Short sale constraints, disperse pessimistic beliefs and market efficiency — Evidence from the Chinese stock market

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ABSTRACT

In the Chinese stock market, the regulatory agency lists qualified stocks on announcement date and permits investors to sell short on the effective date, a practice that allows us to directly study the impact of short sale constraints. Applying an event study to 511 additions, between February 2010 and August 2013, of individual stocks to the list of securities qualified for short sale, we find that short sale constraints cause individual stocks to be overpriced and that such overvaluation is exclusively related to distortions associated with pessimistic beliefs. In addition, we observe lower volatility, skewness and extreme value frequency of stock returns after short sale constraints are lifted. This implies the emergence of a more appropriate distribution of returns and improved market efficiency at the individual stock level as the range of securities qualified for short selling expands.

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1. Introduction

The impacts of short sale constraints and disperse beliefs on capital market are important and controversial. Intuitively, Miller (1977) figured out that short sale constraints, together with belief heterogeneity, will lead to stock overvaluation, since pessimistic investors are forced out of the market through sales of in-hand stocks or are prevented from entering it, rather than allowed to fully incorporate their expectations into current prices through short selling. This asymmetric impact that short sale constraints exert on optimistic and pessimistic investors impedes the discovery function of financial markets, and reduces market efficiency. However, scholars haven't reached a consensus regarding the overvaluation effect, especially theory builders. Short sale constraints have at least four effects that could theoretically result in undervaluation: substitution between stocks (Jarrow, 1980), investors' intertemporal substitution (Gallmeyer and Hollifield, 2008), dynamic adjustment of rational expectations (Diamond and Verrecchia, 1987) and limited information (Bai et al., 2006).

Most empirical studies focus on the following three problems, which are also our concentration in this paper: (1) the significance of overvaluation; (2) the relation between overvaluation and belief dispersion; (3) the influence of short sale constraint on market efficiency.

Firstly, consistent with Miller's intuition, most findings verify the significant overvaluation induced by short sale constraints, with a few exceptions, especially empirical studies based on the subprime mortgage crisis in 2008. Studies focused on mature stock markets such as the U.S. stock market often have technical difficulties in empirical testing. As short-sale constraints differ only marginally among different stocks in these countries, previous scholars (Chen et al., 2002; Danielsen, and Sorescu, 2001; Figlewski, 1981; Jones, and Lamont, 2002; Ofek and Richardson, 2003; Phillips, 2011) have had to find indicators that proxy for short sale constraints. Four indicators commonly used in the existing literature are Relative Short Interest (RSI), Short-Stock-Rebate Rates (SSRR), Breadth of Ownership (BO) and Option Status (OS).[2]

However, almost without exception, these indirect indicators encounter problems of endogeneity or data non-availability. SSPR can well represent the degree of constraints, but the relevant data are not easily accessible — that is why Jones and Lamont (2002) go back to the Great Depression to conduct an empirical test. Figlewski (1981) believes, as observed RSIs increase, the unrealized demand for short sales also increases; therefore, a higher RSI represents a higher degree of short sale constraints; however, this higher RSI could result from smaller short sale constraints, which generate an endogeneity problem.

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[2] RSI is defined as the proportion of daily short trading volume compared with the total stock shares outstanding. SSRR refers to the rebate fee of the security that brokers require from investors who sell short. Breadth of Ownership refers to the diversification of shareholders and ownership, usually measured by the shareholding proportion of institutional investors. Option Status (OS) measures the existence and quantity of stock options, which are believed to be alternatives to short sales.

Although lower Breadth of Ownership may correlate with lower liquidity (Grullon et al., 2004), may signal that there are fewer long-position investors and a higher level of short sale constraints (Chen et al., 2002), and can proxy for a lower supply of shares to sell short (Asquith et al., 2005), as an intermediate variable determined by and affecting many other factors, BO is merely weakly correlated with short sale constraints and thus an inaccurate indicator. Many studies link short sales with the option market. Put–call parity is most powerfully violated under high constraints (Lamont, and Thaler, 2003; Ofek et al., 2004), and 76% of the disparity in price efficiency between stocks with high and low constraints is eliminated after the introduction of stock options (Phillips, 2011). However, options still cannot fully eliminate the effects of short sale constraints. In sum, it is difficult to find two stocks that are identical in all respects except whether they can be sold short in a mature market.

Researchers have sought to mitigate the endogeneity problem in two ways: by examining temporary suspensions of short sales during financial crises, for example, the subprime mortgage crisis of 2008; and by focusing primarily on emerging markets, which have relatively short histories of short sale execution, for example, the Hong Kong stock market.

During the Crisis, the Securities and Exchange Commission (SEC) imposed stringent constraints on short selling, the result of which is highly controversial. Some scholars (Beber, and Pagano, 2013; Boehmer et al., 2013; Grundy et al., 2012; Marsh, and Payne, 2012) use data of stocks that are temporarily banned from short sales during the crisis and discover unanimously an insignificant overvaluation effect — i.e., the ban regulation fails to support the stock price, as supposed. However, as this method focuses on extremely bearish markets, it gives rise to the problem of external validity and generalization to other market circumstances. The normally significant overvaluations of stocks caused by short sale constraints in normal market conditions may just be moderated by behavioral or psychological factors, notably, panic of investors in extreme crisis situations.

Others utilize stock data in emerging markets like Hong Kong, where the regulatory agency has gradually liberalized short sale constraints. Significantly negative returns following the relaxation of constraints (Chang et al., 2007) and differences in H-share premia[3] between shortable and non-shortable stocks that go public in both the mainland and Hong Kong markets (Chan et al., 2011) empirically support Miller's intuition. However, studies that focus on the Hong Kong market encounter other endogeneity problems. The authority in Hong Kong often designates stocks that can be sold short by a series of positive characteristics, for example, high ex-ante returns, large market capitalization and (typically) inclusion in the Hang Seng Index to minimize the interim destabilizing impact of the removal of short-sale constraints. Such a set of criteria leads to similarity in sample characteristics and could undermine the credibility of the analysis, as one can explain the empirical results on the basis of these common qualities rather than as resulting from the relaxation of constraints. In fact, such selection bias is embedded in any standard-meeting policy, as in the permission of stocks going public in both the mainland and Hong Kong markets studied by Chan et al. (2011).

Comparatively, the Chinese capital market has gradually loosened the short sale constraints imposed on stock trading since 2010. In this paper, we utilize the samples provided by the practice in the Chinese stock market, to study the impact of short sale constraints and disperse beliefs on overvaluation and market efficiency. The sample of Chinese stock market provides many advantages.

Compared with the U.S., the Chinese stock market has unique advantages. In the Chinese stock market, the regulatory agency bulletins the list of qualified securities on announcement date and allows them to sell short on the effective date. Given this administrative feature, the only fundamental difference between the same stock before and after the removal of short sale constraints lies in whether permission to short is granted, yielding a good sample with which to directly assess the impact of short sale constraints. In addition, as short sale constraints have been gradually relaxed over a relatively long period in China, the stock market has experienced many different situations, not just market crises and crashes.

Compared with the Hong Kong stock market, the Chinese stock market has advantages with respect to sample diversification. Although the Hong Kong stock market has undergone several major revisions in the criteria of stock qualification, the list of less than 200 qualified stocks continues to be characterized by large-scale stocks and relatively minimal diversity. Correspondingly, the Chinese stock market, though with a shorter history of short sales, has seen substantial additions of eligible stocks with each criteria revision. Up until the present, the qualification list has covered stocks from four main sub-markets in China: Shanghai A-shares, Shenzhen A-shares, the small and medium-sized enterprise board (SME Board) and the growth enterprise market (GEM). Thus, the wider coverage and more diverse sample of the Chinese market tend to reduce endogeneity problems caused by sample convergence in empirical analysis.

Secondly, the conclusions of the relation between overvaluation and belief dispersion have not reached consensus. The problem is that, while above-mentioned theoretical researches have clarified that short sale constraints will exclusively distort beliefs of pessimistic investors, empirical studies have not yet clearly distinguished heterogeneity of pessimistic and optimistic beliefs. Studies that have addressed the impact of disperse beliefs on overvaluation have only employed such indicators as the standard errors of raw (Harris and Raviv, 1993; Shalen, 1993) and abnormal returns (Jones, 2003), which do not represent asymmetries of daily return distribution, and do not reflect the asymmetric effect of short sale constraints on pessimistic and optimistic beliefs neither, albeit only pessimistic investors' expectations are distorted. Intuitively, two stocks with identical belief distributions with respect to downward movements and different belief distributions with respect to upward movements may have significantly different standard deviations, although the degrees of price distortion and overvaluation may be equal. In sum, although standard deviations are indeed highly correlated with dispersion of beliefs, they do not proxy well for the dispersion of only pessimistic beliefs in our context.

Because negative daily returns naturally suggest that beliefs are more pessimistic than optimistic on that day, we increase the weights on negative returns rather than evenly distribute weights when establishing the indicators of the dispersion of pessimistic beliefs, as in a second-order moment indexes standard deviation of returns. We therefore introduce pessimism level indicators that identify the proportion and degree of negative daily returns and demonstrate that overvaluation is exclusively influenced by dispersed pessimistic beliefs.

Finally, short sale constraints should influence the market efficiency as a result of the significant overvaluation and its effect on return distribution. As the overvaluation represents a bias from the fair value and a distortion of investors' beliefs, the constraints will necessarily undermine the price discovery function and the efficiency of the stock market. The relaxation of short sale constraints improves market investment channels and the price discovery function, reduces the volatility of the stock market, and thus enhances market efficiency on the country level (Bris et al., 2007; Saffi and Sigurdsson, 2011; Sanning et al., 2013). At the same time, some scholars argue that a sudden increase in short sales following additions of stocks that can be sold short could increase stock market volatility in the short run (Bernardo and Welch, 2004).

By applying an event study to 511 additions, between February 2010 and August 2013, of individual stocks to the list of securities qualified for short sale, we are able to directly trace the differences before and after the loosening of short sale constraints, and thus utilize the good properties and convenience provided by the Chinese stock market. Our main

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[3] A–H Premiums of stocks that go public in both mainland and Hong Kong markets, are equal to the mainland yield minus the Hong Kong yield on the same stock on the same day.