Short-Selling Bans: Impact on Liquidity, Price Discovery and Stock Prices

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ABSTRACT

The debate around the practice of short-selling, to restrict or not, is continual among academicians, regulators and practitioners. Short-selling bans are practiced by the regulators with a belief that it has the power to improve the market quality. With an objective to establish an academic standing to this date, this paper examines the last body of literatures addressing this issue, limited to three market quality parameters-liquidity, speed of price discovery and stock pricing, and summarizes the ideas and evidences. In most of the cases, the theoretical and empirical studies provide some clear indication: short-selling bans are liquidity damaging, detrimental to the speed of price discovery and has no or under-pricing effect, but in few cases the evidence is not straight forward. Evidences are more generally different than what are popularly argued by the regulators in imposing short-selling restrictions.

Keywords: Short sale, Short-selling ban, Liquidity, Price discovery, Stock pricing, Market quality, Trader, regulator.

1. INTRODUCTION

Debate on shackling or unshackling short sellers among academicians, regulators and practitioners is continual (Bai, 2013). The short-selling regulations, implemented during the financial crisis in 2008, have given rise to a significant amount of research, especially because they provided academics with the perfect natural experiment (Safi and Sigurdsson, 2011). There is currently tremendous interest in short selling not only from academics, but also from issuers, media representatives, the Securities and Exchange Commission (SEC), and legislators. Recent empirical evidence shows that short-selling is much more common than most market observers previously imagined. A survey in 2005 from Diether, Lee and Werner (2009a) reports , one in four shares traded in NYSE stocks and almost one in three shares traded on Nasdaq involves a short seller. The demand for short-sell transactions during crisis period should exceed what we see in regular periods, because in that time traders are more inclined to take an appropriate position through the available investment strategies. So, Short-selling should have profound impact on the market qualities by influencing liquidity,

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informational efficiency and pricing of stock among many others dimensions. Short-selling bans certainly going to affect the way a market when there is no constraints such like. This study is an attempt to examine the influential arguments standing from theoretical model around this debate and to report the empirical evidences, which are either reputing or supporting the theoretical predictions or providing results for rethinking. More specifically, this examine here how the market qualities-liquidity, price discovery and stock prices, are affected by the short-selling bans in the recent past with a focus on the recent financial crisis.

In doing so, this paper examines the mostly cited literatures, which are particularly relevant to this study both from theoretical and empirical ground and provide cross-country as well as country specific evidence. The findings show that in both risk neutral and risk adverse setting,   theoretically bans is more likely to damage liquidity. Though the empirical evidence   is also mix but   the idea of damaging liquidity is more robust and the stock specific characteristics like small-cap, listed options, dual listing etc. affect the liquidity. Bans affect in slowing down the price discovery is more clear cut both in theoretical predications and empirical evidences and become more evident in case of bad news compare to good news. Finally, in the theoretical predictions, short-selling bans on stock price performances are ambiguous and when investors are risk averse, more likely to be under-pricing the more the information efficiency slowed down.

We divide the rest of the paper as follows. Section 2 presents the theoretical background of our discussion , section 3.1 summarize both the theoretical predictions and empirical evidence on the liquidity impact , section 3.2 and sections 3.3 do the same for price discovery and stock pricing impacts respectively and Section 4 concludes.

2. THEORETICAL FRAME WORK

In this section we develop the concepts like short sale, short-selling mechanism and its motivations, short-selling bans, liquidity, price discovery and stock pricing based on the some established literatures. Most of the concepts reflect the idea presented in the following literatures: Gruenewald, Wagner and Weber (2010); Foucault, Pagano, and Roell (2013); Culp and Heaton (2008); & Harris (2003).
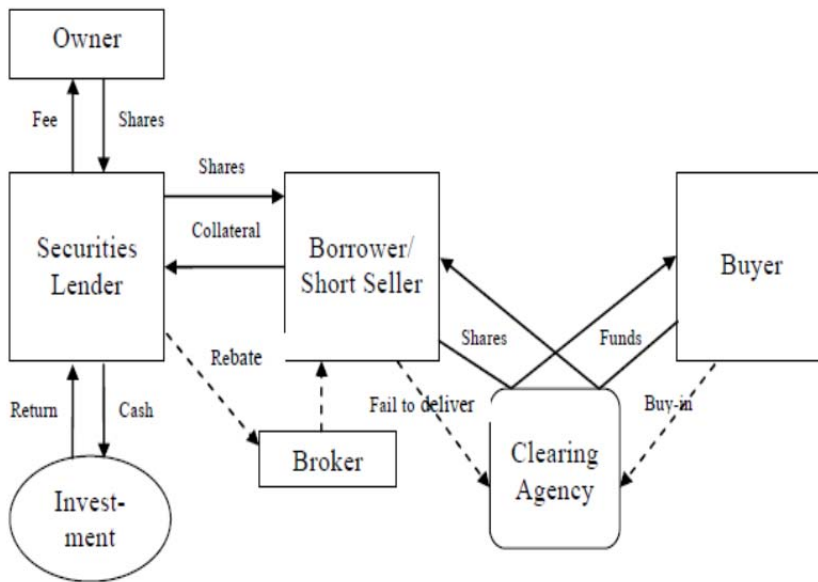
2.1 Short-selling

We use the definition of United States Securities and Exchange Commission regulations to define short sale. A short sale "means any sale of a security which the seller does not own or any sale which is consummated by the delivery of a security borrowed by, or for the account of, the seller." The arrangement efficiency of the investor to cover the short position define either a short sale is 'covered' or 'naked'. In the former, a short-seller has already borrowed the security or made a good faith arrangement to borrow the security, or even it is reasonable to believe that he can locate and borrow the security by the settlement day. In the latter, it does not fulfil any of the covered conditions. In every short transaction, a seller anticipate a bearish market trend of the security and tend to generate a profit by covering the short position with a lower security price than the one realized before in selling. This concerns a lot of risks for the investor if the market realized differently than anticipated.

Short-selling activities may be attributed to many reasons (Diether, Lee and Werner, 2009a). Speculation motive, associated with the expected decreases in a security's market price, receives the most notoriety in the different literatures and policy debates. Some non-speculative reasons, like hedging and arbitrage activities, tax considerations and liquidity and inventory risk managing trading by market-makers and dealers, can also motivate this investment activity. These essentially means that short-sellers seems to be able to predict short-horizon abnormal return either having access to the private information or more capable of predicting misprice and Diether, Lee and Werner (2009a) provides the same conclusions.

In the words of Lecce (2011), despite the widespread criticism, not all naked short-selling is abusive. Naked short-selling is often used for intraday trading, where the position is opened and then closed at some point later in the day. Some naked short selling occurs unintentionally when a short-seller locates shares to borrow (or has reasonable belief that shares can be located and borrowed), but subsequently is unable to borrow the stock in time for delivery.

2.2 Mechanism of Short- selling

The real short-selling environment is quite complex than most of the time illustrated in the class room-type discussion and the stringency of complexity limits the use of short/selling in real market place. The inherent structure of short-selling mechanism essentially determines the potential benefits and risk of the short-selling transactions. This paper find it suitable to use the work of Gruenewald, Wagner, and Weber (2010) to summarize the process of a typical short-selling but we may not find this setting in every type of this transactions.

Covered short-sale: In most markets, when a covered short-sale occurs, the investor borrows securities from a securities lender, traditionally, custodian banks that clear and hold positions for large institutional investors, and enters into an agreement to return them on demand. The trader then sells the stock and delivers the shares to a buyer on settlement. While the position is open, the lender requires cash collateral and eventually they invest the collateral to earn interest. Generally, the lender returns part of the interest to the borrower in the form of a negotiated 'rebate rate'. The spread between the normal market rate and the 'rebate rate' is the 'lending fee' which the lender earns and the borrower pays. When closing a position the trader buys back equivalent shares in the market and returns them to the stock lender. The collateral is then returned to the borrower plus interest earned at the rebate rate. There is no set period on how long a covered short position can be held, provided the lender does not recall the stock and the trader can meet the margin requirements.

Naked short-sale: When conducting a naked short-sale, the investor must either buy back the stock within a short time frame or arrange to borrow the stock before settlement. If the stock is bought back on the same day then naked short-sellers can avoid the lending fee, which is incurred by covered short-sellers. When this occurs, the investors' broker and investor will net-off their positions upon settlement. Failure of buy back the stock on the same day force the investor to borrow the stock and deposit the sale proceeds as collateral and which incurs a lending fee. In the worst case, it may incur fail fees when the investors do not meet settlement.

2.3 Short-Selling Bans

The conventional wisdom is that short selling drives down the price of the stock being sold. The regulators often receives excited opposition to the practice of short selling, much of which invokes accusations of conspiracy theory and nearly religious fervour against short selling in general and naked short selling in particular (Culp & Heaton, 2008) . At the same time, financial economists long have been sceptical of the value of regulations that constrain speculative short selling because of a conviction that short sale constraints may allow overpriced securities to remain overpriced. Short-selling bans varying the continuum of fully illegal to completely allow over the time, across the countries, depending on their forms. The settings of Bans depend on the supply and side of regulations and also the regulator's perception about how a market works. There might be different reasons for which regulators considered to be convinced in launching a ban and may not be successful in achieving its objectives. Generally, Short-selling bans are more evident in the time of financial crisis. Beber and Pagano (2013) quotes, "Most stock exchange regulators around the round the world reacted to the 2007–09 financial crises by imposing bans or constraints on short sales. These hurried interventions, which varied considerably in intensity, scope, and duration, were presented as measures to restore the orderly functioning of securities markets and limit unwarranted drops in securities prices capable of exacerbating the crisis".

Jain, Jain, McInnis, and McKenzie (2013), a recent literature describing the types of short-selling bans around the world, reports that most of the time bans applicable to naked short-selling rather than covered one but some time it may include both. Bans are more particular to financial stocks like the stocks of credit institutions and insurance company rather than all stocks. A lot of time up-tick rule applies to impose the ban and in few cases it particular to the type of traders.

2.4 Liquidity, Price Discovery and Stock pricing

One of the most desired quality issues of a well-functioning security market is liquidity. Market liquidity can be defined on several dimensions like trading costs, the depth available to customers placing large orders, speed of execution etc. A market with less trading cost, more depth and more protected against the execution risk is considered to be more liquid. Everyone likes liquidity: traders like liquidity because it allows them to implement their trading strategies cheaply; exchanges like liquidity because it attracts traders to their markets; regulators like liquidity because liquid markets are often less volatile than illiquid ones.

Given its importance, one would expect that the term liquidity would be well defined and universally understood. In fact liquidity means different things to different people. The confusion is due to the many dimensions of liquidity. Some dimensions are more important to some people than to others. Understanding

liquidity is also important to measure it effectively. Many traders and regulators regularly measure the liquidity. Traders measure liquidity to determine whether their trading strategies are sensible, given the available liquidity. They also measure liquidity to evaluate the service they obtain from their dealers. Brokers likewise measure liquidity to evaluate the service they obtain from their dealers. Regulator and researchers measure liquidity to determine which market structure are best.

Illiquidity is often gauged by the cost of trading, which has both an explicit and implicit component. Explicit costs include broker commission, transaction taxes, platform's trading fees and clearing and settlement fees. These costs are easy to measures as they are charged to final investors explicitly. Implicit costs are those that arise from the illiquidity of the market. Measuring implicit cost is challenging. Generally, they are measured by the gap between execution price and some bench mark used to proxy for the price that would be obtained in a perfectly liquid market. Some simple measures of liquidity include bid-ask spread, the effective bid-ask spread, and the realized bid-ask spread are possible when such data are available. When bid-ask quotes are not available, implicit trading costs can be measured using time series of recent transaction prices and possibly trading volume. These measures include: the volume-weighted average price (VWAP); the estimated price impact of orders; measures of illiquidity based on non-trading; Roll's measures of illiquidity. Sometimes a different measure- execution shortfall is also used to gauge the time dimension of implicit trading cost.

An essential function of securities market is discovering asset values by aggregating investor's private signals about future cash flows. In principle, asset prices change in response to new news about fundamentals namely, future cash flows and discount factor. For any security, new information leads investor to revise their estimate of future cash flow. The speed of adjustments is an important issue. The Efficient market hypothesis (EMH) holds that the adjustment should be instantaneous. According to EMH, at any point in time, trades are made at a price that is equal to the best possible estimate of the value of the asset, incorporating all available information. This can be termed as the true value or fundamental value of the security. Price discovery process, one of the most important aspects, also determines the quality of a market structure. An efficient market can decrease the price uncertainty by unfolding true value immediately and ensure the allocate efficiency.

3. THEORETICAL PREDICTIONS AND EMPIRICAL FINDINGS
This section discusses the impact of short-selling bans on the liquidity, price discovery and stock pricing in a sequential order. In some case they are interlinked and a single argument may be used to establish the result with

different implications. This paper considers both theoretical arguments and empirical evidences from the seminal literature and that follows afterwards.

3.1.1 Liquidity Impact: Theoretical Predictions

Glosten and Milgrom (1985) , Diamond and Verrecchia (1987), and Bai, Chang and Wang (2006) may be considered as leading literatures providing the theoretical predictions of short-selling bans on liquidity. Glosten and Milgrom (1985) shows adverse selection cost accounts for the existence of the bid-ask spread in the presence of informed traders in a competitive risk neutral environment. Since in this model dealers' expected profit is zero, the adverse selection cost eventually bears on the liquidity traders, who by "paying" the bid-ask spread – lose exactly what informed traders gain (Foucault, Pagano, and Roell, 2013). The model uses the definition of spread as the measure of liquidity and predicts that the market liquidity depends not only adverse election cost but also on the parameters like the exogenous arrival patterns of insiders and liquidity traders, the elasticity of supply and demand among liquidity traders, and the quality of the information held by insiders. As the order flow conveys information, the market liquidity tends to rise with trade.

Diamond and Verrecchia (1987) may be regarded as the most important theoretical study examining the effect of short-selling ban on liquidity in a variant model of Glosten and Milgrom (1985). They predict that bans on short-selling is detrimental to market liquidity when bans equally apply to both informed and uninformed investor. On the contrary, bans can boost the market liquidity when the fraction of informed traders exceeds that of uninformed trader. According to this model, the net effect of short-selling bans is ambiguous. A rational expectations model of trade with bid and ask prices posted by competitive risk neutral specialist is used to clarify the informational effects of these constraints. The basic structure is based on of Glosten and Milgrom (1985) with some variations: competitive risk neutral market makers without inventory cost, infinite numbers of informed and uninformed traders, stringiness of short selling bans translated in different categories of traders' cost exposures and influence the motive of short-selling trade. In the model, short-selling type falls into three categories: i) no-cost type which allows full reinvestment or consumption of short-sale proceeds ii) proceeds-restrictions type , a short-sale generates no funds today but does allow one to profit if the price falls and finally iii)   short-prohibition which eliminate any opportunity to short-sell, either because an individual trader is prohibited from engaging in this activity, or the cost is so high that no trader would avail himself of the opportunity regardless of what he knows. The study analyses effect of short-sales prohibitions and short-sale constraints compare to when there is no restriction represented by no-cost scenario.

Diamond and Verrecchia (1987) shows, short-sell prohibitions to both informed and uninformed alike, reduces the informational efficiency of prices compared with unconstrained short-sales. Reduced information content is more severe when there is bad news because this is when more of the informative short-sales would otherwise have appeared. Therefore reduces the speed at which the bid-ask spread narrows over time. They argue that when the price is far from the true but yet unknown liquidation value, there is more uncertainty in the price, and hence the bid-ask spread is wider. They also show, this result is more profound when there is bad news compare to good news. One implications of this result is that a bear market is more detrimental to liquidity than a bull market when it comes under short-selling bans. They also show that short-restrictions alone can improve informational efficiency. The adjustment of bad news relative to good news has an ambiguous effect on the bid-ask spread. Under short-selling bans when potential short-sellers have superior information, a short-selling ban removed the uninformed traders alone and increases the informational efficiency which in turn decreases the bid-ask spread. On the contrary, short-restriction increases the fraction of informed traders in the pool of potential market participants. Increasing the proportion of traders subject to proceeds-restrictions by reducing the proportion of traders who can short-sell costless and/or the proportion that are prohibited from short-selling increases the bid-ask spread for a given amount of information revealed by past trade. As a result the overall effect is ambiguous.

Another theoretical study, Bai, Chang and Wang (2006), can be worthwhile to understand the effect of short-sale bans on liquidity in a risk adverse investors' environment. This study predicts that short-selling bans is detrimental to market liquidity when bid-ask spread compensate dealers for their inventory holding cost. Under the setting of rational expectation model, the study considers a marginal risk adverse investor rather than a risk neutral one as assumed in most of the study including Diamond and Verrecchia (1987). The idea is that to the extent risk matter for the asset prices, short-sale constraints also influence prices through their impact on investors' perceived risk about the fundamentals. When bid-ask spread compensate risk adverse dealers for their inventory holding cost, a short- selling ban is detrimental to liquidity by widening bid-ask spread. Constraining short sales prevent certain trades from the pool of informed traders, which are driven by the private information of more informed investors with bad news. Limiting these traders reduces the amount of information contained in the demand of the asset. The reduction in the price's information content does increase the uncertainty about the asset as perceived by the uninformed investors. A market maker, being risk averse and uninformed, will widen their bid-ask quotes to cover their inventory holding costs in an environment with more uncertainty about stock fundamentals. Beside these, short- selling bans eliminate some liquidity suppliers from the competition and allow the market makers widen their gap in a more oligopolistic setting.

3.1.2 Liquidity Impact: Empirical Findings

The empirical studies like Boehmer, Jones, and Zhang (2009), Kolasinski, Reed, and Thornock (2013) and Marsh and Payne (2012) provide evidences- short-selling damages the liquidity of the market, similar to the theoretical prediction of the previous theoretical models. Boehmer, Jones, and Zhang (2011) examines the impact of short-selling ban in the United States during financial crisis through exploiting the difference between the financial stocks targeted by the ban and those that were not. They find that liquidity –as measured by spread and price impact- deteriorated significantly for stocks subject to bans. The first empirical test by Kolasinski, Reed, and Thornock (2013) also confirms that the short-selling ban in United states during financial crisis detrimental to liquidity. This test got motivation by the counterintuitive predication of short-sell of Diamond and Verrecchia (1987).

The evidence of the recent most comprehensive cross country study on short selling ban during the period 2007-09 financial crisis is coming from Beber and Pagano (2013). This literature aims to know how liquidity reacted to short-selling bans in 30 countries, exploiting cross-country variation in the bans' enactment and lifting dates, in their stringency, and in their coverage to identify their effects and filter out the effect of other concomitant country-specific events or policies. This study takes bid-ask spreads and Amihud illiquidity index as liquidity measures taking sample consists of daily data for 16,491 stocks in 30 countries from January 2008 to June 2009.

As the evidence goes, the bid-ask spread increased worldwide with the salient moments of the crisis. Short-selling restrictions were implemented in the wake of the bad news about the situation in U.S. banks in September 2008. These short-selling bans contributed to the deterioration in liquidity. Stocks affected by a short-selling restriction experienced a significantly larger median bid-ask spread during the ban period. The analysis by Beber and Pagano (2013) further shows that ban on naked short sales is associated with an increase in the bid-ask spread and the more stringent ban on covered short sales the more the bid-ask spread. Disclosure of short-selling obligation has a positive impact on liquidity in the sense that disclosure may reduce adverse selection problems in the market because short sellers trade less aggressively on their negative information. This literature provides evidence that short-selling bans on financial stocks are robustly associated with a larger bid-ask spread during financial crisis period. The study shows the enactment of a ban is associated with the decreases in liquidity as measured by bid-ask spreads, and the lifting of a ban is associated with an increase in market liquidity. This evidence is consistent with the idea that short-selling bans were responsible for deterioration in market liquidity.

Beber and Pagano (2013) also provide evidence that the liquidity effect of short-selling bans is not homogenous across stocks. Small-cap stocks are exposed to

the adverse liquidity effect where as large- cap stocks do not. The stock without a listed option is more restrictive to the liquidity than that of a one with listed option. Finally in examining the cross-listed stocks, the study shows that when a ban is imposed on the domestic market it not only decreases the liquidity of domestic market but also decreases the liquidity of foreign one but not vice versa. As quoted in this literature "So when a ban is imposed at home, its effects spill over abroad, whereas the opposite is not true". All in all, their empirical analysis of this study suggests that the short-selling ban was damaging to market liquidity, especially for stocks with no listed options, a small market capitalization, and high volatility.

There are some studies which report more conflicting or even ambiguous evidences. Jones (2012) shows the two different short-selling bans in 1930s produced different results where a particular type of ban increased the liquidity but the other came out as liquidity damaging. Charoenrook and Daouk (2009), in their cross-country study of market-wide short-sale restrictions, find that when short-selling is possible there is greater liquidity.

3.2.1 Impact on Price Discovery: Theoretical Predications

The anticipated effect of short-selling bans on the speed of price discovery is more clear- cut than on liquidity as determine in pioneer theoretical model of Diamond and Verrecchia (1987).The model predict that short-selling bans slow down the price-discovery process. In the given setting of the model, short-selling bans which are imposed to both informed and uninformed alike, reduces the informational efficiency of prices compared with short-sale without bans. Bans prevent informed traders from short-selling and as a consequence price discovery process become slowly down. The model predicts when all the traders who can sell short can do the same costless then with the increases proportion of trader who are prohibited from short-selling, the expected number of periods required for adjustment of prices increase. The literature also anticipates that Price discovery process is delayed more in bear market compare to that of bull market. As a result, with the release of public information, price adjustment experiences a larger magnitude of change in the presence of short-selling bans than those which occur in the absence of short-selling bans. This prediction of the model is consistent with the general argument of the regulators behind the short-selling regulation: Bans protect the market from the pessimist traders' pressure which is rapidly compounded in the stock price and even more profound when this news reflect a negative bubble or herding behaviour rather than any price sensitive information relates with its fundamental value.

When short-selling bans only eliminate the uninformed from the pool of investors but not the both informed and uninformed then model predicts an opposite result than is predicted for eliminating both. According to the authors

jargon, short-restrictions alone have surprising implications: they improve informational efficiency, improve the adjustment of bad news relative to good news. This is counter to the intuition developed in models without rational expectations that costly short-selling leave only relative optimists in the pool of traders, slowing the price discovery process to private bad news. They argued further that when change in short-selling cost only affect the uninformed traders then bans can improve informational efficiency, at least in theory though these effects are unlikely to dominate.

Bai, Chang & Wang (2006) shows under a fully rational expectations equilibrium model, short-sale bans reduce the allocation and informational efficiency of the market by limiting the activities of the both traders who trade for two reasons either to share risk or to speculate on private information. Isaka (2007) aims to test the Diamond and Verrechia (1987) hypothesis that short-sale constraints reduce the speed of price discovery process in response to private information and cause a sharp decline in prices when announcements occur that reveal negative information to the public. Results indicate that short-sale constraints reduce the adjustment speed of stock prices especially to the bad news before the announcements of revised earnings forecasts disclosed by firms.

3.2.2 Impact on Price Discovery: Empirical Findings

There are substantial literatures which studies the effect of short-selling bans on the speed of price discovery process. Bris, Goetzmann and Zhu (2007) is one of the related significant international study examines the effects of short-sales constraints. By using cross-sectional and time-series information from 46 equity markets around the world the study finds that prices updating process in the event of negative information is faster in countries where short sales are allowed and practiced. This implies that short-selling bans make the price discovery process less efficient.

In a very comprehensive well-designed recent study of Beber& Pagano (2013), they test the theoretical prediction in Diamond and Verrecchia (1987) by a market model regressed on the corresponding broad national stock market index from January 2008 to June 2009. This study lies on time series variation rather than cross-country variation as found in Bris et al. (2007) and also remarkable to remove the pure cross-sectional variation from the sample. Their idea is that the effect of short-selling ban on the speed of price discovery is unambiguously negative. By restraining trading by investors with negative fundamental information, a short-selling ban should slow price discovery, and more so in bear markets. The finding is robust and consistent with the lower speed of price discovery during the ban period. They also test stringency of the informational efficiency prediction in bearish market as in Diamond and Verrecchia (1987). The motivation is that a short-selling bans are intended to limit the activity of

investors with bad news and should slow price discovery more in overall declining markets than in rising ones. The evidence shows that not only do short-selling bans slow price discovery, but they do so especially during overall market declines, consistent with the theoretical predictions. Biais, Bisiere, and Decamps (1999)'s finding on Paris Bourse also support the idea that bans on short-selling activities are negatively related with the price efficiency. Similar findings are also established from other studies. Boehmer and Wu (2013)'s evidence suggest that short-selling activities accelerate the price discovery process in equity market. The idea is that prices are closer to fundamental values when short-sellers are more active. Saffi and Sigurdsson (2011), and Reed (2007) also provide evidence empirically consistent with the idea that non- prohibition of short-selling activities accelerate the speed of price discovery.

Kolasinksi, Reed, and Thornock (2013) provide contrasting evidence from these studies. This literature has a counterintuitive motivation of Diamond and Verrecchia (1987) that short selling bans may actually increase the informational content of short-selling and findings and evidence support the same. But the finding is apparently only to a limited version of short-selling restrictions applied to some stocks accompanied with higher disclosure requirements as was happened in USA during financial crisis of 2008 and thus limits its generality.

3.3.1 Impact on Stock Pricing: Theoretical Predictions

Asset pricing models usually assume unrestricted short-sales with full use of the proceeds. Recognizing the short-selling constraints, an extensive body of theoretical and empirical literature has developed with regard to information arrival and asset trading models that contain the effect of costly short-selling on an asset's equilibrium price. The seminal work of Miller (1977) shows that, securities that face short-selling restrictions become overpriced because bans restrict the informed traders with negative news from acting on their beliefs. In this scenario, stock prices reflect the beliefs of only optimistic investors. Miller's theory is driven by short-sale constraints and the heterogeneous beliefs among investors. Given heterogeneous beliefs and no short-sale bans, pessimistic traders can short the stock, which counteracts optimistic traders who go long, and they jointly set equilibrium stock prices and return. However, under short-selling bans, investors motivated by bad news are unable to short the stock freely, and the equilibrium price tend to reflect a positive bias and subsequent returns will be low. For any given level of short-selling bans, the more heterogeneous the expectations, the greater will be the price and return bias. Hence, prices should rise above their full-information values when a ban is imposed, and decline when it is lifted. But the prediction of Miller's model does not survive if rational expectation theory holds as in Diamond and Verrechia (1987). In the setting of rational expectation, traders recognize the existence of short-sale constraints and adjust their beliefs such that no overpricing of securities will exist, on average.

Because rational investors are aware that due to short-selling bans security prices are withheld from updating negative information so individual stock prices reflect an expected quantity of bad news. In equilibrium stocks are not systematically overpriced when short sales are banned.

Bai, Chnag and Wang (2006) , as opposed to the risk-neutral agent in Diamond and Verrechia (1987) when agent is risk averse , shows that the price impact of short-sale constraints is not clear cut, depends on particular trader's share in the pool of traders. The model based on fully rational expectations equilibrium and classifies investors, who either trade to share risk or speculate on private information. In the presence of short-sale constraints, bans limit both types of trades, and thus reduce the allocation and informational efficiency of the market. Short-sale restrictions shift the asset's demand to the right when it try to limit the risk sharing traders and consequently increases the security price. But the opposite is true when the same is motivated by private information. The net effect of short-selling bans effect of information over risk-sharing or vice versa is ambiguous. The theoretical prediction of Hong and stein (2003) is more aligned with idea that a short-selling ban may worsen the condition of price fall rather than prevent it. They develop a theory of market crashes based on differences of opinion among investors. They argue that because of short-sales constraints, bearish investors do not initially participate in the market and their information is not revealed in prices. However, if other previously bullish investors stay out of the market, the originally bearish group may become the marginal buyers. When market begins to drop; accumulated hidden information comes out, thereby intensifying the price decline.

3.3.2 Impact on Stock Pricing: Empirical Evidence

A rich volume of literatures addresses this issue starting back to 1980s. In measuring the short selling proxy lot of misconception and problem addressed in the literatures developed latter. Our study considers the evidences only coming from some most prominent and recent literatures. Strong evidence from Bris, Goetzmann, and Zhu (2007)   support the idea that short-selling practices have a significant effect on return distribution. The markets where short selling is either prohibited or not practiced, produces a return distribution which is less negatively skewed than the one we may expect in the presence of short-selling. But this is not true for the return distribution of an individual stock. Both Jones and Lamont (2002), a study on NYSE, and Chang, Cheng and Yu (2007), a study on Hong Kong stock market, support the Miller's (1977) overpricing hypothesis. On the contrary, Boehmer, Jones, and Zhang (2011) and Diether, Lee, and Werner (2009) study on the suspension or removal of short-sale price tests, provides no significance evidence for stock price effects.

Beber and Pagano (2013) finds that short-selling bans failed to support prices, except possibly for U.S. financial stocks. The study analyse the effect of short-selling ban across the countries during financial crisis 2007 to 2009 to materialize the evidence against all theoretical prediction from the literatures- Miller's overpricing hypothesis and consistent popular view of regulators, and a temporary overpricing effect on financial stock by Brunnermeier and Oehmke (2008) . But the study addresses some issues that might be responsible for not making this finding robust in US market during financial crisis. Because, the bail-out program during financial crisis made US market heterogeneous compare to others. Beber and Pagano (2013) also agree with the short-term overpricing theoretical prediction of Brunnermeier and Oehmke (2008). But there is no evidence of this like from any other countries than USA. As mentioned before, the positive effect shown for USA may result from the TARP (Troubled Asset relief Program) announcement rather than from the ban itself. In the same study, a further analysis confirms that U.S. stock market response to short-selling bans is positive and significant. In countries other than USA, short-selling bans are associated with either no significant change or a decline in stock returns and is consistent with the predictions of Hong and Stein (2003) and Bai, Chang, and Wang (2006).These results are robust even after addressing the probable endogenity issues.

4. CONCLUSION

The popular myth of short-selling affect, short-selling is detrimental to the market quality, is no longer acceptable as it given. Most of the markets in any crisis is generally   regulated by this motivation and was particularly true during the last financial crisis. This is one of the pitfalls that stop the regulator to achieve the desired objectives in a market. In most of the cases, the vast theoretical and empirical literatures provide us some clear indication but in few cases the evidence is not straight forward which demands, more research should be undertaken with noble methodologies and ideas. Though the most cases the theoretical prediction of short-selling bans on liquidity is market damaging but depends a lot on a certain market structure parameters, like types of restrictions, risk attitude of market participants and proportion of the existence of informed and liquidity traders etc. Most of the empirical studies establish the theoretical idea that short-selling bans are liquidity damaging which include recent evidences and also some of them from the last financial crisis of 2007-09 around the world. The effects are quite robust and vary across markets. This is specially evidenced for the stocks with low market capitalization, high return volatility and no listed options. During the financial crisis, this affect was largely evident especially for financial stocks. In theoretical predications, the effect of short-selling restrictions on the speed of price discovery is straighter forward to have an indication that bans slow down the price discovery process. Most empirical studies establish this idea profoundly and have the evidence that a bear market is more profound to this informational inefficiency than of a bull one. The stock

pricing effects of short-selling bans are not very clear cut in theoretical model. Depending on the market regulations and participants belief, theoretical predictions range in a continuum of overpricing to under-pricing and even ambiguous in some cases. But most of the empirical evidences are supportive to the idea that short-selling bans are associated with either no significant change or under-pricing effect.

The practice of Short-selling and the debate around short-selling, whether good or bad for market, are both rooted to the history of securities market. Short-selling bans are practiced by the regulators with a belief that it has the power to improve the market quality. But the large body of literatures are providing evidences, more generally, different than what are popularly argued by the regulators in imposing short-selling restrictions and which is especially evident in the period of financial crisis. Still, some grey areas are associated with few evidences where the policy issues are in perplexed. We hope empirical studies with more comprehension in scope and methodology shall come out to make the issue more clear cut to the regulators and practitioners in shaping a quality market which is more liquid, efficient and reflect a true price.

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