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Regulatory changes, market integration and spillover effects in the Chinese A, B and Hong Kong equity markets☆

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ABSTRACT

We document the changes in dynamic stochastic structure of the various industrial sectors of the Chinese A, B and the Hong Kong share markets. We utilize a robustly estimated vector error correction model with multivariate generalized autoregressive conditionally heteroscedasticity (VECM-MV-GARCH) model to test for possible cointegrating vectors between the market segmentations pre and post deregulation of the Chinese B share market. Our results suggest that before deregulation there is weak evidence of cointegration between the A and B share markets. However, post deregulation the situation changes and the segments appear to be significantly cointegrated. MV-GARCH results suggest that the conditional correlations of market/sector shocks also increase significantly over the sample period.

1. Introduction and motivation

An important question in finance is the role of binding regulatory constraints on the price formation mechanism of traded assets. In this sense, the February 14, 2001 regulatory change in China offers a useful natural experiment in elucidating the impact of ownership restrictions on the relative dynamics of asset prices within a market. This paper's contribution is to test for changes in the comovement structure of the various segments of the Chinese equity market after this regulatory event.

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China's equity security markets are divided into three geographic and three broad share classes. The geographic segmentations are the Shanghai Stock Exchange, Shenzhen Stock Exchange and Hong Kong Stock Exchange.[1] Broadly, share classes are denoted as follows: mainland Chinese firms can issue stock in A shares, which are domestically owned, traded and denoted in Chinese domestic currency; and/or in B shares, denoted in US$ or HK$. Until February 2001 B shares were available only to overseas investors, after which ownership rules were relaxed to permit domestic investors with foreign currency to purchase B shares. Finally, Hong Kong shares are traded on the Hong Kong stock exchange and include enterprises incorporated in mainland China and listed on the Hong Kong stock exchange.[2] In addition to A and B shares a Chinese firm may also issue state shares, legal person shares and employee shares. However, only the A and B shares are actually traded, with the A share market perceived as being the most liquid.

Our tests seek to answer three questions: first, do the stock indices representing the overall market and sector levels have long run relationships between them, and does the significance of these long run relationships change after the regulatory change of February 14, 2001? Second, what is the price discovery direction of information shocks? Lastly, how does the transmission mechanism that propagates these shocks change through time? We employ a general multivariate linear VECM framework with dynamic second moments, characterized by a MV-GARCH model. This modeling setup permits diagnostic testing for long run cointegrating relationships between the log price processes; it builds impulse response models of returns to delineate the direction of information in the market; and finally it computes time varying factor loadings from the dynamic covariance matrices, in order to isolate the structural decomposition of the instantaneous shock transmission mechanism.

Between February 14 and 19, 2001 the Chinese securities and regulatory commission (CSRC) relaxed the ownership rules on the B share market. This paper's contribution is the implementation and exposition of tests for changes in the various dynamic relationships between the A, B and Hong Kong shares after the 2001 regulatory changes, detecting if the direction of price discovery has been affected by the adjustment in the ownership mix of the B share markets.

We construct VAR models of the market and of nine sector indices (by single digit SIC codes) and estimate these models over the periods January 1, 1993 to February 13, 2001 and February 14, 2001 to May 1, 2009, as well as for the whole sample period January 1, 1993 to May 1, 2009. We test for cointegration using a robust version of the VECM/Johansen FIML approach and then, using the stationary returns series, we assess the direction of shocks within the system. In our next step, we further decompose the market at the sector level to apply the VAR and the time varying factor loading frameworks: first, over two time periods, partitioned around the B share market policy change in 2001; and, second, tested against the whole time period for robustness. Specifically our data set consists of the Consumer Goods, Consumer Services, Financials, Industrials, Oil and Gas, Technology, Telecom, Basic Material and Utilities sectors as well as the overall market (Figure 1).

Decomposing the market at the sector level allows for a deeper understanding of the hierarchy of the Chinese equity securities market with respect to the international equity market; and it assists in developing an understanding of each sector's relative contribution to capital flows into and out of the Chinese economy. Prior to 2001, the B share segment sector prices represented the relative investment preferences of foreign investors in respect to Chinese industrial sectors, while the Hong Kong share segment represents investors' aggregate speculative capital investments in the Chinese industrial sectors, with added exposure to the Hong Kong financial markets.

Prior literature has documented the A share market as the dominant price discovery mechanism prior to deregulation. Our results suggest that the direction of information transmission was unidirectional during this period. We, however, also find strong evidence to suggest a bidirectional lagged and instantaneous shock transmission mechanism post-deregulation. We interpret this change by suggesting

[1] Under the *one country, two systems* principles enshrined in the 1984 Sino-British Joint Declaration, Hong Kong is a separate economic entity from mainland China. In this sense, the A and B shares are aggregated as *market segments*, whereas the Hong Kong stock market is a separate *market*, however for brevity and readability we shall interchange between these two classifications.

[2] These are collectively known as H shares. There are, as of August 2009, 114 H shares with around $US600 billion of market capitalization, which is around 30% of the total market capitalization for Hong Kong (source Thomson Reuters and Hong Kong Stock Exchange (HKEx)). We include the whole of the capitalization of the Hong Kong equity market including the H shares, as we are interested in the macro level relationships and not simply the cross listed relationships. There are 43 H share companies listed prior to February 2001 and 71 companies listed afterwards.