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AN EVENT STUDY ANALYSIS OF U.S. HOSPITALITY STOCK PRICES' REACTION TO FED POLICY ANNOUNCEMENTS

Chen: U.S. hospitality stock prices' reaction to Fed policy announcements

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ABSTRACT

This paper is an event study analysis of the reaction of daily U.S. hospitality stock prices to announcements of Federal Open Market Committee decisions concerning the federal funds target rate (*FFTR*). The study first identifies two components of changes in the *FFTR*, namely the expected and the unexpected (or surprise) components. The surprise component that is not yet priced into the market can be calculated from the change in the federal funds futures rate. According to the efficient market hypothesis that stock prices should have already reflected all information available in the market, it is hypothesized that hospitality stock prices should respond only to the surprise component. Test results support the hypothesis. Except for restaurant index, the responses of airline, gambling, hotel and travel and leisure stock indices to the surprise component of changes in the *FFTR* are highly significant. The corresponding responses to the actual changes in the *FFTR* and the expected component, in contrast, are statistically insignificant.

Key Words: U.S. hospitality stocks; Event study; Federal funds target rate; Federal funds futures rate

INTRODUCTION

Many financial studies have analyzed the impact of Federal Reserve (Fed) monetary policy on stock returns (for example, Bernanke and Kuttner, 2005; Conover et al., 1999; Kuttner, 2001; Thorbecke, 1997). Empirical findings support a strong link between equity returns and monetary policy changes. Several recent papers have examined whether changes in monetary policy could significantly influence stock performance in different hospitality sectors.

Barrows and Naka (1994) investigated the effect of economic variables on U.S. hospitality stock returns and revealed that U.S. restaurant and lodging stock returns were strongly related to money supply growth rates. Chen et al. (2005) showed that money supply growth rates could explain hotel stock returns in Taiwan. Moreover, monetary factor measured by lag changes in discount rate were found to be an explanatory factor of hotel stock returns in China (Chen, 2007b). Chen (2007a) reported that Taiwanese hotel stocks performed better under an expansive monetary condition.

This paper contributes to the hospitality literature by analyzing the reaction of daily U.S. hospitality stock prices to announcements of Federal Open Market Committee (FOMC) decisions concerning the federal funds target rate (*FFTR*). By applying Kuttner's (2001) methodology, the study isolates the unanticipated component of policy actions. Specifically, by using federal funds futures data to construct a measure of the unexpected (or surprise) component of the *FFTR* change, Kuttner (2001) found that the surprise component has a significant impact on U.S. bill, note and bond yields.

Since then, the methodology has been widely used by academic research papers to examine the impact of monetary policy surprise on stock market returns. For example, Bernanke and Kuttner (2005) reported that stock market prices responded only to the surprise change in *FFTR*. Basistha and Kurov (2008) investigated the reaction of stock returns to surprise *FFTR* changes in different economic conditions. Jansen and Tsai (2010) tested asymmetries in the impact of surprise *FFTR* changes on stock returns in bull and bear markets. However, no studies to date have examined the effect of monetary policy surprise on hospitality stock performance.

Moreover, while the previous hospitality finance studies identified several significant monetary explanatory factors of hospitality stock returns, the monetary policy measures used in their studies, such as growth rates of money supply or changes in discount rates, may coincide with changes in business cycle and/or other relevant economic variables. The significant effect found in those papers could be attributed to economic factors rather than to monetary policy. As Bernanke and Kuttner (2005) noted, it is difficult to estimate the response of stock prices to Fed monetary policy actions because the stock market is unlikely to respond to Fed policy actions that were already anticipated. Distinguishing expected from unexpected Fed policy actions is therefore, critical in detecting policy effects.

This paper is the first in the hospitality literature to identify the surprise element of monetary policy changes and examine the reaction of hospitality stock prices to monetary policy surprises. Note that the surprise component is the unanticipated component that has not been already priced into the market. According to the efficient market hypothesis that asset prices should have already reflected all information available in the market, it is therefore hypothesized that the response of hospitality stock prices to the surprise component in monetary policy announcements should be highly significant and, however, to the expected component should be negligible.

DATA AND VARIABLES IN AN EVENT STUDY ANALYSIS

In recent years, the Fed has focused more on the federal funds rate (*FFR*): the interest rate on overnight loans of reserves from one bank to another. These overnight loans of reserves occur because some banks need to borrow funds to meet reserve requirements set by the Fed, while other banks have excess funds. On the other hand, the *FFTR* is determined by a meeting of the members of the FOMC. In practice, when targeting a specific *FFR*, the Fed increases or decreases the money supply through open market operations to push the federal funds to the targeted value. Since February 1994, the Fed has announced a *FFR* target at each FOMC meeting and this announcement is watched closely by market participants because it influences the interest rate throughout the economy. To measure the impact of Fed policy actions on U.S. hospitality stock prices, it is necessary to calculate the reaction of hospitality stock prices to *FFTR* changes on the day of the change. The methodology used in the study could be described as an event-study style of analysis because it examines the response to FOMC meetings and announcements. The relevant sample would be the set of all days corresponding to FOMC meetings.

Since February 1994, the FOMC has announced the current *FFTR* immediately after an FOMC meeting. This study starts the sample on February 4, 1994, which is the first event (announcement) with a 25-basis-point rate cut (a decrease of 0.25%). The last event in the sample is the FOMC meeting on October 25, 2006, which does not change the current *FFTR*. Following Kuttner (2001), the unscheduled FOMC meetings are omitted. As a result, the sample contains 102 observations, including 30 increases, 15 decreases and 57 non-changed. All funds rate data are obtained from the website of the Federal Reserve Bank of New York (<http://www.newyorkfed.org>).

To analyze the reaction of U.S. hospitality stock prices to *FFR* changes, the daily hospitality index returns on each sample event day are computed as: $HIR_t = \ln(HI_t / HI_{t-1}) \times 100\%$, where HI_t is the daily closing index for each hospitality sector on day t . Similarly, the daily market returns are calculated as $MR_t = \ln(SP500_t / SP500_{t-1}) \times 100\%$, where $SP500_t$ is the daily S&P 500 closing index on each event day. The five hospitality sectors covered in the study are airline, hotel, restaurant and travel and leisure. Five hospitality sector indices and the S&P 500 index are taken from the DataStream database.

To distinguish anticipated from unanticipated Fed policy actions, Kuttner (2001) derived a measure of the surprise (unexpected) element of any specific change in the federal funds target from the change in the futures contract's price relative to the day before the policy action. Specifically, given that an event (announcement) takes place on day d of month m , the unexpected (or surprise) component of target funds rate change can be calculated from the change in the rate implied by the current-month futures contract. The surprise element of the *FFTR* change can be computed based on the change in the implied rate of the current-month federal funds futures on the day of the Fed policy decision (Kuttner, 2001). The one-day target funds rate surprise for day d is given as:

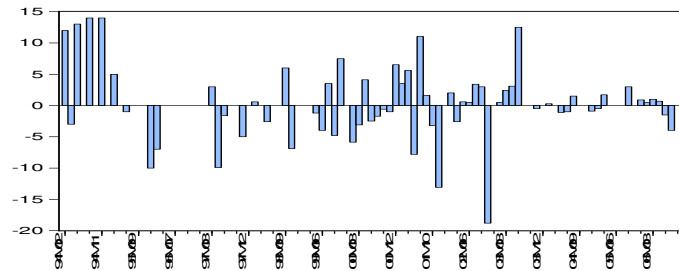
$$Surprise = \frac{D}{D-d} (FR_{m,d}^0 - FR_{m,d-1}^0), \quad (1)$$

where *Surprise* is the unexpected *FFTR* change, $FR_{m,d}^0$ is the current-month 30-day federal funds futures rate on day d , $FR_{m,d-1}^0$ is the current-month 30-day federal funds futures rate on day $d - 1$, D is the number of days in the month m , and d is the day of the current FOMC meeting.

Bernanke and Kuttner (2005) explained that this method is generally a good gauge of the surprise change in the target *FFR* because the monthly average of the effective *FFR* on which the contract is based is very close to the average target rate. Accordingly, the expected component of changes in *FFTR* ($\Delta FFTR$) can be defined as the actual $\Delta FFTR$ minus the surprise: $Expected = \Delta FFTR - Surprise$. Figure 1 depicts the surprise component of actual changes in *FFTR* on all event days. As shown in Figure 1, the surprises occurred frequently, indicating

that it is not always easy for market participants to make correct predictions of $\Delta FFTR$.
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Figure 1
The surprise component of actual $\Delta FFTR$ (basis point)



MODEL AND RESULTS

To assess the reaction of hospitality stock prices to monetary policy actions, this study examines one-day response of hospitality stocks to $\Delta FFTR$. The procedure involves regressing daily hospitality index returns on daily $\Delta FFTR$ on all event days:

$$\text{Model I: } HIR_t = \alpha_1 + \beta_1 \Delta FFTR_t + \varepsilon_t, \quad (2)$$

where the error term ε_t represents factors other than monetary policy that affect hospitality stock prices on event day t . One shortcoming of Model I is that monetary policy changes are simply measured as changes in $FFTR$ on days of FOMC meetings. Bernanke and Kuttner (2005) has shown that on the day of announcement, most stock prices react not to the announcements themselves, but to their unexpected component that is not already priced into the market.

To separate the effects of expected and unexpected $FFTR$ changes on hospitality index returns, Model II is based on Eq. (3):

$$\text{Model II: } HIR_t = \alpha_2 + \beta^e \text{Expected}_t + \beta^s \text{Surprise}_t + v_t, \quad (3)$$

where *Expected* and *Surprise* denote the expected and surprise components of changes in $FFTR$, respectively. The coefficients β^e and β^s represent the corresponding effects of expected and surprise $FFTR$ changes on hospitality index returns.

Table 1 reports the estimation results of the responses of hospitality stock indices to $\Delta FFTR$ based on Model I. For all five hospitality and the market sectors, the coefficient β_1 is statistically insignificant. The explanatory power (adjusted R^2 value) is very small. These results suggest that hospitality and market returns do not significantly respond to actual $\Delta FFTR$.

Table 1. The responses of U.S. hospitality indices to $\Delta FFTR$

Sector	Constant	$\Delta FFTR$	F-statistic [p-value]	\bar{R}^2
Airline	19.73 (1.14)	-0.77 (-1.24)	0.88 [0.35]	0.01
Gambling	-49.70 (-2.54)***	-0.05 (-0.06)	0.01 [0.95]	0.00
Hotel	11.35 (0.83)	0.12 (0.23)	0.03 [0.85]	0.00
Restaurant	9.50 (0.74)	0.76 (1.34)	1.61 [0.21]	0.01
Travel and leisure	12.65 (0.83)	0.66 (0.74)	1.19 [0.28]	0.01
S&P 500	18.16 (1.71)*	0.44 (0.86)	1.06 [0.31]	0.01

Notes: The numbers in parentheses are the Newey and West (1987) corrected t -statistics. * Statistical significance at the 10% level. ** Statistical significance at the 5% level. *** Statistical significance at the 1% level.

Test results of the responses of hospitality stock index returns to $\Delta FFTR$ according to Model II are summarized in Table 2. When the factor $\Delta FFTR$ is broken into its expected and surprise components, the coefficient β^s is negative and statistically significant for the airline, gambling, hotel, travel and leisure and

The responses of U.S. hospitality index returns to the surprise and expected $\Delta FFTR$

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Sector	Constant	Expected	Surprise	F-statistic [p-value]	\bar{R}^2
Airline	18.43 (1.05)	-0.06 (-0.07)	-7.80 (-1.93)*	2.19 [0.12]	0.04
Gambling	-50.78 (-2.50)***	0.55 (0.51)	-5.92 (2.04)**	1.05 [0.35]	0.02
Hotel	9.71 (0.67)	1.02 (1.50)	-8.78 (-2.80)***	4.72 [0.01]***	0.09
Restaurant	9.58 (0.75)	0.71 (1.25)	1.20 (0.49)	0.81 [0.45]	0.02
Travel and leisure	10.78 (0.73)	1.68 (1.92)*	-9.45 (-4.17)***	8.11 [0.00]***	0.14
S&P 500	16.89 (1.73)*	1.14 (2.56)***	-6.45 (-3.47)***	7.47 [0.00]***	0.13

market sectors, implying that stock indices of hospitality sectors, except for restaurant, significantly respond to the surprise component of $\Delta FFTR$. Test results further indicate a -7.80% one-day airline index returns in response to a 1% point surprise rate increase. Similarly, a 1% point surprise rate increase leads to a corresponding -5.92%, -8.78%, -9.45% and -6.45% one-day index returns for gambling, hotel, travel and leisure and market sectors on the event days. Nonetheless, the responses of hospitality stock indices to the expected component indicated by the coefficient β^e are much smaller than those to the surprise component and are insignificant in general.

The adjusted R^2 value reveals that 4% of variance in airline index returns and 2% of variance in gambling index returns on the event days is associated with news about monetary policy. In comparison, the percentage of variance in returns explained by Fed funds rate surprise is much higher for the hotel, travel and leisure and market sectors: 9%, 14% and 13%, respectively. Moreover, F-statistic shows that the expected component together with the surprise component can significantly explain the hotel, travel and leisure and market index returns, but fail to explain the airline, gambling and restaurant index returns significantly.

CONCLUSION

This paper examines the reaction of daily U.S. hospitality stock indices to Fed monetary policy announcements, and specifically to $\Delta FFTR$. An important issue arises when measuring the response of U.S. hospitality index returns to Fed policy actions is the correct identification of monetary policy changes. Previous studies in the hospitality literature used growth rates of money supply or changes in discount rates as the measures of monetary policy. However, the problem with these measures is that growth rates of money supply or changes in discount rates can coincide with changes in some other relevant economic variables and the effect attributed to monetary policy in those papers may reflect other factors.

To estimate the response of hospitality stock indices to $\Delta FFTR$ accurately, this study uses federal funds futures data to separate unanticipated changes in the target rate from anticipated changes. Test results based on an event study analysis find that except for restaurant index, the responses of airline, gambling, hotel and travel and leisure stock indices to the surprise component of the actual $\Delta FFTR$ are large and highly significant. On the contrary, the corresponding responses to the actual $\Delta FFTR$ and the expected component are statistically insignificant.

Empirical findings have some important implications. As mentioned, the efficient market hypothesis states that stock prices should reflect all information available in the market, hospitality stock prices are expected to respond only to the surprise component in monetary policy announcements. Test results from airline, gambling, hotel and travel and leisure sector support the efficient market hypothesis. Further, this study shows that it is critical to distinguish anticipated from unanticipated Fed policy actions; the failure to do so could introduce a significant bias in empirical estimations of the reaction of U.S. hospitality index returns to changes in monetary policy.

In addition, Nowak (1993) argued that monetary policy changes are likely to have a strong impact on industries that are sensitive to the interest rate and on those industries with a substantial export or import components. The possible reason for the high responses of airline, gambling and hotel stock indices to $FFTR$ surprises could reflect the fact that these industries are capital-intensive, and require regular and large investment decisions. Therefore, changes in the cost of capital and interest rate changes induced by monetary policy changes would have a bigger impact on expected future corporate earnings of capital-intensive industries, which should be reflected in the responsiveness of stock index returns. In comparison, the restaurant industry is

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less capital-intensive and Skalpe (2003) argued that the performance of restaurants primarily depends on the choice of an appropriate location and a limited amount of capital to equip and furnish the facility. These may explain the insignificant responses of restaurant index return to *FFTR* surprises.

Furthermore, monetary policy changes have an influence on exchange rates. An appreciation or depreciation in currency can significantly affect future corporate earnings of firms in those industries that engage in international trade. For example, a devaluation of the U.S. dollar makes travel and leisure activities more costly, especially by reducing the willingness of travelers to travel internationally. Therefore, the relative openness of the travel and leisure industry to trade could be the reason for the strong response of travel and leisure index to *FFTR* surprises.

Finally, examining cyclical variation in the effect of Fed policy on the stock market, Basistha and Kurov (2008) found a much stronger response of stock returns to unexpected changes in the *FFTR* in economic recession. Jansen and Tsai (2010) analyzed whether surprise *FFTR* changes have different effects on stock returns in bull and bear markets. They reported that the influence of surprise *FFTR* changes on stock returns in a bear market was higher than that in a bull market. Future studies can investigate whether the reaction of hospitality stock prices to monetary policy surprises varies at the different stages of business cycle and in different stock market conditions.

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