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The price impact asymmetry of institutional trading in the Chinese stock market

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ABSTRACT

The asymmetric price impact between the institutional purchases and sales of 32 liquid stocks in the Chinese stock market in 2003 is carefully studied. We analyze the price impact in both drawup and drawdown trends with consecutive positive and negative daily price changes, and test the dependence of the price impact asymmetry on the market condition. For most of the stocks, institutional sales have a larger price impact than institutional purchases, and a larger impact of institutional purchases exists only in a few stocks with primarily increasing tendencies. We further study the mean return of trades surrounding institutional transactions, and find that the asymmetric behavior also exists before and after institutional transactions. A new variable is proposed to investigate the order book structure, and it can partially explain the price impact of institutional transactions. A linear regression for the price impact of institutional transactions further confirms our finding that institutional sales primarily have a larger price impact than institutional purchases in the bearish year 2003.

1. Introduction

The study of large trades is of crucial importance for both market risk estimation and personal investments, since large trades generally have a strong impact on the stock price and consequently increase investors' costs [1–9]. Meanwhile, growing evidence shows that large trades play a major role in trading in stock markets, which represent a large fraction of the market's total trading volume [10–14]. Therefore, there have been a variety of studies focusing on the price impact of large trades and the factors may influence their impact.

Large trades generally refer to those transactions executed with large number of shares. Kraus and Stoll first studied block trades traded in blocks of 10 000 or more shares in the New York Stock Exchange, and found that block purchases have a larger permanent impact than block sales [15]. Keim and Madhavan studied block trades in the US markets, and found that there exist significant differences between the temporary and permanent impacts of buyer-initiated and seller-initiated trades [10]. Gemmill collected the 20 largest customer purchases and sales for each share in the London Stock Exchange, and found that the impact of purchases is larger than the impact of sales, both temporarily and permanently [16].

An alternative way of investigating large trades is to study institutional trading, since institutions generally have large amounts of capital and their transactions have, on average, a large number of shares. Chan and Lakonishok analyzed the

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price impact of the entire sequence of institutional trades in the New York and American Stock Exchanges, and found that the overall price impact after purchases and sales displays an intriguing asymmetry [17]. Chiyachantana et al. analyzed the institutional trading in 32 international stocks, and revealed that the price impact asymmetry remarkably depends on the stock market condition: the price impact is much higher for institutional purchases in the bull market, while institutional sales have a larger price impact in the bear market [18].

Explanations appear in the literature to account for the price impact asymmetry between large purchases and sales. Saar used a trading model to investigate the behavior of institutional investors, and claimed that the information difference between buys and sells may cause the asymmetry [19]. However, this information explanation is hard to test from empirical measurement. Frino et al. and Gregoriou attributed the price impact asymmetry to the bid-ask bias near open and close trades [13,20]. This price impact asymmetry can still be observed not using the opening or closing prices. Anderson measured the price impact using the transactions surrounding block trades, and related price effects to changes in order book depth [21].

To the best of our knowledge, few studies have been conducted on the price impact asymmetry of institutional trading in the Chinese stock market. The main purpose of this paper is to test if the price impact asymmetry between institutional purchases and sales exists in the Chinese stock market. We will further attempt to study the dependence of the price impact asymmetry on the detailed condition of the Chinese stock market. Though it is still not clear what really causes the price impact asymmetry, a new variable introduced to facet the volumes and gaps of different price levels may offer a description of the order book structure surrounding institutional transactions. More remarkably, this variable can partially explain the price impact of institutional trading.

The rest of the paper is organized as follows. Section 2 introduces the data we analyzed and their summary statistics. Section 3 studies the price impact of institutional trading, and examines the asymmetry between the price impacts of purchases and sales. In Sections 4 and 5, we investigate the returns of trades and the order book structure related variable surrounding institutional transactions. Section 6 provides a regression model of explaining the price impact of institutional trading. Section 7 concludes.

2. Data

We use a sample of institutional trading data of 32 liquid stocks traded on the Shenzhen Stock Exchange (SZSE) in 2003. The SZSE is one of the two stock exchanges in mainland China, and it has two separate markets including A-shares and B-shares. These 32 stocks analyzed in our study are all in the A-share market of SZSE, and their stock names are SDB (000001), VANKE-A (000002), CBG (000009), CSG (000012), KONKA GROUP (000016), KAIFA (000021), CMPD (000024), SEIC (000027), ZTE (000063), YANTIAN PORT (000088), SACL (000089), HYCC (000406), GPED (000429), SCPH (000488), GED (000539), FSL (000541), JMC (000550), WEIFU HIGH-TECH (000581), CHANGAN AUTOMOBILE (000625), HEBEI STEEL CORP. (000709), LN&TS (000720), XINXING PIPES (000778), FAWCAR (000800), STSS (000825), CITIC GUOAN INFO. (000839), WULIANGYE (000858), ANSC (000898), TIK (000917), VALIN STEEL (000932), ZYTS (000956), and XSCE (000983).

The trading data are extracted from a database of order flows [22,23]. This database contains the orders of submission and cancellation of all the investors traded on the 32 stocks in 2003. A double-auction mechanism is used during the opening time from 9:30 to 11:30 and 13:00 to 15:00, and transactions are automatically executed according to a price-time priority matching rule. In the database, each investor is endowed with a particular ID number. Therefore, we can obtain the trading records of each investor, including the trade price, the trading volume, and the transaction time. In addition, this database also provides a code identifying the investor type for each investor, i.e., institution or individual. Therefore, we can pick out the institution trading data, and analyze their price impact on stock prices.

Table 1 presents the summary statistics of the institution trading data of the 32 stocks. The stock codes are offered in the first column, and the industries they belong to are in the last column. The float capitalization C_f (in units of million CNY (Chinese Yuan)), the number of institutional orders N_o, and the total size of institutional orders S_o for each stock are provided in the second, third, and fourth columns respectively. Not exactly true, but in general, those stocks with large numbers of institutional orders have large sizes of institutional orders. Table 1 also provides the corporate actions of the 32 stocks in 2003, for instance the cash dividend, the bonus share, and the rights issue. The main content of the corporate action includes the ex-dividend date, dividend payout ratio, and rights issue price.

3. The price impact asymmetry of institutional purchases and sales

3.1. Price impact

In this section, we focus our attention on calculating the price impact of institutional trading. The price impact of block trades or institutional trading has been widely studied in a variety of stock markets [16,17,24–26]. A popular way of measuring the price impact is to compare the average price of an executed order with an unperturbed price prior to the order. Following Refs. [18,27], the price impact is calculated as the ratio of volume-weighted trade price (P_{VWT}) of the component trades in an order to the price at the time the order is released (P_r):

$$PI = \ln P_{VWT} - \ln P_r \tag{1}$$