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## INSIGHTS

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### THE INTENDED AND COLLATERAL EFFECTS OF SHORT-SALE BANS AS A REGULATORY TOOL

*Terrence Hendershott<sup>a</sup>, Ethan Namvar<sup>a,\*</sup> and Blake Phillips<sup>b</sup>*

*Short-sale bans have been utilized globally as a regulatory tool during periods of financial crisis. This paper reviews the observed intended and unintended effects of short-sale bans. Research has documented pervasive effects spanning many financial markets that include options, convertible bonds, credit default swaps, and exchange-traded funds. Such implications should be of interest to regulators and policymakers when contemplating future bans.*



*“Knowing what we know now, I believe on balance, the commission would not do it [short-sale ban on financials] again. The costs appear to outweigh the benefits.”*

—Christopher Cox, Former Chair of the U.S. Securities and Exchange Commission.<sup>1</sup>

In times of crisis, regulators of financial markets are increasingly turning to bans of short-sale transactions as a market-stabilizing tool. For example, on the heels of the market turmoil associated with the bankruptcy announcement of Lehman Brothers on September 19, 2008, market regulators around the world banned the short sale

of financial sector stocks. Similarly, in the summer of 2011, European market regulators banned short selling of sovereign bonds and stocks seeking to stabilize markets in a tailspin over sovereign debt default concerns.<sup>1</sup> This paper surveys the research on the impacts of short-sale bans on financial markets.

Proponents of such actions argue that short selling encourages speculation and price manipulation, unjustly reducing asset values with the potential to contribute to self-perpetuating price spirals in times of panic.<sup>2</sup> Commenting on a ban of naked short positions imposed in July 2008, acting SEC Secretary, Florence Harmon, stated: “We intend these and similar actions to provide powerful disincentives to those who might otherwise engage in illegal market manipulation through the dissemination of false rumors and thereby over time

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<sup>a</sup>Haas School of Business, University of California, Berkeley, CA 94720, USA.

<sup>b</sup>University of Waterloo, School of Accounting and Finance, Ontario, Canada N2L 3G1.

\*namvar@haas.berkeley.edu

to diminish the effect of these activities on our markets.” In contrast, advocates of short sales argue that they provide an important mechanism to impound bearish investor opinions in prices and contribute to liquidity in the market.

Short-sale bans are a blunt regulatory tool with broad potential effects in financial markets. However, the magnitude of the effects is tempered by the extent to which investors can circumnavigate the ban. For example, the ban on short-selling financial sector stocks in 2008 did not extend to derivative market makers, creating opportunities for the migration of short-sale order flow to options and credit default swap (CDS) markets. Both regulators and investors need to recognize the potential impacts of such regulation. The impacts of the 2008 short-sale ban and potential channels of mitigation have been extensively examined and the synthesis of these studies provides valuable insights into the likely effects of future restrictions on short selling.

The ban on short selling in 2008 produced both intended and unintended results. The goal of this paper is to provide regulators and market participants with a survey of the existing evidence if and/or when short-sale bans are contemplated in the future. We divide the effects of the short-sale ban into two categories based on the statements of intentions. The intended effects were to thwart the dissemination of false rumors (short-selling speculation) and to improve or stabilize investor confidence. The unintended effects included: (1) reducing overall market liquidity, impeding price discovery, and increasing volatility, (2) increasing the price of options, (3) equity market price inflation and wealth transfers, (4) reducing the level of short covering, (5) causing a near-collapse of the convertible bond market, (6) increasing transaction costs of some exchange-traded funds (ETF), (7) price inflation in the CDS market, and, finally, (8) an opportunity cost of correct policy.

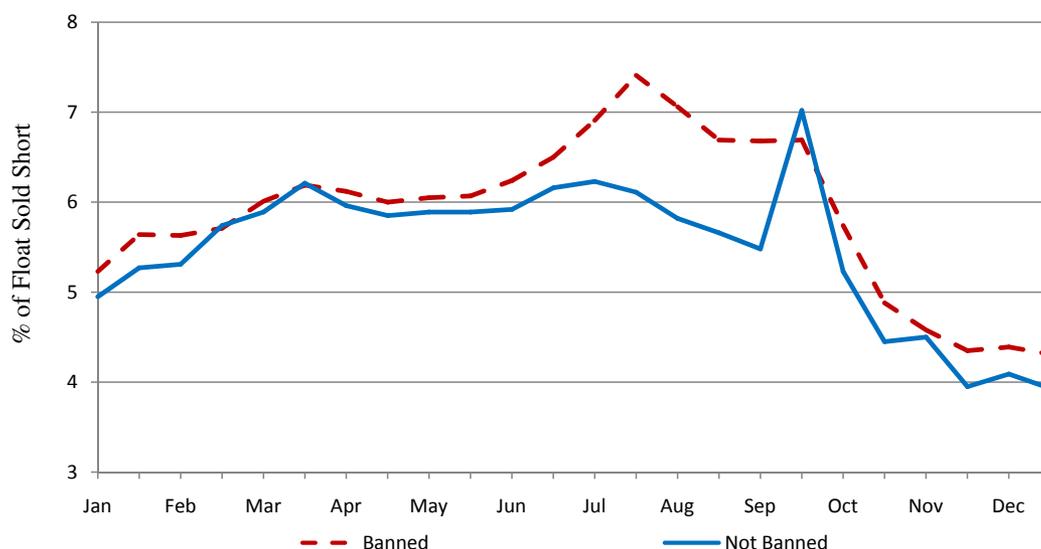
## 1 Intended effects of the 2008 short-sale ban

During the recent financial crisis, the SEC halted short selling in the stocks of financial firms in U.S. markets between September 19, 2008 and October 8, 2008. The stated purpose of the ban was to limit the influence of short-selling speculation on financial sector stocks and boost investor confidence in a highly volatile, uncertain market.

### 1.1 Short-selling speculation

The short-selling ban was largely effective in reducing short positions. Figure 1 shows the value-weighted average percentage of float sold short in 2008 for all stocks in the Center for Research in Security Prices database, separately displaying banned and not-banned stocks (provided by Harris *et al.*, 2013; Boehmer *et al.*, 2013 report similar results). The percentage of float sold short is similar for the banned and not-banned samples at the start of the year (5%) and peaks for both samples immediately prior to the ban at a value of 7%. During and following the ban, short interest dropped to approximately 4% for both samples. From these trends, it is clear that the short-sale ban reduced the proportion of short selling in the market, but it is not clear that short-selling pressure was abnormally high for stocks included in the ban. Further, there was not a clear abnormal effect of the ban on banned stocks relative to the rest of the market. In summary, the short-sale ban leads to a strong reduction in short positions in target firms, but there was also a collateral reduction in short interest across the market.

The short-sale market may provide an incomplete picture of short positions during the ban. As the ban did not extend to market makers in derivatives markets, it was theoretically possible for investors to bypass the ban by purchasing put options. Battalio and Schultz (2011) find that the

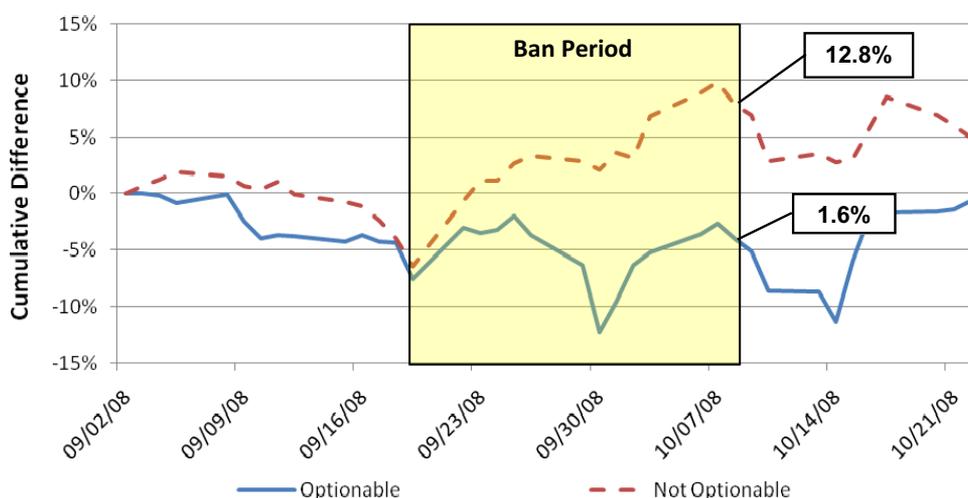


**Figure 1** Value-weighted average percentage of float sold short in 2008.

ratio of option-to-stock volume was comparable for banned stocks relative to a control sample, preceding and during the ban. This evidence suggests that investors did not migrate to the option market during the ban and further suggests that short pressure was not abnormally high in the option market for banned stocks preceding the ban. In contrast, Harris *et al.* (2013) and Beber and Pagano (2013) find that the ban had unique effects on optionable versus nonoptionable stocks

in the United States and internationally. For example, as reported in Figure 2, Harris *et al.* (2013) estimate price inflation at the end of the ban of 12.8% for stocks without traded options, while price inflation effects were negligible for stocks with traded options.

Similarly, Courtney (2010) finds evidence that investors migrated to the CDS market to take short positions in banned stocks. Comparing the CDS



**Figure 2** Price inflation for stocks with and without traded options.

spreads of banned stocks relative to a control sample, Courtney (2010) finds that CDS prices of banned stocks experience significant price pressure that reverted following the ban. These effects were more pronounced for stocks with greater pre-ban short interest.

### 1.2 Investor confidence

Over a short horizon, investor confidence is difficult to quantify. Two reasonable proxies examined in the literature are the change in aggregate market prices surrounding the ban and aggregate market volatility. These measures capture changes in investor perceptions of future aggregate cash flows or their riskiness, as well as the level of disagreement in these valuations.

Boehmer *et al.* (2013) contrast the cumulative returns of banned stocks relative to a matched control sample and find that preceding the ban, cumulative returns for the banned and control samples were statistically indistinguishable. They also report a relative price improvement during the ban of 5% for the banned stock sample, but note that the price increases are difficult to attribute exclusively to the ban due to the coincidental announcement of the Troubled Asset Relief Program (TARP).

Using a factor-analytic model, Harris *et al.* (2013) report price inflation of 10–12% during the ban for banned stocks. Likewise, Harris *et al.* also struggle to clearly attribute price inflation to the ban. First, as mentioned above, simultaneous to the short-sale ban, congress was debating the TARP program which was broadly expected by investors to benefit financial sector stocks. Second, if price inflation was a result of the ban, prices should adjust downward following the ban. Harris *et al.* (2013) find that prices adjust only for the portion of their sample with negative pre-ban performance. Boehmer *et al.* (2013) report price correction the day after the ban, but that correction

is reversed in the following day. A viable alternative interpretation is that markets were bolstered by interventions to curb short selling, resulting in a sustained increase in asset prices. Clear attribution of price effects between the short-sale ban and TARP announcements may not be possible.

The international, multicountry evidence on price effects is perhaps more compelling and provides a cleaner analysis, as only U.S. markets would directly benefit from TARP. Additionally, ban timing was unique across countries resulting in a staggering of analysis periods, further mitigating potential endogeneity biases. Consistent with Boehmer *et al.* (2013) and Harris *et al.* (2013), Beber and Pagano (2013) find sustained aggregate price inflation in association with the short-sale ban for the U.S. market. But, examining 29 other countries which enacted similar bans, they find, without exception, that price inflation coincidental with the ban period reversed following the ban.

Focusing on volatility effects of the ban, Lioui (2009) finds that the ban on short selling increased the volatility of stock prices and exacerbated the effects of the original crisis by systematizing volatility to the entire market. These results lead Lioui to conclude that the ban on short sales had a greater impact on the overall market than it did on the actual practice of short selling, and that this in turn exaggerated the very problem of market volatility that the ban was designed to solve. Boehmer *et al.* (2013) examine intraday volatility using the proportional intraday range and find that the range was 3.43 percentage points greater for the banned stocks relative to a negligible pre-ban difference in volatility.

With the United States potentially being a notable exception, bans on short sales appear to have failed to support aggregate market prices, failing

to fulfill one of their primary objectives. Furthermore, volatility increased markedly during the ban, reflecting an erosion of consensus on asset values and an increase in investor uncertainty.

## 2 Collateral (unintended) effects of the 2008 short-sale ban

The ban on short selling in 2008 produced many unintended results. In academic circles, it is largely accepted that, in aggregate, short selling has a broadly positive market influence. For example, Bris *et al.* (2007) consider whether short-sale restrictions may be helpful during severe market panics. They analyze 46 equity markets and find that short-sale restrictions do not have noticeable effects at the individual stock level. On the other hand, they find that markets with active short sellers are informationally more efficient than those markets without significant short selling. Charoenruek and Daouk (2005) examine 111 countries to determine the effect of market-wide short-sale restrictions. They find that index returns are less volatile and markets are more liquid when short sales are allowed. Finally, Boehmer and Wu (2013) show that short selling broadly renders markets more efficient. It stands to reason that these market characteristics would be significantly impeded by short-sale restrictions and a series of unintended effects may occur.

### 2.1 Reduction in market liquidity and impediment of price discovery

The first unintended effect of the short-sale ban was the reduction of overall market liquidity and the impediment of price discovery. Focusing on the United States, Boehmer *et al.* (2013) find that during the short-sale ban, effective spreads of banned stocks widened from 42 to 145 basis points relative to a widening of 35–57 basis points for the constructed control sample. As an alternative liquidity measure they examine standardized

5-minute price impacts of the banned stock and control sample. During the ban, standardized 5-minute price impacts increased from 33 to 76 basis points for the banned stock sample, relative to an increase of 30–48 basis points for the control sample.

Turning to the international evidence, Beber and Pagano (2013) estimate a market model regression of weekly returns for each stock on the corresponding national market index. They find that the median autocorrelation of residuals from this model is significantly larger for banned stocks, suggesting a larger departure from a random walk and a lower speed of price discovery resulting from the ban. Using bid–ask spreads as a proxy for liquidity, Beber and Pagano (2013) also find that the bans reduced liquidity and these effects were more marked for small market capitalization stocks and stocks with no listed options. Ni and Pan (2011) examine information flows between the U.S. equity, option, and CDS markets during the 2008 short-sale ban. They find that cross-sectional predictability increased between the equity market and both of the derivatives markets in relation to negative information, suggesting that equity markets were less complete during the ban.

In summary of this literature, liquidity was significantly reduced and price discovery was impeded during short-sale bans around the world. These factors resulted in increased transaction costs for market participants and inefficient wealth transfers between investors who transacted at prices which failed to fully reflect all available information.

### 2.2 Increase in the price of options

Another unintended effect of the short-sale ban was the increase of option prices. Battalio and Schultz (2011) examine the cost of trading in the options market during the short-sale ban and

document a dramatic increase in bid–ask spreads for options. They estimate that liquidity demanding investors paid an additional \$505 million USD in transactions costs due to inflated bid–ask spreads. Grundy *et al.* (2012) provide similar evidence and find that violations of put–call parity were more frequent during the ban but that the reduction in transactional efficiency mitigated potential arbitrage profits.

### 2.3 Price inflation and resultant wealth transfers

By preventing short sellers from trading, short-sale bans collectively impeded speculators and informed investors with negative information from trading, creating a bias toward prices above fundamental values as documented by Harris *et al.* (2013) and others. The unintended consequence of this bias is that U.S. equity buyers bought at inflated prices and would face losses when prices adjusted downward after the ban. Harris *et al.* (2013) provide a conservative estimate of \$2.3–4.9 billion in the United States for the resultant wealth transfers between buyers and sellers in the U.S. equity markets.

### 2.4 Reducing the level of short covering

The ban also led to the unintended reduction of short covering. Large declines in the stock market, as was seen prior to the SEC’s decision to ban short sales, often induce small “pockets” of buying related to short covering. However, with the short-sale ban in place, market participants who would have normally covered their positions to lock-in profits by selling short were prone to leaving their positions open due to uncertainty regarding future short position availability. During the short-ban period in the United States from September 19, 2008 until October 8, 2008, the S&P 500 index had four declines of 4–8%.<sup>3</sup> The effects of these declines may have been muted if

investors had greater confidence in short position availability.

### 2.5 Causing a near-collapse of the convertible bond market

Perhaps one of the most unanticipated unintended consequences of the short-sale ban was the dramatic decrease in liquidity in the convertible bond market. Choi *et al.* (2009) find considerable evidence of arbitrage activity as well as increased equity market liquidity following bond issuance, with much of the liquidity improvements positively and significantly related to their proxy for convertible bond arbitrage activity. Similarly, Choi *et al.* (2010) show a strong linkage between convertible bond arbitrage hedge fund flows and capital supply to convertible bond issuers. Mitchell *et al.* (2007) estimate that convertible arbitrage funds account for 75% of the convertible bond market. The effect of hedge fund flows is so vital to capital supply for convertible bond issuers that, all else equal, just one standard deviation increase in hedge fund flows corresponds to a 38.6% increase in capital supply to those issuers.

In a typical convertible bond arbitrage position, investors hedge the transaction by shorting the corresponding common equity of the firm. As short selling is a necessary component of convertible bond arbitrage strategies, the restriction of this hedging opportunity leads to significant reductions in investor participation in the convertible bond market, an important source of financing for firms (in particular lower-rated financial firms).<sup>4</sup> As Faulkender and Petersen (2006) note, companies tend to have significantly more debt in their capital structures when they have access to public debt markets. For companies in distress, the convertible bond market was a vital source for financing. Under the short-selling ban, convertible bond issuance decreased dramatically both in number and average weekly proceeds.<sup>5</sup> Without

the capacity to short sell, demand for convertible securities is reduced, leaving issuing firms without an important source of capital. The 2008 short-sale ban induced a severe decline in capital supply for convertible bonds and a resulting decline in debt issuance.

### *2.6 Increasing transactions costs of some ETFs*

The short-sale ban had unintentional effects on ETFs that depend on short sales as part of their investment strategy. One example is the Rydex Inverse 2x S&P Select Sector Financial ETF (RFN) which enables investors bet aggressively against financial stocks in the S&P 500 index. Trading in this ETF, as well as two others provided by ProShare Advisors, was temporarily halted upon the announcement of the ban. The Rydex ETF (RFN) utilizes equity swaps, options, and futures in order to maintain an inverse position to the financial sector. Despite the fact that market makers (including ETFs) were exempt from the ban, swap brokers were less willing to hedge by short-selling financial shares. Thus, these ETFs had difficulty in creating new shares to meet demand, leading to a trading premium relative to the value of the fund's holdings. For example, on September 19, 2008 ProShares Ultrashort Financials (SKF) traded at a 16% premium to the value of its portfolio.<sup>6</sup> Further, limitations on access to short sales impeded the ability of ETFs to inversely track their benchmarks, necessitating an increase in trading and correspondingly increasing transaction costs borne by investors.

### *2.7 Price inflation in the CDS market*

The final unintended effect of the ban was the migration of hedge motivated trading to the CDS market. Ni and Pan (2011) study the impact of the 2008 SEC short-sale ban on the information flows for banned stocks, in equity, option,

and CDS markets. Focusing on stocks traded jointly in all three markets, they find greater predictability in prices between the option and CDS relative to the equity market, in particular for negative information. In other words, during the ban, price discovery of negative information occurred first in derivative markets not directly impeded by the short-sale ban and the speed with which negative information was impounded in equity prices was reduced. Similarly, Courtney (2010) finds that CDS spreads for firms subject to 2008 short-sale ban were abnormally high relative to a matched control sample, suggesting increased hedging demand for these firms and potential migration of order flow from the equity to CDS market.

### *2.8 Opportunity cost of correct policy*

One underrated aspect of incorrect policy is the true opportunity cost of correct policy that would have produced more effective and intended positive results in the market. Not only did the SEC implement a policy that did not obtain its intended goal, it created a misperception that its policy decision—enacting the temporary ban on short selling—would correct for problems in the market when the credit crunch began to unfold. It can be argued that, had the SEC not put into effect a short-sale ban, policymakers could have (or at least should have) used more effective and aggressive policy to address the roots of the causes of the financial crisis.

## **3 Concluding remarks**

The evidence surveyed here shows that short-sale bans have limited effectiveness and significant costs. The costs include reducing overall market liquidity, impeding price discovery, and increasing volatility in markets for a variety of financial instruments. Moreover, the bans caused an unintended near-collapse of the convertible

bond market. Finally, the bans distorted market prices in the equity, option, and CDS markets. These inflated prices transferred wealth from buyers to sellers during the ban. Furthermore, the ban could provide temporary protection for the management of highly levered, yet poorly managed firms, potentially leading to future moral hazard in financial firms through excess short-term borrowing.

The counterfactual of what would have occurred without the 2008 and 2011 bans is not observable. It is possible that costs of the shorting ban were worth incurring because the ban prevented a short-selling-induced meltdown of the financial system. However, policymakers need to acknowledge the costs of market interventions such as short-sale bans and clearly state under what circumstances these costs are outweighed by the likely unobservable benefits. Making decisions in unprecedented circumstances is difficult for regulators. Now that time has passed and the evidence is in, regulatory agencies around the world should develop guidelines for future shorting bans in times of crisis. Principle and rule-based decision making would enable market participants to better prepare for, and cope with, future regulatory actions.

## Notes

- <sup>1</sup> Telephone interview with *Reuters*, December 31, 2008.
- <sup>2</sup> Masters *et al.* (2011).
- <sup>3</sup> Goldstein and Guembel (2008) posit a theoretical model which supports many of these claims.
- <sup>4</sup> We use intraday data to calculate the declines.
- <sup>5</sup> Research analysts estimated that 65% of the \$60 billion in convertible bonds issued in the first eight months of 2008 was by financial firms (Lauricella, 2008).
- <sup>6</sup> During the first half of the year, proceeds from convertible bond issuances averaged \$944 million. During the ban, proceeds averaged \$20 million. Also, the number of issues declined from almost three/week to only one during the ban (Choi *et al.*, 2010).
- <sup>7</sup> We use end of day values provided by Proshares to estimate the premium.

## References

- Barr, A. (2008). "Short-Sale Ban Disrupts Trades for Hedge Funds," *MarketWatch* **26**, September, 2008.
- Battalio, R. and Schultz, P. (2011). "Regulatory Uncertainty and Market Liquidity: The 2008 Short Sale Ban's Impact on Equity Option Markets," *Journal of Finance* **66**, 2013–2053.
- Bebchuk, L. and Goldstein, I. (2011). "Self-Fulfilling Credit Market Freezes," *Review of Financial Studies* **24**, 3519–3555.
- Beber, A. and Pagano, M. (2013). "Short-Selling Bans around the World: Evidence from the 2007–2009 Crisis," *Journal of Finance* **68**, 343–381.
- Boehmer, E. and Wu, J. (2013). "Short Selling and the Price Discovery Process," *Review of Financial Studies* **26**, 287–322.
- Boehmer, E., Jones, C., and Zhang, X. (2013). "Shackling Short Sellers: The 2008 Shorting Ban," *Review of Financial Studies*, forthcoming.
- Bris, A., Goetzmann, W., and Zhu, N. (2007). "Efficiency and the Bear: Short-Sales and Markets around the World," *Journal of Finance* **62**, 1029–1079.
- Cameron, D. (2008). "Exchange CEOs to Study Whether Short-Sale Bans Destabilizing," *Dow Jones Newswires*, 14 October, 2008.
- Charoenrook, A. and Daouk, H. (2005). "The World Price of Short Selling," Unpublished Manuscript.
- Chen, Q., Goldstein, I., and Jiang, W. (2006). "Price Informativeness and Investment Sensitivity to Stock Price," *Review of Financial Studies* **20**, 619–650.
- Choi, D., Getmansky, M., and Tookes, H. (2009). "Convertible Bond Arbitrage, Liquidity Externalities and Stock Prices," *Journal of Financial Economics* **91**, 227–251.
- Choi, D., Getmansky, M., Henderson, B., and Tookes, H. (2010). "Convertible Bond Arbitrageurs as Suppliers of Capital," *Review of Financial Studies*, 2492–2522.
- Courtney, S. (2010). "2008 SEC Short Selling Ban: Impacts on the Credit Default Swap Market," Unpublished Working Paper.
- Faulkender, M. and Petersen, M. A. (2006). "Does the Source of Capital Affect Capital Structure?" *Review of Financial Studies* **19**, 45–79.
- Goldstein, I. and Guembel, A. (2008). "Manipulation and the Allocational Role of Prices," *The Review of Economic Studies* **75**, 133–164.
- Grundy, B., Lim, B., and Verwijmeren, P. (2012). "Do Option Markets Undo Restrictions on Short Sales? Evidence from the 2008 Short Sale Ban," *Journal of Financial Economics* **106**, 331–348.

- Harris, L., Namvar, E., and Phillips, B. (2013). "Price Inflation and Wealth Transfer during the 2008 SEC Short Sale Ban," *Journal of Investment Management*, forthcoming.
- Laise, E. (2008). "Short-Sale Ban is Hitting Mutual Funds," *Wall Street Journal*, 24 Sept. 2008.
- Lauricella, T. (2008). "Short-Sale Ban Wallops Convertible-Bond Market," *Wall Street Journal*, 26 Sept. 2008.
- Lecce, S. (2011). "Short Selling, Volatility and Market Efficiency. The Impact of Short Selling on Financial Markets," Unpublished Manuscript.
- Lioui, A. (2009). "The Undesirable Effects of Banning Short Sales," Unpublished Manuscript.
- Masters, B., Demos, T., and McCrum, D. (2011). "Knee-jerk Short-Selling Ban Raises Fears," *Financial Times*, 12 Aug. 2011.
- Mitchell, M., Pedersen, L., and Pulvino, T. (2007). "Slow Moving Capital," *American Economic Review* **97**, 215–220.
- Ni, Sophie Xiaoyan and Pan, J. (2011). "Trading Puts and CDS on Stocks with Short Sale Ban," Unpublished Manuscript.
- Tsang, M. (2008). "Short-Selling 'Math Geek' Not Naked, Covered in Blame (Update 1)," *Bloomberg*, 2 Oct. 2008.

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