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Short Sales Bans
Shooting the Messenger?

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Executive Summary

In response to the recent financial crisis, many governments chose to ban or restrict short sales, hoping to mitigate the impact of the stock market downturn. Stock markets function as a continuous election, held to determine the allocation of resources with buyers voting for and sellers voting against investment in particular stocks. Banning short selling is akin to disenfranchising the "no" voter, thereby creating a distortion in the resource allocation process. Ban-induced price distortions damage the integrity of stock prices among investors and potentially cause stocks to expand beyond what is optimal for the firms and the economy.

Despite these costs, short sales bans continue to be pursued. Regulators often opt to ban short selling to prop up company stock prices and to increase bank depositor confidence. Large corporations and CEOs often favor short sales bans because the bans increase their companies' stock price.

But short sales bans do little to support the aims of regulators—namely to prop up prices and slow down stock market adjustment. As demonstrated, the motivations of corporations and CEOs to favor short sales bans are not in line with the public interest.

This paper concludes that the benefits of stock selling and buying freedom outweigh the short-run uncertain benefits of artificially propping up particular companies' stock prices and partially reducing volatility. Ultimately, capitalism requires free markets to allocate resources optimally and requires a continuous election process expressed through the demand and supply for a firm's shares, as buyers and sellers interact in the market. Restricting or banning short selling systematically biases that interaction.

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Short selling is inherently riskier than buying stock.

Introduction

In reaction to the collapse of Lehman Brothers, governments around the world moved to ban the short selling of financial industry stocks. Short selling, as will be explained in depth below, is a strategy employed by investors who believe a stock or other financial instrument will soon fall in price. Politicians and regulators feared that short sellers would drive down the stock price of financial firms, worsening their already weak condition. However, short sellers and other market participants were expressing their judgment regarding the health of these companies—a judgment that governments wished to suppress. Rather than listening to what the markets were saying, governments tried, ultimately without success, to present an alternate reality.

What Is Short Selling?

So what is it, exactly, to short a stock? To answer this, let us first consider its opposite, taking a "long" position. As I write this, stock in Apple Inc. is trading for about $250 a share on the New York Stock Exchange. If my bank is willing to lend me $1,000 for the next 12 months, and I take an optimistic view of Apple's prospects, I can borrow the money and use it to buy four shares of the stock. In market jargon, this borrow-and-buy strategy is known as taking a long position. Then, if my optimism turns out to be justified and the price a year from now is, say, $300 per share, I will be able to sell my four shares for $1,200, giving me a 20 percent return (less interest on the bank loan and any brokerage fees, bid-ask spread, etc.). Another way of thinking of this process is that it involves buying an asset denominated in a currency (Apple stock) that appreciated in value over the year.

Now suppose that, instead of being a bull, I take a bearish view of Apple, and expect the price to fall by 20 percent to only $200. How could I trade on my prediction?

If my outlook is bearish, I ought to create a position that will rise in value when the share price falls—in other words a negative asset, a liability denominated in Apple stock. This can be achieved straightforwardly by borrowing the shares from a holder of the stock who is willing to lend them[1] (usually via a broker[2]) in return for a small fee. Ignoring transaction costs, the lender's fee, and any interest costs, the arithmetic is as follows. I borrow four shares now and sell them immediately for $250 a share, bringing me a cash inflow of $1,000. At the end of the year, I go back into the market to buy four shares in order to pay off my lender; if my forecast is right, I will only have to pay $200 for each share. That would leave me with a profit of $200, or 20 percent.[3]

The symmetry between short sales and purchases is not complete, however, because of the difference in the risk profile. On the one hand, if I am wrongly bullish about Apple, I could lose the whole of my investment—all of the $1,000—if Apple goes bankrupt and the stock becomes worthless. But on the other hand, the maximum possible loss on a short sale is unlimited, because if my bearishness proves unfounded and the stock price rises, I lose $1 for every $1 rise in the price, multiplied by the number of shares that I shorted. Since the upside is, at least in theory, unlimited, so is my potential loss. Short selling is therefore inherently riskier than buying stock.

For shorter-horizon trading, a cruder way to profit from a prospective fall in share prices exploits the fact that most trades on the stock market are only settled two or three days after the deal is booked, so that a sale agreed to on a Monday only commits the seller to deliver stock on Wednesday. If on Monday I expect Apple stock to fall within the next two trading days, I can simply enter a sell order at the current price of $250 without taking the trouble to borrow the shares in advance. I would then pick up stock in the market at the last moment so as to deliver it to the buyer when settlement comes due. If by Wednesday Apple has fallen as expected, I would be able to buy a few minutes ahead of the settlement dead-

line for $200 and sell a few minutes later for the agreed-upon price of $250 per share.[4]

This simpler strategy involves an "uncovered" sale, which means that I am selling stock that is not in my possession (not even as a loan) at the time of the agreement. Hence the strategy itself is known as "naked short selling," which can be contrasted to a covered short sale in which I take the precaution of borrowing stock to sell, as described earlier.

Short Sales and Portfolio Management

The above examples relate to short selling in isolation from broader portfolio considerations. For a more general example of the usefulness of shorting, suppose a fund manager thinks BP's recent problems in the Gulf of Mexico have been overestimated and that it is oversold at its present price level. If he simply buys BP stock, he runs the risk that he could be proved right, yet still lose money—if, for example, the price of oil falls, dragging down the price of all stocks in the sector, or if the stock market as a whole turns bearish. What he wants to do is take a position to profit from a rise in the value of BP stock *relative to the market*, or at least to *other stocks in the oil sector*. In other words, he needs to short the oil sector and long BP. He can achieve this outcome by buying BP stock and simultaneously taking a short position in Exxon, Shell, Chevron, and so on.[5] Then, if BP stock subsequently rises by 3 percent but the rest of the sector is unchanged, he will be able to sell his BP stock at a 3 percent profit, while closing out his short position (repaying the stock loan) for no loss or gain. On the other hand, if the oil sector as a whole falls by, say, 10 percent, but the price of BP stock falls by only 7 percent, he will make a profit of 10 percent on the short position compared to a 7 percent loss on the long position, again leaving a net gain of 3 percent.

In this situation, the short sale serves two purposes. First, it enables the fund manager to back his own judgment about the relative price of BP stock while hedging his position against an adverse movement in the broader market. Second, the short position pays for the long position, so that the cost of the speculation as a whole is only the dealing cost plus the small fee charged by the stock lender.

Short Sales Bans and the Flow of Information

In each of these cases, the act of trading serves to transmit information to the market—good news about a stock in the case of buying, bad news in the case of selling. We can think of stock markets as places where a continuous election is held to determine the allocation of resources, with buyers voting for and sellers against investment in a particular share. In our example of an unhedged Apple trade, buyers are optimistic about its prospects and therefore want to see the corporation receive more resources, whereas sellers—whether shorting or simply reducing or liquidating long positions—are voting against it. In the BP example, the buyer who simultaneously shorts other oil stocks is voting in favor of a diversion of resources from the rest of the sector to BP.

Viewed this way, a ban on short selling amounts to disenfranchising the "no" voter—the continuous election is turned into a referendum in which only a "yes" vote is allowed. As such, a ban on short selling represents a systematic distortion in the resource allocation process. Why would a regulator ever consider this sort of intervention? Apart from the fact that suppressing bad news is the kind of activity usually associated with third-world dictatorships rather than Western democracies, it is also extremely unhealthy for the economy and for markets, since it is bound to have a damaging effect on their ability to allocate resources efficiently to the industries and corporations best able to make use of them.

There are two possible aspects to this. On the one hand, insofar as a short sales ban is successful in boosting the price of the stocks involved above their free-market level, it has

A ban on short selling represents a systematic distortion in the resource allocation process.

the effect of reducing their cost of capital and potentially causing them to expand beyond what is optimal for the firm and the economy. On the other hand, even if short selling is permanently prohibited, all the evidence suggests that bad news will eventually percolate through to the market, as long positions are liquidated and the ongoing inflow of new money into the market from institutions and individuals is diverted away from suspect shares. It would not be surprising then if investors were deterred from buying a particular stock simply on the suspicion that its price may have been artificially, and temporarily, boosted by a short sales ban. Worse still, even when there is no obviously bad news in the public domain, the risk that some stocks may be overvalued—given inside information or simply a lack of unanimity about the "correct" price— may cast a cloud over all the stocks covered by a ban. The result would be a loss of confidence in the reliability of market prices and a consequent drop in volumes and in liquidity as investors are frightened off by the danger of buying at artificially inflated prices.

Bad news will eventually percolate through to the market.

Why a Ban?

There is a long history of restrictions on short selling, going back to the earliest days of stock market trading four centuries ago.[6] The degree of intervention has fluctuated ever since, but the long-term trend to deregulation across the world, and especially in the United Kingdom and the United States, might have been expected ultimately to bring a complete end to all restrictions on short sales. However, the collapse of Lehman Brothers on September 18, 2008, threw the deregulation trend into reverse, at least temporarily. The succeeding 24 hours saw a wave of short sales bans of varying degrees of strictness and scope imposed in markets across the world.[7] For example, whereas the United States and the UK, along with the major continental European countries, targeted financial stocks alone, bans in the Asian markets covered all stocks.[8] Furthermore, although some countries (e.g., Singapore) prohibited only naked short sales, others included covered shorting and even derivative-based short positions in options, futures, or swaps.[9]

In fact, the only country not to ban short selling was China, as a result of a decision that reportedly was made at the highest political level. As a September 26, 2008, Bloomberg report remarked, "China's action contrasts with regulators in the U.S., Europe and Australia." It seems that in the final quarter of 2008, the spirit of the free market was kept alive only in the People's Republic.

What was the justification for this wave of regulatory activism?

On the day the ban was introduced, Hector Sants, chief executive of the UK financial regulator, the Financial Services Authority, made the following statement:

> While we still regard short-selling as a legitimate investment technique in normal market conditions, the current extreme circumstances have given rise to disorderly markets. As a result, we have taken this decisive action, after careful consideration, to protect the fundamental integrity and quality of markets and to guard against further instability in the financial sector.[10]

It is hard to know how to interpret this justification, since it relates to unspecified problems in the stock market itself. What exactly is meant by "disorderly" markets? Reference to "integrity and quality" suggests the FSA was worried about mispricing, whereas "instability" suggests the concern was volatility.[11]

FSA Chairman Callum McCarthy was more explicit. Speaking on the same day, he explained the need for the ban as follows:

> We have been much concerned . . . at the volatility and what I would describe as incoherence in the trading of equities, particularly for financial institutions. There is a danger in a trading system which allows financial institutions to be targeted and subject to extreme short

selling pressures, because movements in equity prices can be translated into uncertainty in the minds of those who place deposits with those institutions with consequent financial stability issues.[12]

If there was incoherence in equity trading, there was at least as much in the FSA's statements!

The interpretation of this latter statement appears to be that either mispricing or excessive volatility in the financial sector of the stock market might cause panic among depositors and lead to a run on the banks. Note that this argument, which was also deployed by U.S. Securities and Exchange Commission chairman Christopher Cox to justify acting to suppress short selling on U.S. markets, is specific to banks and other retail financial institutions. It can hardly be applied to investment banks, let alone non–financial corporations.[13]

Was this danger a reality? There certainly were ominous signs of restlessness among depositors in both countries, though it is hard to say how far it was associated with day-to-day fluctuations in the stock market. If, however, one takes the FSA and SEC fears as justified—if we accept that low prices and/or high volatility in the market for bank shares could have unsettled depositors—two questions arise: Did the short sales ban actually raise and/or stabilize prices? And what might be the side effects of intervening in this way?

Academic Literature

Academic research on the effects of short sales restrictions starts with the work of Edward Miller, who argued that since short sellers were by and large better informed than the rest of the investment community, a ban would be bound to impede the flow of bad news into the market, causing short run overpricing and, more debatably, lower volatility.[14] This conclusion was disputed by Diamond and Verecchia, who presented a detailed analysis that allowed for the fact that restrictions vary in their degree of severity from simply making short sales more costly (usually by imposing higher margin requirements) all the way through to an outright ban on all speculation against stock prices.[15] Instead of propping up the level of stock prices, they suggested that a ban would slow down the process of adjustment to news, especially if it was bad. Skepticism about the price effect was taken further by Bai, Chang, and Wang, who argued that a short sales ban could actually drive stock prices lower because, as long as it was in force, investors would demand a premium to compensate them for the risk of holding stocks in the knowledge that there may well be bad news not yet discounted in current market prices.[16] Perhaps more importantly, Boehmer and Wu found convincing evidence that short selling increases the speed at which new information is incorporated into U.S. share prices, so a ban might be expected to damage stock market integrity.[17]

These researchers based their conclusions on the evidence of short selling restrictions prior to 2008.[18] Assessing the most recent episode, however, is complicated by the fact that the final quarter of that year was one of the most dramatic periods in the history of financial markets, which makes it hard to isolate the effects of the ban itself. In particular, in a number of countries, including the United States and the UK, the ban coincided with massive schemes to bail out the banks (and other financial institutions), which would have been bound to have an enormous impact on share prices in any case.

Nonetheless, a number of researchers have looked at evidence from some of the many countries that imposed a ban, attempting as far as possible to control for the effect of the U.S. Troubled Asset Relief Program, quantitative easing, and the direct bailouts of financial and non–financial corporations that were taking place at more or less the same time.[19]

Marsh and Niemer examined a number of markets from around the world to see whether the ban affected volatility and skew-

Short selling increases the speed at which new information is incorporated into U.S. share prices.

Banning short sales seems to have had little effect on the pattern of price movements.

ness (i.e., the tendency for share prices to fall in bear markets by more than they rise in bull markets), with results that were somewhat inconclusive.[20] Clifton and Snape, in a very early study, found a significant reduction in the liquidity of the stocks affected by the ban in the London market, both in terms of lower turnover and far wider spreads between bid and ask prices, as market makers tried to protect themselves against being picked off by traders with more up-to-date information (of a negative nature).[21] Similarly, Boehmer, Jones, and Zhang found evidence that the SEC's ban had damaged market quality, as indicated by wider spreads, greater price impact, and increased intraday volatility.[22] Although prices were higher for restricted than unrestricted stocks, they were unable to attribute this effect to the ban, given the number of other measures being taken at the same time to prop up the financial sector.

Copeland and Elliott compared the performance of a portfolio of the stocks covered by the UK ban with a control portfolio made up of the rest of the financial sector quoted in London.[23] They found that, while the ban raised the price of the restricted stocks relative to what would otherwise have been the case, the boost was largely a one-off impact of about 6 percent on September 19, the day the restrictions were introduced (as can be seen in Figure 1). Moreover, the first-day boost was smaller than the subsequent fall when the ban was lifted three months later. As is also clear from the figure, banning short sales seems to have had little effect on the pattern of price movements, as evidenced by the high correlation between the market value of the two portfolios. In fact, the correlation coefficient between returns on the banned and the exempt stocks was just under 90 percent, compared with only 80 percent in the three months following the ban.

Formal econometric tests showed that, controlling for the first-day effect, the ban had an insignificant, possibly even negative effect on returns. Interestingly, although market risk, as measured by beta, was lower for all financial stocks during the 90 days of the ban, there was some evidence that for the portfolio of banned stocks it fell more on days of good news than on days of bad news, which may be a sign that investors were wary of buying on good news, or even that they were taking the opportunity to offload stock when the market was in a bullish mood. The only significant impact of the ban, however, was a substantial reduction of 50 percent or more in the volatility of returns on the banned stocks, and this was true for volatility whether unconditional or conditional on the trend in the previous few days.[24]

In summary, the results of the short sales ban were not impressive, given that, as already emphasized, they need to be seen against the background of an unprecedented degree of intervention in world stock markets, especially in the UK and the United States. In particular, the ban was introduced simultaneously with measures that amounted to the nationalization of two of the four largest banks quoted in London, so that throughout the three months and beyond, investors believed they could count on being bailed out in any similar crisis situation in the future—a reduction in risk (and increase in moral hazard) that could have been expected to damp down volatility in any case, even without restrictions on short sales.

Who Benefits from Restrictions on Short Sales?

If restrictions on short sales distort prices, as has been argued here, one might well ask why anyone would favor their introduction. The answer is surely to be found in the urge that top CEOs share with politicians to suppress bad news wherever possible. There are a number of possible reasons for this, all of which conflict with the interest of the investing public and of the broader economy.

In the first place, the remuneration of senior management is often tied implicitly or explicitly (via executive share options) to the price of the company's stock, so anything that artificially inflates its price is likely to be wel-

Figure 1
Price of UK Restricted and Unrestricted Portfolios During Short Sales Ban
(Shaded area represents duration of ban)

Source: DataStream.

comed in corporate boardrooms. Public interest, however, points in the opposite direction. Even in the absence of a direct link to the price of the company stock, the possibility of short selling gives the market the chance to express its opinion of remuneration packages—a control mechanism vastly preferable to the political intervention that has been repeatedly threatened in the last year or two, involving direct limits on management bonuses, favorable tax treatment for firms that suppress bonuses, and so on.

Second, the threat from short sellers is often viewed by ambitious CEOs as an obstacle to their empire-building, potentially dragging down the price of the equity that they propose to use as currency on the acquisition trail. Given that experience supported by research suggests that most big takeovers destroy value, anything that makes them easier is neither in the interest of the predator's shareholders nor of the economy as a whole.

Third, by propping up the share price of possible target companies, short sales bans make it easier for boards of directors to repel predators. That may be good for management, but it is bad for corporate governance in general. It is also bad for the shareholders of target companies, since they are deprived of the takeover premium—often 30 percent or more, and in any case far in excess of the temporary boost, if any, resulting from the imposition of a ban on short sales.

More generally, mergers and acquisitions are an important part of the process whereby a capitalist society allocates resources to the most productive firms. The price mechanism is absolutely central to that process, so anything that distorts it is potentially damaging. Two episodes from the UK in 2007–08 provide illustrations of the dangers.

The UK short sales ban was actually triggered by the collapse a few days earlier of the giant banking group HBOS, which had been created by a series of mergers over the preceding years. HBOS had made a rights issue to existing shareholders only six weeks before, at which point some 18 percent of its shares were out on loan.[25] However, by the time of the collapse, this figure had fallen to only 2.75

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Capitalism requires free markets to allocate resources optimally.

percent, so it is hard to see how short sellers could have played a major role in the bank's demise. Even if they had been instrumental in bringing down the bank, the question must be asked: why pick HBOS? Short sellers had no particular reason to victimize HBOS, no special animus or prejudice against it, no hidden agenda—they simply believed the bank to be overleveraged, too reliant on the money markets (which were no longer functioning at that stage), and with too many mortgage-backed assets whose true value would turn out to be far less than appeared on their balance sheet. All of those suspicions turned out to be justified. In other words, short sellers had valuable information to transmit to the market.

At the time, it was suggested that HBOS, along with a number of other financial institutions, was a victim of unscrupulous speculators who were taking short positions, then spreading unfounded malicious rumors so as to drive down the price of their target—the so-called "short-and-distort" strategy. It seems likely, however, that the reality regarding HBOS was every bit as bad as the share price indicated in the weeks and days prior to the imposition of the ban. More generally, there is the symmetrical argument in favor of a ban on stock buying: if the aim is to prevent short sellers profiting by spreading malicious rumors, why not also protect investors from those who take long positions in a stock, then spread stories to suggest it is undervalued?

In contrast to the case of HBOS, consider a case in which short sellers were absent, or at least not present in sufficient numbers. In the first half of 2007, as the credit crunch was brewing, two of the UK's (and the world's) biggest financial institutions were involved in a bidding war over the Dutch bank ABN Amro. The winner, with a bid of just under $100 billion, was the consortium led by Royal Bank of Scotland—a final burst of empire-building from which it never fully recovered. Ultimately, Royal Bank was taken over by the British government in September 2008. This episode begs the question: where were the short sellers who might have scuppered the catastrophic takeover by pushing down the price of the acquirer's stock?

In the end, capitalism requires free markets to allocate resources optimally. Corporate governance is a vital link in this mechanism, and it in turn relies on the continuous election process expressed through the demand and supply for a firm's shares, as buyers and sellers interact in the market. Restricting or banning short selling systematically biases that interaction, distorting corporate governance and loosening an important constraint on management. The result is routinely that agency costs are raised, with negative consequences for the economy as a whole.

The excessive latitude short sales bans give management in normal times is not the most important concern, however. It would be hard to disagree today with Alan Greenspan's famous (or notorious) judgment that the markets were in the grip of "irrational exuberance" in 1997, and again for much of the period from 2005 to 2007 leading up to the credit crunch. If the markets are to take their share of the blame for what happened, the accusation on the charge sheet is surely that there were far too many buyers and nowhere near enough sellers to generate rational prices.

Now, of course, there is no guarantee that investors will take as much advantage as they should of the freedom to take short positions. Recent experience is not encouraging in this regard—there were few legal or regulatory barriers to short sales in most countries before the credit crunch, though in practice short selling is always harder than buying, especially for retail traders. Nonetheless, given that the excess leverage that has been exposed in the current crisis could never have been possible without exuberance—irrational or otherwise—restrictions on short sales seem like the last thing we need. If anything, in order to reduce the chance of another bubble in financial markets, we should be considering the reverse, examining ways to make short sales easier and more accessible to the small investor. If we believe a bias toward excessive optimism is endemic in the market, the situation will only

be made worse by disenfranchising the pessimists.

Conclusion

A short sale involves nothing more than borrowing stock in order to sell it and, when the price falls, making a profit by repaying the loan for less than the proceeds of the original sale. As such, it is simply the opposite of a leveraged purchase of stock. The two activities are symmetrical.

Banning short selling is a knee-jerk reaction by regulators, often in response to lobbying by corporate management seeking to preserve its freedom to operate without pressure from the market. At best, short sales bans have only a small short-term effect on prices, as seems to have been the case with the bans introduced in September 2008. At worst, they seriously impede the flow of information, distorting prices and creating a false market.

Notes

1. Note that lending stock to speculators is a popular way of enhancing the returns earned by pension funds, life insurers, and other institutions whose business involves holding large portfolios over long periods.

2. Stock may be lent by a broker without the knowledge of the beneficial owner, in the same way that bank deposits are used for loans without the knowledge of the depositors.

3. Strictly speaking, the return on shorting is undefined, because no money is actually invested upfront, although in practice a broker may well demand collateral for the loan of the shares in the form of either stock or cash, with possible margin calls in the event that the price rises and the short position loses money.

4. The two-day wait would not apply to the stock purchase component of the deal because it would simply be "netted" against the sale and the account credited or debited with the difference.

5. In practice, the fund manager would be more likely to short an oil sector futures contract or possibly an oil exchange–traded fund, rather than short every individual share one by one.

6. See Bris Arturo, William N. Goetzmann, and Ning Zhu, "Efficiency and the Bear: Short Sales and Markets around the World," Yale ICF Working Paper # 02-45, September 2004. They trace the first anti–short sales regulation to the Amsterdam Exchange in 1610, only eight years after its foundation.

7. Alessandro Beber and Marco Pagano, "Short-Selling Bans around the World: Evidence from the 2007–9 Crisis," Centre for Economic Policy Research Discussion Paper #7557, 2009.

8. Financial Services Authority, "Amended List (as at 6 February 2009) of UK Financial Companies in Connection with Short Selling (no 5) Instrument 2009," working list, 2009.

9. Fredrik Hansson and Erik Rüdow Fors, "Get Shorty? Market Impact of the 2008–09 U.K. Short Selling Ban," University of Gothenburg Working Papers in Economics #365, 2009. These hastily imposed measures also included a number of other provisions. In some countries, regulators took the opportunity to impose a disclosure requirement for short positions above a specified threshold (0.25 percent in the UK and the United States—far lower than the threshold for long positions).

10. Financial Services Authority, "FSA Statement on Short Positions in Financial Stocks," 2009, http://www.fsa.gov.uk/pages/Library/Communication/PR/2008/102.shtml.

11. Financial Services Authority, "Short Selling," FSA Discussion Paper 09(01), 2009.

12. Speech to the Lord Mayor's City Banquet, http://www.efinancialnews.com/story/2008-09-19/hedge-funds-pour-scorn-on-uk-shorting-ban.

13. This is not to say that falls in the price of investment bank stock will have no effect on those who lend to them. Rather, the point is that those who operate in wholesale markets can be assumed to be in a position to make an informed decision without having to rely exclusively on a signal from the equity market. In any event, the U.S. authorities used this sort of argument—the danger of stock market weakness damaging consumer confidence—to justify bailing out General Motors.

14. Edward M. Miller, "Risk, Uncertainty and Divergence of Opinion," *Journal of Finance* 32 (1977): 1151–68.

15. Douglas W. Diamond and Robert E. Verrecchia, "Constraints on Short-Selling and Asset Price Adjustment to Private Information," *Journal of Financial Economics* 18 (1987): 277–311.

16. Yang Bai, Eric C. Chang, and Jiang Wang, "Asset Prices under Short Sale Constraints," University of Hong Kong and MIT working paper, 2006.

17. Ekkehart Boehmer and Julie Wu, "Short Selling and the Informational Efficiency of Prices," Mays Business School discussion paper, Texas A&M University, 2009.

18. Also see Adam V. Reed, "Costly Short Selling and Stock Price Adjustment to Earnings Announcements," University of North Carolina working paper, 2007.

19. Beber and Pagano.

20. Ian W. Marsh and Norman Niemer, "The Impact of Short Sales Restrictions," Cass Business School working paper, 2008.

21. Matthew Clifton and Mark Snape, "The Effect of Short-Selling Restrictions on Liquidity: Evidence from the London Stock Exchange," Capital Markets Cooperative Research Centre Limited, 2008.

22. Ekkehart Boehmer, Charles M. Jones, and Xiaoyan Zhang, "Shackling Short Sellers: the 2008 Shorting Ban," Johnson School Research Paper Series 34(09), 2009.

23. Laurence S. Copeland and John A. Elliott, "The Impact of the 2008 Short Selling Ban in the London Stock Market," Cardiff Business School working paper, 2010.

24. It is a well-established fact that stock market returns exhibit volatility clustering, i.e., a tendency for high (low) volatility days to be followed by more high (low) volatility days.

25. Presumably this was as speculative short positions. The data are from the BBC on September 19, 2008, quoting Data Explorers.

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