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Dynamic co-movements and diversification benefits: The case of the Greater China region, the UK and the US equity markets



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ABSTRACT

This paper investigates the level of long-run co-movements and short-run dynamics among the Greater China region (Hong Kong SAR, Mainland China and Taiwan), the UK and the US stock markets. Although stock-price-index (SPI) co-movements are established in the long-run, the dynamic analysis based on a fixed rolling window of 160 weeks points out only intermittent episodes of long-run co-movements. Using an asymmetric dynamic covariance approach, we find positive but low and insignificant conditional correlations between stock market returns. These findings indicate scope for diversification benefits, the extent of which is estimated on the basis of different portfolio choices. Our portfolio analysis indicates that both UK and US investors would have secured higher levels of mean returns on the diversified portfolio. Furthermore, pairwise tests of equality show that the differences in the Sharpe ratios are statistically significant only in the case of UK investors.

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1. Introduction

The absence of long run co-movements and low levels of correlations among stock markets can increase potential gains from international portfolio diversification (Baele and Inghelbrecht, 2009). The rapid growth of equity markets in the Greater China region (comprising Hong Kong SAR, Mainland China, and Taiwan), coupled with low growth rates in developed economies in the second half of the 2000s, have made the Greater China markets potential alternatives for international investors seeking to diversify their investment portfolios. Although linkages among western developed and Asian emerging stock markets have received extensive attention (Sheng and Tu, 2000; Phylaktis and Ravazzolo, 2002; Chelley-Steeley, 2004; Yu et al., 2010; Lucey and Muckley, 2011), only a few studies have investigated the relationship between the Greater China region markets and their developed counterparts (Weber and Zhang, 2012) and the existence of integration among these markets remains an open question (Li, 2007; Burkedin and Siklos, 2012).

The markets of the Greater China region have developed at a fast pace, doubling in size since the early 2000s. According to World Bank data, the market capitalisation of listed companies in Mainland China and Hong Kong at the end of 2012

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stood at 4805 billion USD—about 25% of the market value of the listed firms in the UK and the US markets. Although stock market openness in Mainland China is still restricted, the Chinese authorities have taken a number of steps to stimulate equity investment by foreign investors.¹

The contribution of this study to the current literature is threefold. Firstly, we added to the empirical literature by using an up-to-date dataset and employing both static and dynamic cointegration approaches that allow for establishing whether market long-run co-movements (i.e. cointegration) is a stable or episodic feature of the Greater China region, the UK and the US. To the best of our knowledge, the dynamic (time-varying) approach to cointegration has not been used so far to investigate the relationship between the markets in the Greater China region, and those in the UK and the US. Furthermore, the number of dynamic cointegration studies is still small in general (Pascual, 2003; Gilmore et al., 2008; Yu et al., 2010; Balcilar et al., 2014).

Secondly, Burdekin and Siklos (2012) have used Engle's dynamic conditional correlation (DCC) model to investigate return co-movements in the context of the Japanese, the US, Mainland China and other Asia-Pacific markets (Australia, Indonesia, Korea, Malaysia, New Zealand, the Philippines, Singapore, Taiwan, and Thailand). The authors have reported an increasing trend in the correlation between returns, but they also point out that it is not clear whether this trend is temporary or permanent. Hence, our second contribution is to address this open question by employing the asymmetric dynamic covariance (ADC) model of Kroner and Ng (1998) to estimate the dynamic co-movements of returns between the Greater China markets and their developed counterparts in the UK and the US. The advantage of this model is that it nests a number of popular multivariate GARCH models (such as VEC, CCC, BEKK and F-ARCH). As such it allows for conducting Likelihood Ratio (LR) tests with a view to identifying the model that is most adequate for the case at hand.

Finally, we built optimal portfolios to uncover possible diversification benefits for both the UK and the US international investors willing to diversify their portfolio risks by holding stocks issued in the Greater China region. Thereby we provide novel evidence on diversification benefits as well as the evolution of the portfolio over a time period that includes the recent global financial crisis.²

Our findings indicate that the Greater China region, the UK and the US stock markets have gone through intermittent periods of cointegration, with dynamic co-movement of returns showing only one-way spillover effects from the UK and the US to the Hong Kong and Taiwan stock markets. In addition, the conditional correlation among these markets is low, suggesting that international diversification opportunities may exist. However caution must be used when interpreting these results as low correlations are necessary for diversification opportunities but they are not a sufficient condition. For instance, market segmentation and market friction can exclude diversification opportunities despite low correlation.³ The portfolio analysis findings lend support to the evidence from cointegration and indicate that the domestic stock dominance in the portfolio tends to disappear in the period from 2010 to 2013.

The remainder of this paper is organised as follows. Section 2 reviews the literature. Section 3 presents the methodology. The data is described in Section 4. The empirical results are presented in Section 5 whilst Section 6 summarises the conclusions.

2. Literature review

The major motivation of the studies on integration among stock markets is the potential benefits of international portfolio diversification (Leong and Felmingham, 2003). The related empirical literature focusing on linkages between the Greater China stock markets and their developed counterparts can be divided into three main strands, each of which is based on a well-established methodological approach.

The first strand is based on Vector Autoregressive (VAR hereafter) models, using impulse response functions and forecast error variance decomposition to evaluate the extent to which shocks originating from one market affect other markets; and whether market volatility is driven by internal shocks or shocks originating in other stock markets. For instance, Groenewold et al. (2004) employ dynamics tools (i.e. impulse response function and forecast error variance decomposition) to analyse the interrelationship among the Greater China markets. They report that the Mainland China stock market is isolated from

¹ Authorities in Mainland China have introduced legislation aimed at attracting foreign equity inflows into the domestic market. The introduction in the early 1990s of *B-shares* in both the Shanghai and the Shenzhen stock exchanges, which allowed foreign investors to invest in both stock markets was a legislation milestone (Hung, 2009). This was followed, in 2001, by making the *B-shares* available to domestic residents as well (Hung, 2009; Johansson and Ljungwall, 2009). In the second half of the 2000s, a new system was introduced which aimed to eliminate non-tradable shares (NTS). As pointed out by Beltratti et al. (2012), that reform allowed for diversity in the firms' ownership structure. The wider ownership structure, in turn, has contributed to the improvement in the quality of the corporate governance practices in Mainland China's stock markets (Beltratti et al., 2012).

² To the best of our knowledge, our study is the first attempt at investigating diversification opportunities for UK and US investors wishing to invest in the Greater China stock markets over the recent global financial crisis period.

³ In the case of market segmentation, Bekaert et al. (2011) show that countries' regulation with respect to foreign capital flows as well as a number of non-regulatory factors (such as a country's political risk profile and stock market development) can explain different levels of segmentation in many countries. Thereby, an increase in market segmentation might prevent international investors to diversify their portfolio in foreign stock markets. Further, there is also empirical evidence of reversal in terms of increasing market cointegration during periods of recession. As pointed out by Bekaert et al. (2011), such phenomenon is due to the increase on global risk aversion leading investors to be less willing to diversify their portfolio in foreign stock markets. In the case of market frictions, such as short sales restrictions and transaction costs, De Roon et al. (2001) show that when investors face them, diversification benefits from emerging markets might disappear.

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