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Foreign investors and the speed of price adjustment across multiple correlation regimes in Korea☆

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ABSTRACT

This paper investigates whether foreign investors have information advantage by testing for the speed of price adjustment between the portfolios of stocks sorted by foreign ownership in Korea. The tests are performed across multiple correlation regimes between the world and domestic markets estimated by the dynamic conditional correlation model. We find that, while the stocks with high foreign ownership have higher adjustment speed in the low-correlation regimes, the evidence becomes weaker in the high-correlation regimes. This result indicates that the information advantage of foreign investors found in the literature is mainly driven by the pattern in the low-correlation regimes.

1. Introduction

Whether foreign investors have information advantage in local markets has been a widely discussed issue in recent empirical researches on emerging financial markets. As found by Bae et al. (2012), stock prices with greater investibility to foreigners adjust to global information more quickly than those of less investible stocks, which indicates an advantage of foreign investors to process global information. However, it does not mean that foreign investors also have an advantage of adjusting to local market information, and there has been a conflict of opinions. One side of studies argues that foreign investors are better informed in local markets because of superior expertise and sophistication (Grinblatt and Keloharju, 2000; Froot et al., 2001; Park and Chung, 2007). The other side argues informational disadvantages of foreign investors with respect to local news, which is consistent with the asymmetric information-based explanation of locally-biased holdings and outperformance (Kang and Stulz, 1997; Coval and Moskowitz, 2001; Choe et al., 2005; Dvořák, 2005).

While these studies discuss the information asymmetry and resulting investment performance between foreign and domestic investors, there is a lack of research to investigate the dynamic pattern of information asymmetry based on time-varying correlations between the global and local market movements. The cross-market correlations have long been regarded as an important factor to determine the benefits of international asset allocations. While the earlier literature regards the cross-market correlations as constant, Longin and Solnik (1995) find evidence that the correlations vary over time, and Ang and Bekaert (2002) and Driessen and Laeven (2007) also find that benefits of international diversification vary with the time-varying correlations. Bekaert and Harvey (1995) and Dumas et al. (2003) then explain that the cross-market correlations increase with the degree of market integration. It is also argued that the cross-market correlations increase during the market downturn with high volatility (Ramchand and Susmel,

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1998; Ball and Torous, 2000; Longin and Solnik, 2001) or in a financial contagion (Boyer et al., 2006; Chiang et al., 2007). These results indicate that the information processing and investment decisions of foreign investors highly depend on the cross-market correlations that vary over time.

We intend to fill this gap and contribute to the literature by making a detailed comparison of the speed of price adjustment to local market information between foreign and domestic investors in Korea, recognizing that the degree of information asymmetry may vary over time depending on how closely the local markets co-move with the world markets. Korean is a case of emerging markets with the advanced and liberalized stock market, which can provide an important analysis regarding the behaviors and effects of foreign investors. We explicitly divide the full sample period into multiple correlation regimes by detecting structural break points of the average conditional correlation between the world and domestic stock markets, and compare the speed of price adjustment to the local market information between foreign and domestic investors in each correlation regime.

This analysis begins with estimating the conditional correlation by applying the dynamic conditional correlation (DCC) model of Engle (2002). As a next step, we apply the test of multiple structural breaks by Bai and Perron (2003a,b) to detect the regime shifts based on the average conditional correlation. Then, for each regime, we perform the tests with the Dimson beta regression and the vector autoregression (VAR) framework for the portfolios of stocks sorted by foreign ownership (FO), which is defined as the number of shares held by foreign investors divided by the total shares outstanding, imposing restrictions to compare the adjustment speed following Brennan et al. (1993). To the best of our knowledge, this paper is the first to consider multiple structural breaks in the world-local market correlation to investigate the time-varying pattern of price adjustment between foreign and local investors.

The results are summarized as follows. The full sample period can be divided into four correlation regimes, and the tests applied to the portfolios of stocks sorted by FO, controlling for the effect of market value (MV), show that the patterns of advantage in adjusting to local market information become distinguished in the high- and low-correlation regimes. That is, during the low-correlation regimes, the high-FO portfolio has higher adjustment speed than the low-FO portfolio among the stocks with the largest MV, which drives the full-sample result of foreign investors' information advantage as found in the literature. However, the evidence of foreign investors' advantage becomes much weaker during the high-correlation regimes, where the low-FO portfolio shows higher sensitivity to both contemporaneous and lagged local market movements.

This paper proceeds as follows. In Section 2, estimation of the conditional correlation and the test for the multiple structural breaks will be performed. Section 3 compares the speed of adjustment between the high-FO and low-FO portfolios based on the tests with the Dimson beta regressions and the VAR model for the correlation regimes. Section 4 concludes.

2. Estimating multiple correlation regimes

Our empirical analysis is composed of two stages. In the first stage, we estimate the conditional correlation between the world stock market and the Korean stock market returns during the period of January 1998 to December 2015, by applying the DCC model. Based on the estimated conditional correlation, we examine whether there are regime shifts in the average correlation by the multiple structural break tests. While we can also apply the regime switching dynamic correlation model based on the Markov chain following Pelletier (2006), we avoid pre-specifying the number of regimes but estimate them with the time-varying correlation from the data. We also intend to detect multiple break points to analyze investor behaviors within each regime, for which combining the DCC model and the multiple structural break tests can provide an effective way. For the world market return, we use the MSCI world index that is composed of large- and mid-size stocks across 23 developed countries. For the Korean stock market return, we use the KOSPI index that includes all common stocks listed on the Korean Stock Exchange (KSE). We use the weekly returns for the MSCI world index and the KOSPI index to avoid the nonsynchronous trading problem, which provide 939-week return observations. Both data are from the Bloomberg.

In the second stage, we sort all stocks that have been listed on KSE by MV and FO to construct 4×4 portfolios at the beginning of each year, and derive the value-weighted daily returns for the annually-rebalanced portfolios.[1] Park and Chung (2007) point out that MV and FO are positively correlated, and Bae et al. (2012) also mention that a local stock's accessibility to foreign investors is positively associated with its size. As Lo and Mackinlay (1990) find that the returns of large-size stocks tend to lead those of smaller stocks, these studies suggest that the observed lead-lag relationship between the high-FO portfolio returns and those with low-FO portfolio returns may be driven by the size effect, so that it is important to control for MV and to distinguish the effect of FO on the speed of price adjustment. Accordingly, we first sort stocks into four groups by MV and then, within each MV quartile, we sort stocks into four subgroups by FO. This sorting procedure produces 16 portfolios with an approximately equal number of stocks in each portfolio. We include all firms traded in the KSE from 1998 to 2015 in the sample. Firms with missing FO data at the beginning of each year are excluded. The data for MV, FO, and the returns of all stocks in the sample are from the DataGuide.

We first estimate the conditional correlation between the world and Korean stock markets by applying the DCC model. For the world stock market return $r_{W,t}$ and the Korean stock market return $r_{M,t}$ at time t, the return equations are specified as

$$r_t = \mu + \gamma r_{t-1} + \varepsilon_t, \tag{1}$$

where $r_t = [r_{W,t} \;\; r_{M,t}]'$, $\varepsilon_t = [\varepsilon_{W,t} \;\; \varepsilon_{M,t}]'$, and $\varepsilon_t | I_{t-1} \sim N(0, H_t)$ with a $t-1$ period information set I_{t-1}. For the matrix of autoregressive parameters $\gamma = [\gamma_{ij}]_{i,j = W, M}$, we impose one restriction $\gamma_{WM} = 0$ to capture the relation that, while the lagged world

[1] Since Asparouhova et al. (2013) show that the equal-weighted portfolio returns could be biased because of noisy prices, we report the results using the value-weighted portfolio returns. However, our results turn out to be robust when we also use the equal-weighted portfolio returns in our empirical analyses.