FFTR from January 1994 to December 2005. The dependent variable for the combined regression is the value-weighted portfolio return of all stocks in hotel and restaurant industries (SIC codes 7011 or 5812) on the announcement day. The dependent variable for the model "Hotel" is the value-weighted portfolio return of all stocks in the hotel industry (SIC code 7011) on the announcement day. The dependent variable for the model "Restaurant" is the value-weighted portfolio return of all stocks in the restaurant industry (SIC code 5812) on the announcement day. "Expected chg" is the expected rate change derived from Federal Funds Futures prices on the announcement day. "Surprise chg" is the surprise range change on the announcement day. "x Positive surprise" is the interactive term between "Surprise" and a dummy variable "Positive surprise," which is equal to one if the surprise rate change is positive. For each independent variable in a model, we report its regression coefficient with its robust heteroskedastic standard errors in the parentheses. Levels of statistical significance are as follows: *** = 0.1%, ** = 1%, * = 5%, and + = 10%.

EXHIBIT 7
The effect of reversals in policy on prices

	Market	Combined Hotels and Restaurants	Hotel	Restaurant
Expected chg (standard error)	0.09	0.24	-0.34	0.46
	(0.26)	(0.44)	(0.46)	(0.54)
Surprise chg (standard error)	-3.73**	-3.66+	-7.01**	-2.70
	(1.22)	(1.95)	(2.58)	(1.85)
x Reversals (standard error)	-8.27***	-5.13*	-13.11***	-2.21
	(1.30)	(2.26)	(3.14)	(2.28)
Constant (standard error)	13.84*	14.60	18.77	12.91
	(6.66)	(10.56)	(11.54)	(11.90)
Adj. R-squared	0.415	0.153	0.431	0.059

Notes: The sample includes 100 announcements about the FFTR from January 1994 to December 2005. The dependent variable for the combined regression is the value-weighted portfolio return of all stocks in hotel and restaurant industries (SIC codes 7011 or 5812) on the announcement day. The dependent variable for the model "Hotel" is the value-weighted portfolio return of all stocks in the hotel industry (SIC code 7011) on the announcement day. The dependent variable for the model "Restaurant" is the value-weighted portfolio return of all stocks in the restaurant industry (SIC code 5812) on the announcement day. "Expected chg" is the expected rate change derived from Federal Funds Futures prices on the announcement day. "Surprise chg" is the surprise range change on the announcement day. "x Reversals" is the interactive term between "Surprise" and a dummy variable "Reversals," which is equal to one if there was a reversal in policy. For each independent variable in a model, we report its regression coefficient with its robust heteroskedastic standard errors in the parentheses. Levels of statistical significance are as follows: *** = 0.1%, ** = 1%, * = 5%, and + = 10%.

the surprise is positive and zero otherwise. We multiply this dummy by the amount of surprise change and analyze the coefficient of this variable, with the results shown in Exhibit 6.

For the combined portfolio, the coefficient of the surprise rate change remains negative, and is significant at the 0.1 percent level. The coefficient of the interactive term

with a surprise change and a positive surprise is positive, but the statistical significance is weak. The coefficients of this variable between the regressions for the individual hotel and restaurant portfolios, however, differ substantially. In the regression for the hotel portfolio, the coefficient is positive and significant at the 5-percent level. The positive coefficient indicates that when the surprise is positive (i.e., the actual

rate increase is greater than expected or the actual rate cut is smaller than expected), the reaction of the hotel industry is weaker than when the surprise is negative.

For restaurants, the coefficient is positive but not significant, which is consistent with that portfolio's relatively weak response to any surprise in rate changes, also as shown in Exhibit 6. Once again, the coefficients of the expected rate change in all regressions are not significant, a finding consistent with the efficient market hypothesis.

Reversals. As the current target rate has been relatively low for a long period of time and that low rate stance will eventually be reversed, it is particularly interesting to see how security values react to the reversal of interest rate policies. Exhibit 7 presents regressions to examine the effect of such reversals, which is negative in all cases and statistically significant in the combined portfolio and the hotel portfolio. This finding indicates that a reversal in the direction of the monetary policy plays a significant role in explaining the hospitality industry's reaction to monetary policy actions. This is not surprising, as markets may interpret reversals in the monetary policy as a long-term directional change in Federal Reserve's monetary policy. In other words, after a reversal, the markets may perceive that the Fed will not change the direction of its policy for a long while and, therefore, successive rate changes will be in the same direction as the most recent one. Hence the reaction to the initial reversal will be strong in anticipation of further expected changes in the same direction.

In summary, there is a strong significant response of the hospitality industries to surprise changes in FFTR. Notably, the response of the hotel industry is 78-percent greater than the magnitude of response of the overall equity market. The stronger reaction of the hotel industry is consistent with the view that the hotel industry is more sensitive to the "cost of money" (proxied by the FFTR and controlled by the Federal Reserve) than are restaurants and other "average" industries.

Implications and Limitations

Investors in the hotel industry particularly should find this research to be of great interest. Investors interested in putting money into the hotel business should be aware

that hotel stocks are more sensitive than most to changes in macroeconomic environment, as reflected in the Federal Reserve's monetary policies. Our estimate of the "riskiness" of the hotel industry indicates that the hotel business is riskier than other industries on average, when the riskiness is gauged by the exposure to the monetary policy. Further, given the broad expectation that the Fed will eventually have to abandon its current low-rate policy and increase rates, our evidence suggests an even higher risk of losing value when that policy reversal occurs.

Overall, our results suggest that current owners of hotel assets consider taking steps to "save the bed from the Fed." In other words, investors are wise to include hospitality investments in their portfolios as long as they understand those risks and know how to hedge the investment. By no means do we imply that investors should avoid investing in or allocate less money to this industry when they construct their portfolios. Instead, the analysis here serves as a tool to account for those risks and take them into account in a portfolio. Executives and current hotel owners could consider hedging the macroeconomic risks by engaging in transactions in the derivatives markets. A natural place for finding hedging instruments is the CBO's Fed funds futures and options on those futures. When making capital budgeting decisions, executives of hotel companies should also adjust their discount rates depending on whether the going interest rates are high or low compared to historical averages.

Limitations. The above analysis sheds light on some macro risks for the hospitality industry, but it has its limitations. While we report evidence that the hotel industry responds strongly to monetary policy actions, we do not discuss what fundamental sources explain the market's reaction. That is, we do not study here whether the stock returns are driven by changes in future dividends (or cash flows, in general), or by the expected change in real interest rate (which is part of the discount rate used in capital budgeting decisions), or changes in future risk premiums. In the context of the hotel industry, one way to explore these questions in future research is to examine whether the hotel room rates respond to monetary policy changes. ■

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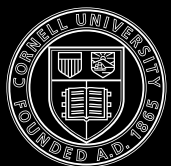
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