

# The speed of adjustment to information: Evidence from the Chinese stock market <sup>☆</sup>

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## Abstract

This paper examines the speed of price adjustment in Chinese A- and B-share stock markets. We use a VAR model to show that A-shares, which are owned primarily by domestic individual investors, adjust to information faster than do B-shares, which are owned primarily by foreign institutional investors. Our analysis of firm characteristics suggests that the speed of stock price adjustment for A-shares is related to earnings per share, while that for B-shares is related to firm size. We also find that A-shares react more quickly to bad news, while B-shares react more quickly to good news. The difference in the speed of adjustment between A- and B-shares decreased following the liberalization of financial policy in February 2001, which allowed domestic investors to purchase B-shares. © 2007 Elsevier Inc. All rights reserved.

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## 1. Introduction

This study examines the speed of adjustment of prices to information in Chinese stock markets. The structure of the Chinese market provides an interesting setting for the study of this phenomenon. The Shanghai Stock Exchange (SHSE) and the Shenzhen Stock Exchange (SZSE) issue two classes of shares. A-shares can be purchased and traded by domestic (Chinese) investors only and are denominated in the local currency, RMB. B-shares are denominated in U.S. dollars on the Shanghai Stock Exchange and Hong Kong dollars on the Shenzhen Stock Exchange, and were sold only to foreign investors before February 11, 2001. After this date, B-shares were made available to domestic Chinese investors holding U.S. or Hong Kong dollars.

As of December 31, 2003, both A- and B-shares were dual-listed by 87 companies. These 87 paired A- and B-shares have the same voting rights and are traded simultaneously on the Shanghai and the Shenzhen stock exchanges (dual listing of both A- and B-shares is permitted on the Shanghai and Shenzhen exchanges, but cross-listing the same stock on the two exchanges is prohibited). Since investors in A- and B-shares face the same firm-level fundamentals and equivalent systematic risk, market efficiency implies that the prices of A- and B-shares should exhibit the same speed of adjustment if investors have homogeneous characteristics.

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However, practical considerations suggest that the assumption of homogeneity between A- and B share investors is not valid. A report from the Chinese Securities Regulatory Commission (CSRC) in 2004 indicated that the A-share market has been dominated by domestic individual investors, while the B-share market is mainly comprised of foreign institutional investors. Kang, Liu, and Ni (2003) note that trading decisions of A-share investors are based on sentiment and news from informal sources, and Chen, Lee, and Rui (2001) suggest that B-share prices are more closely related to market fundamentals, while A-share prices are more likely to be influenced by non-fundamental factors. Hence, it is reasonable to classify B-share investors as more likely to be rational traders who focus on economic fundamentals, while A-share investors tend to act as noise traders.

In analyzing this two-tier market structure, previous research on Chinese stock markets has focused on cross-market causal relationships and the interpretation of the persistent price differentials between A-shares and B-shares. Evidence indicates that a substantial price discount is associated with B-shares as compared to A-shares. Su (1998) finds that the average daily discount of B-share prices relative to A-share prices is about 62%, and similar discounts are documented by Chen et al. (2001). These studies suggest that the existence of persistent price differentials between A-shares and B-shares is due to differences in risk factors or different degrees of liquidity associated with the two markets.

The price differential between A-shares and B-shares suggests that investors in the two markets may process information differently. We provide additional evidence regarding the processing of information in Chinese stock markets by examining the speed of adjustment of A- and B-shares. We study the determinants of the speed of adjustment of stock prices, and also explore how this speed varies between firms experiencing good performance versus those experiencing poor performance. In addition, we examine the effects of a change in ownership restrictions that occurred in 2001. Our results yield insights regarding the extent to which these markets are segmented or integrated, and on the relative efficiency and the reaction of market participants.

The remainder of the paper is organized as follows. Section 2 presents a simple model of price adjustment in stock markets. Section 3 introduces a VAR model used to examine the speed of price adjustment. Section 4 describes the data. Section 5 reports the VAR model estimate of the speed of adjustment of Chinese A- and B-share index prices. Section 6 describes the measure the speed of price adjustment for individual stocks, and an examination of the factors that influence the speed of adjustment. Section 7 examines how the speed of adjustment changes in different market environments. Section 8 concludes the paper.

## 2. A price adjustment process

Economic theory argues that price dynamics often follow a partial adjustment process. Damodaran (1993) and Koutmos (1999) model stock price adjustment as

$$P_t - P_{t-1} = (1 - \lambda)(P_t^f - P_{t-1}) + u_t, \quad (1)$$

where  $P_t$  and  $P_t^f$  represent the natural logarithms of the observed price and the unobserved fundamental price, respectively,  $\lambda$  is a constant between zero and one, and  $u_t$  is a random error term. Eq. (1) states that if the current price  $P_{t-1}$  deviates from the equilibrium level of price  $P_t^f$ , the subsequent price  $P_t$  will adjust in a fraction measured by  $(1 - \lambda)$ . Thus,  $(1 - \lambda)$  measures the speed of adjustment. The challenge in applying this model is that  $f$  is usually unobservable. To make the model empirically tractable, we need to specify the unobserved value  $P_t^f$ . As suggested by Fama and French (1988), this component is assumed to follow a random walk process with drift:

$$P_t^f = \alpha + P_{t-1}^f + v_t \quad (2)$$

where  $\alpha$  is the drift term and  $v_t$  is the error term. By combining Eqs. (1) and (2), we derive an autoregressive process of order one as follows:

$$r_t = \phi_0 + \phi_1 r_{t-1} + \varepsilon_t, \quad (3)$$

where  $r_t = P_t - P_{t-1}$ ,  $\phi_0 = \alpha(1 - \lambda)$ ,  $\phi_1 = \lambda$ , and  $\varepsilon_t = u_t - u_{t-1} + (1 - \lambda)v_t$ . Eq. (3) implies that the adjustment process is not frictionless, and the friction parameter,  $\lambda$ , can be obtained by estimating the regression coefficient  $\phi_1$ . A positive value of  $\phi_1$  is consistent with the financial system imposing price limits (Kim & Limpaphayom, 2000), a frictional market, extrapolative expectations (Koutmos, 1999), or nonsynchronous trading (Lo & MacKinlay, 1990). A negative value is consistent with the presence of positive feedback trading (Antoniou, Koutmos, & Percli, 2005; Sentana & Wadhvani, 1992).

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