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The dynamic cross-correlations between foreign news, local news and stock returns

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HIGHLIGHTS

- We explore the dynamics relationship between stock prices and media coverage of AH pair stocks in China.
- The MF-DCCA is employed.
- H-share prices seem to move more consistently with foreign media coverage.
- A-share prices react to different media coverage at the similar intensity.
- The findings support the existence of local bias in media choosing.

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ABSTRACT

Plenty of literature has proven the existence of local media bias in stock market from the perspective of trading volume. Given to the cross-listings of AH stocks in China, we explore the dynamics relationship between stock prices and media coverage by means of MF-DCCA. We mainly find that H-share prices seem to move more consistently with foreign media coverage in contrast to mainland media coverage, while A-share prices react to different media coverage at the similar intensity. These findings are robust to alternative measurements of returns. Generally speaking, our findings support the existence of local bias in media choosing.

1. Introduction

News media plays a critical role in financial market, notably in the Internet era the accessibility and abundance of news have been improved a lot [1,2]. It exerts an influence on financial market not only through the way that it serves as the carrier of information [3,4]but also by itself [5,6]. As Robert J. Shiller mentioned in his famous book *Irrational Exuberance*, "although the news media present themselves as detached observers of market events, they are themselves an integral part of these events". In this paper, we extend the evidence that media's own qualities or characteristics can have an impact on the stock market.

Local bias, a phenomenon that people tend to have preference for geographically proximate investments even without political and monetary boundaries exiting in flows of capital, has been widely discussed in finance literature. This bias not only influences individual investors' choices [7] but also influences fund managers' decisions [8] and analysts' coverage [9], and not only exists in developed markets such as America, Germany, Finland, Korea et al. [10–13], but also exists in emerging markets such as Indonesia and China [14,15]. Furthermore, this bias has an impact on investors' choices of which stock to

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search on the Internet [16], which stock to pay attention to [15] and which stock to hold [11]. Academicians put forth a variety of explanations for this puzzle by empirical research [7] or model setting [17], which can be roughly grouped into two categories: information asymmetries [11,17] and familiarity [12,18].

However, some conclusions reached by Gurun et al. [19] and Miller et al. [20] suggest a different channel: investors exposed to disproportionately positive (though may not accurate) value-relevant information from local media, which results in the propensity to investing in nearby equities. Burgeoning literature have proven that market participants seem to trust or acquire more information from local media [5] or local analysts [21]. And local media also has more power in corporate governance compared with foreign media [22]. However, considering the fact that the financial literature has yielded a large number of in-depth studies concerning the relation between media coverage and stock returns [3,6,23,24], nearly all of the papers aforementioned only document investors' local preference on media from the view of trading volume or CEO turnover. Motivated by the pioneering study of Jia et al. [21], we utilize the dual-class shares of Chinese firms, namely A shares traded in mainland China by local investors and H shares traded in Hong Kong by foreign investors, and the MFCCA method [25,26], or to be exact, the MF-DCCA approach, to explore the dynamic cross-correlations between returns and media coverage from different regions. To our knowledge, this paper is the first to investigate the local media preference from the perspective of stock returns and support the hypothesis that media itself may contribute to the local-bias puzzle.

The remainder of the paper is organized as follows. In Section 2, we introduce the methodology mainly employed in detail. And then, we briefly describe the data and its source. In Section 4, we show the empirical results of our analysis and consider how the choice of different window lengths may influence our results. For robustness, we use another return computing method to proxy stock returns and divide stocks into two groups based on their market capitalization in Section 5. Section 6 summarizes the paper and deals with the economic applications of our findings.

2. Methodology

The traditional cross-correlation functions are limited when the relationship under analysis is nonlinear and nonstationary. Several papers have made great contribution to overcome this drawback. Podobnik et al. [27] and Zhou et al. [28] put forward the detrended cross-relation analysis (DCCA) method, which further evolved into different versions adapted to various scenarios [29], to name a few, the MF-X-DMA [30] that based on the MF-DMA [31,32] and the DMA [33], the MF-X-PF [34–36], the MF-PX-DFA or the MF-PX-DMA [37], the MF-X-WT [38], the MF-HXA [39] ,the MF-X-WL [36], the DMCA [40] and so forth. The method employed by this study is the multifractal extension of the DCCA, the MFCCA [25,26,41], which has been widely used in papers that detect the dynamic cross-correlations between two time series in financial markets, such as the study conducted by Zhang et al. [41]. In this section, we would like to briefly introduce this method.

Suppose there are two time series x_t and $y_t (t = 1, 2, \ldots n)$, where n refers to the length of these two time series.

Step 1: Get the "profile" of each series where the profile can be defined as the cumulative sum of the series.

$$X(p) = \sum_{t=1}^{p}(x_t - \overline{x}), Y(p) = \sum_{t=1}^{p}(y_t - \overline{y}) \tag{1}$$

where $\overline{x}$ and $\overline{y}$ are the averages of the time series x_t and y_t respectively.

Step 2: Find different lengths l and divide two profiles obtained from last step into N non-overlapping segments, where $N = int(\frac{n}{l})$. Considering that n may not be a multiple of length l, the same procedure should be repeated by starting from the other end of each time series to avoid a small fraction at the end of the series being missed out during the calculating process. Thus, we will get $2 \times l$ segments. Following [42], we set $10 < l < n/5$.

Step 3: By calculating least-square fits for each series, we get local trend series $\widetilde{X_s}$ and $\widetilde{Y_s}$ at every window s.

For $s = 1, 2, \ldots, 2N$, the detrended covariance for each segment can be obtained by using the following method:

for $s = 1, 2, \ldots, N$,

$$F^2(l, s) = \frac{1}{l}\sum_{p=1}^{l}[X_{(s-1)l+p}(p) - \widetilde{X_s}(p)][Y_{(s-1)l+p}(p) - \widetilde{Y_s}(p)] \tag{2}$$

and

$$F^2(l, s) = \frac{1}{l}\sum_{p=1}^{l}[X_{n-(s-N)l+p}(p) - \widetilde{X_s}(p)][Y_{n-(s-N)l+p}(p) - \widetilde{Y_s}(p)] \tag{3}$$

for $s = N + 1, N + 2, \ldots, 2N$.

Step 4: the qth-order function can be derived by averaging all segments s:

$$F_q(l) = \left\{\frac{1}{2N}\sum_{s=1}^{2N}[F^2(l, s)]^{q/2}\right\}^{1/q} \tag{4}$$