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ABSTRACT

The literature on short-selling restrictions focusses mainly on a ban's impact on market efficiency, liquidity and overpricing. Surprisingly, little is known about the effects of short-sale constraints on herd behaviour. Since institutional investors have come to dominate mature stock markets and rely extensively on short sales, constraining these traders may influence the asset pricing process. We investigate six stock markets that faced bans during the recent global financial crisis. Our empirical evidence shows that short-selling restrictions exhibit either no influence on herding formation or induce adverse herding. This implies a higher dispersion of returns around the market compared to rational asset pricing, which can be interpreted as an increase in uncertainty among stock market investors.

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1. Introduction

The effects of short-sale restrictions on market efficiency, liquidity and overpricing have been extensively studied in the finance literature. The global financial crisis has renewed interest about the consequences of short-selling bans. Regulators impose short-sale constraints to displace short sellers and, ostensibly, to prevent further declines in stock prices. Most notably, however, the literature is silent about short-sale constraints' effect on institutional investors' trading behaviour and, in particular, the possibility of generating herding behaviour. The present study aims to make a start in closing this gap. As outlined in Vives (2008, pp. 200–209) herding captures the conformity of investors' choices. In the present context this means that institutional investors will imitate each other when making investment decisions.

Excluding short sellers constitutes market intervention, since, in spot markets, only investors owning stocks are able to express pessimistic beliefs about their underlying value. Short-sale bans may also affect the pricing process via institutional investors' trading because these

investors dominate mature stock markets.¹ In addition, mainly institutional investors engage in short-selling as an instrument to express their negative opinion on future stock values. The consequences of herding behaviour may show up in the pricing process through the distribution of individual, or a cross-section of, stock returns relative to the performance of the market as a whole. This paper investigates the impact of short-selling restrictions on institutional investors' herding behaviour in the United States, the United Kingdom, Germany, France, South Korea and Australia during the turmoil that afflicted financial markets in 2008–2009.

The widely adopted approach proposed by Christie and Huang (1995) and Chang, Cheng, and Khorana (2000) is used to test the conjecture that short-sale constraints affect institutional investors' herd behaviour. By following the literature and contrasting the findings for the stocks facing short-selling restrictions with those for a matched control sample, the effects of the crisis per se and the constraints can be disentangled. Given the short-lived nature of the bans to be examined, sample sizes are small. To overcome this drawback, test statistics are estimated using a bootstrapping methodology. Our empirical results

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¹ See, for example, Gonnard, Kim, and Ynesta (2008). In the six countries examined, the financial assets of institutional investors grew very rapidly in the years leading up to the global financial crisis of 2008. By 2007, financial assets of institutional investors as a percent of GDP exceeded 200 percent in some cases (for example, the United States and the United Kingdom) and were well over 100 percent in the other countries considered in this study, with the exception of Korea (around 90 percent of GDP). In what follows then, for simplicity, the evidence presented in this study will be referred to as largely pertaining to the behaviour of institutional investors.

do not support the notion that herding among institutional investors was an important phenomenon during the global financial crisis. For some markets, the evidence reveals no influence of short-sale constraints on herding behaviour. Interestingly, in other cases, returns on banned stocks show increased dispersion around the market, indicating so-called adverse or anti herding.

Unlike regular herd behaviour, adverse herding is a relatively unexplored phenomenon. In theoretical models, regular herding equilibria often arise from sequential decision problems (Avery & Zemsky, 1998; Bikchandani, Hirshleifer, & Welch, 1992; Hirshleifer & Teoh, 2003; Scharfstein & Stein, 1990). For instance, financial analysts can be shown to have strong incentives to follow their colleagues if they aim at maximizing their future labour market reputation relative to each other (Graham, 1999). Effinger and Polborn (2001), however, introduce a model of competing agents facing incentives to go against the grain in order to appear as the only smart ones in the market. If this effect dominates, an agent will always oppose the action of his predecessor, thereby acting as a contrarian. Avery and Chevalier (1999) put forward a framework in which self-confidence built upon past successes leads managers to go against the market consensus.

Evidence for adverse herding among experts can be found for oil-price analysts (Pierdzioch, Rülke, & Stadtmann, 2010), American Depository Receipts (Demirer, Kutan, & Zhang, 2014), and even for Federal Open Market Committee members with respect to their inflation forecasts (Rülke & Tillmann, 2011). Addressing the case of stock market herding, Hwang and Salmon (2004) reveal a tendency of investors to reduce their herding or even to switch to adverse herd behaviour during periods of crisis, while regular herding is more likely to arise during calm times. Seeking a theoretical explanation for these findings, Hwang and Salmon (2009) address swings in herding behaviour related to time-variations in market sentiment. In particular, investors are prone to regular herding when they broadly agree about the stock market's future performance, while adverse herd formation is the consequence of a high level of divergence of opinion among market participants.

Our finding of adverse herding in stocks subject to a short-sale ban is likely to be a consequence of increased uncertainty among investors. It is well known in the literature that banning short-selling may bias stock prices. Most research papers are supportive of overvaluation (see, for example, Seneca, 1967; Miller, 1977; Figlewski, 1981; Aitken, Frino, McCorry, & Swan, 1998; Desai, Ramesh, Thiagarajan, & Balachandran, 2002; Asquith, Pathak, & Ritter, 2005; Boehme, Danielsen, & Sorescu, 2006).² Bai, Chang, and Wang (2006), however, show that if investors are allowed to be risk averse, restricting short sellers may result in both over- or undervaluation depending on the degree of asymmetric information in a given stock. Others predict or report no impact on the level of stock prices, but argue with reduced informational efficiency due to the constraints (see, for example, Diamond & Verrecchia, 1987; Bris, 2008). Hence, restricting short sellers causes uncertainty about stock prices, which, in turn, may reduce an investor's trust in the market consensus resulting in adverse herd behaviour.

The structure of the paper is as follows. The next section reviews the literature on the recent short-sale bans. The third section outlines the econometric methodology. The fourth section provides an overview of the institutional details and the timeline of the short-selling bans as well as of the data. The fifth section discusses the empirical results and the final section is the conclusion.

2. Literature review

The debate on short-selling has a long history.³ Paralleling regulators' reaction to the global financial crisis, the academic literature on

the impact of these constraints has received renewed attention. Some studies deal with Miller's (1977) overvaluation hypothesis. Miller (1977) argues that short-sale constraints, combined with the divergence of market participants' opinion, can lead to an upward bias in asset prices, as pessimists are unable to express their beliefs.

Analyzing the ban on naked shorts in selected financial stocks in the United States in July and August 2008, Boulton and Braga-Alves (2010) compare the behaviour of banned stocks with a matched control sample. Their results lend support to the notion that the ban led to a temporary inflation in stock prices. This effect is nearly reversed a couple of days after the expiration of the constraints. However, it is debatable whether the prohibition of all short sales in nearly 800 financial stocks in the United States in September and October 2008 had a similar effect. Making use of a factor-analytical out-of-sample approach, Harris, Namvar, and Phillips (2009) advocate the view that, similar to the case of the first short-sale regime, this ban also artificially inflated stock prices, although their evidence for a reversal of prices after the rule was abolished is less clear. By contrast, Boehmer, Jones, and Zhang (2011) apply matching techniques to control for the effects of the crisis per se. They, however, conclude against the overvaluation hypothesis. A broad international perspective is given in Beber and Pagano (2013), who examine restrictions in 30 countries in 2008–2009. They are also unable to detect systematic overpricing.

The majority of papers, however, focus on the impact of short-sale constraints on market liquidity and efficiency. Analyzing the ban in the United States in July and August 2008, Bris (2008) and Boulton and Braga-Alves (2010) provide evidence supporting the notion that short-sale restrictions entail rising bid-ask spreads, lower trading volumes and reductions in pricing efficiency. Boehmer et al. (2011) show that the ban in September and October 2008 had a similar impact on US market quality. In addition to overvaluation, Beber and Pagano's (2013) international analysis also addresses this issue of market quality. Their findings support severe deteriorations to liquidity as well as slower price discovery. Stressing an argument put forward by Diamond and Verrecchia (1987), Kolasinski, Reed, and Thornock (2013) analyze the efficiency of the remaining short sales during both US bans.⁴ Consistent with the predictions in Diamond and Verrecchia (1987), higher costs and other obstacles to short-selling drive out uninformed investors. This change in the mixture of investors, in turn, shows up in increased informational efficiency in the remaining shorts.

Autore, Billingsley, and Kovacs (2011) examine the connection between liquidity and overpricing. In principle, the liquidity shock due to the ban should suppress stock prices that might offset the overvaluation effect (Amihud & Mendelson, 1986). The authors' evidence supports the notion that abnormal returns following the inception of the ban are lower the more intense the decline in liquidity for a given stock. Dealing with the United Kingdom's experience in 2008–2009 – an extended shorting regime that also covered derivatives – Marsh and Payne (2012) find the ban to be detrimental to order book liquidity and trading volume and to increased bid-ask spreads. Helmes, Henker, and Henker (2011) report reduced trading activities and wider spreads for Australia.

The impact of the short-sale bans on markets for assets other than stocks has also been investigated. In most cases, derivative trading is unaffected by short-selling constraints and might, in principle, be used by investors to circumvent the restrictions. In particular, single stock options and futures are considered substitutes for short sales (Danielsen & Sorescu, 2001; Danielsen, Van Ness, & Warr, 2009). Grundy, Lim, and Verwijmeren (2012) as well as Battalio and Schultz (2011) address this notion for the case of the United States in September and October 2008. Their evidence reveals that the substitutability between short sales and options and futures is relatively limited and that no large

² Harrison and Kreps (1978) also demonstrate that, under certain circumstances, even extreme overvaluation exceeding the valuation of the most optimistic investor may arise.

³ See Boehmer, Huszar, and Jordan (2010) and Bris, Goetzmann, and Zhu (2007) for literature reviews on short sales.

⁴ The July–August ban left covered short sales unaffected while market makers and specialists were exempted when the Securities and Exchange Commission (SEC) prohibited all short sales in almost 800 financial stocks in September and October.

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