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EFFECTS OF SEARCH VOLUME INDEX ON RETURN OF HOSPITALITY INDUSTRY STOCK

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Abstract

This study proposes a new indicator of stock price in hospitality industry by using the search volume index from search engine. The search volume index of a hotel is calculated by the customer's search frequencies and can be treated as a proxy of customers' attentions on the hotel. Therefore, search volume index is proposed to be used to predict the returns of the hotel's stock. Monthly returns of all the stocks of hospitality industry in America market has been collected. A panel data model has been applied to analyze the effect of the search volume index of these hotels from Google Trends on their stocks returns. The result indicates that the hotel's stocks will have excessive returns when it has gotten an abnormal search volume index.

Keywords:

Customer attention, search volume index, abnormal return

1. Introduction

The hospitality industry has extensively used the Internet for marketing because of its influence (Xiang & Gretzel, 2010). With the Internet, customers can perform activities, such as searching, selecting, booking, and paying for hotel rooms (McCarthy et al., 2010). Apparently, the Internet has become an important avenue for people to collect hotel information. A recent study indicated that a search volume index (SVI) recorded by search engines, such as Google, can affect a stock's abnormal returns (Da et al., 2011a). In Da et al.'s (2011a) study, the search for the stock code of a firm instead of the product is explained using investor attention theory. The study reveals that the discrepancy between the SVI of a firm's product and theoretical expectation is due to the noise in data. For the listed firms in the hospitality industry, we found that the SVI of the hotel names exerts a positive effect on the abnormal return of their stock. Thus, searching for hotel information on a search engine not only benefits the searcher but also the stock value of the hotel searched.

Several studies explain the effects of online search information on the abnormal return of

stocks (Liu & Ye, 2016). Drake et al. (2012) pointed that SVI reflects the information demand of an investor. Da et al. (2014) claimed that the SVI of some given words indicate the sentiments of investors. Previous studies also asserted that the SVIs of firms' products affect revenue surprises and exhibit strong predictability for returns around earning announcements (Da et al., 2011b). Regarding the SVI of a firm's product, Da et al. (2011a) asserted that the SVI of the stock code is important, whereas the SVI of the product will not conform to theoretical expectation. The researchers explained this abnormal result using data noise. They assumed that the data of the SVI of the products do not perfectly match that of a firm. However, in the hospitality industry, the products of firms possess unique brand names that customers can easily distinguish. Thus, we believe that the SVI of hotel names can influence the abnormal return of stocks of the listed hotel firms. The search volume of firms' product should be treated as a customer attention instead of investor attention. And the effect of customer attention on stock price should be different with investor attention. The investor attention has a short-term effect and the customer attention have a long-term effect on the stock price. In addition, searching for a hotel on a search engine not only benefits the searcher but also the stocks of the hotel by having a better return than other hotels.



Fig 1: Search result of Google Trends using the keyword “Hilton Hotel”

2. Data and methodology

To address this issue, two types of data were used. First, we collected the stock data from Yahoo! Finance. We selected all the 21 stocks, which were listed in the U.S. and belong to the hospitality industry category. Second, we gathered the SVI of the listed firms using the Google Trends, which offered the keyword index according to search frequency. Figure 1 shows the search result of Google Trends using “Hilton Hotel” as a keyword. We collected the monthly SVI of hotel names and their stock codes from Google Trends to obtain an unbalanced panel dataset from January 2004 to December 2016. However, we did not obtain more than 21 stocks in a cross section because several stocks were listed later than 2004. We matched stock data and search data by date and generated a dataset which included 2935 records. Thereafter, we transformed the variables to an abnormal change following Da et al.’s (2011a) research. We used SP500 index as a benchmark and define the abnormal return which measured by the difference between the close price return of the stock and the return of the SP500 index. Finally, we used the abnormal search volume index of stock code, the change of stock trading volume and the change range of stock price as control variables. We obtained all the variables and their measure methods as listed in Table 1.

| Variable sign | Variable name | Description |
|---------------|--------------------------------|--|
| aRtn | Abnormal return | Difference between the close price return of the stock and the return of the SP500 index |
| NASVI | Abnormal SVI of the hotel name | Different between the SVI of this month and the median of the last four months |
| CASVI | Abnormal SVI of the stock code | Difference between the SVI of this month and the median of the last four months |
| ChgV | Volume change | Log ($\mathbf{Volume}_t - \mathbf{Volume}_{t-1}$) |
| ChgP | Range of price change | Absolute value of the close price return |

Table 1: List of variables

To explore the effects of SVI on the return of stocks, we proposed a period fixed-effect panel data model, which is expressed as follows:

$$aRtn_{i,t} = \alpha_0 + \alpha_t + \beta_1 NASVI_{i,t} + \beta_2 CASVI_{i,t} + \beta_3 ChgV_{i,t} + \beta_4 ChgP_{i,t} + \varepsilon_{i,t},$$

where i represents the stocks, and t represents the month. We controlled the volume and volatility of stocks to explore the abnormal SVI of the hotel name (NASVI) or the abnormal SVI of stock code (CASVI), which influences the return of stocks.

3. Empirical analysis

We test the data before analysis model. The Wooldridge test (Wooldridge, 2010) result indicates that the variables have no autocorrelation (p value = 0.4319 > 0.05). Table 2 presents the result of the model. NASVI exerts a significant positive effect on the monthly abnormal return of stocks, whereas CASVI does not exert a significant effect. The control variables are also consistent with those in other research, clearly indicating their positive effect on the abnormal return of stocks. According to the model result, the SVI of hotel names is more important than that of the stock code to the abnormal return of stocks in long term. The result of CASVI is consistent with the conclusion of other research (Da et al. 2011a), that is, CASVI does not affect the abnormal return of stocks after one month (four weeks). With this finding, we considered that customer attention (NASVI) positively influences the excess return of stocks in long term rather than investor attention (CASVI) in hospitality industry. Table 3 shows the robustness test result. We changed the parameters on measuring the abnormal SVI from 5 to 8, and the results are similar with that of Table 2. In addition, NASVI coefficients are more significant when n is larger.

The contributions of this research are as follows. First, to our knowledge, this research is the first to explore the effects of SVI on hotel stocks. Previous studies focused more on economic factors (Chen et al., 2005). Second, we investigated the effects of a common customer's attention on a stock's return instead of the investor's attention by changing the keywords from stock codes to hotel names. Third, we addressed the conflicting results in other studies

on the influence of the attention on the stock market using data from the hospitality industry (Da et al., 2011a).

| Variables | Coef. |
|-------------------------|-------------------------|
| NASVI | 0.014394** (2.1356) |
| CASVI | 0.002759 (0.835) |
| ChgV | 0.002002* (1.7729) |
| ChgP | 0.476253*** (20.069) |
| adjusted R ² | 0.13499 |
| F-statistic | 116.056*** |
| Number of <i>T</i> | 153 |
| Number of <i>N</i> | 14–21 |

t-statistics in parentheses: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Table 2: Effects of SVI on stock's abnormal return in the hospitality industry

| Variables | n = 5 | n = 6 | n = 7 | n = 8 |
|-------------------------|---------------------------|---------------------------|---------------------------|---------------------------|
| NASVI | 0.0170123** (2.2037) | 0.0181419** (2.3854) | 0.0294907*** (3.9321) | 0.0292267*** (3.9386) |
| CASVI | 0.0038711 (1.0334) | 0.0046047 (1.2724) | 0.0042320 (1.2921) | 0.0045575 (1.4170) |
| ChgV | 0.0019207* (1.6929) | 0.0019048* (1.6766) | 0.0017893 (1.5025) | 0.0018332 (1.5376) |
| ChgP | 0.4764416*** (20.0878) | 0.4746570*** (19.9411) | 0.4640001*** (19.2365) | 0.4635688*** (19.1826) |
| adjusted R ² | 0.14252 | 0.13539 | 0.13906 | 0.13915 |
| F-statistic | 116.225 | 115.891 | 118.782 | 118.298 |
| Number of T | 152 | 151 | 150 | 149 |
| Number of N | 14-21 | 14-21 | 14-21 | 14-21 |

t-statistics in parentheses: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$, and *n* is the parameter of measuring the abnormal SVI.

Table 3: Results of robustness test

4. Conclusions

Our research also offers several practical implications. First, the retail investor can find superior hospitality industry stock by distinguishing the abnormal SVI. Second, stock analysis can assess factor for selecting stock by abnormal search volume in the hospitality industry. Lastly, practitioners can determine the expectations of investors for their stocks. Therefore, SVI supplies data support for expectation management of stocks in the hospitality

industry.

Nevertheless, the research bears limitations. For instance, the values of the findings can be limited due to data noise. Additional empirical results are needed to examine whether other industries feature similar characteristics. Finally, other variables in the model can be added to control other potential influencing factors.

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