

MEMORANDUM

TO: Distribution List
FROM: Office of Economic Analysis
DATE: January 14, 2009
RE: Analysis of the July Emergency Order Requiring a Pre-Borrow on Short Sales

This memo summarizes the results of a study conducted by the Office of Economic Analysis on the effects of the Commission's Emergency Order of July 15, 2008. The Order imposed temporary rules affecting short selling in the stocks of 19 issuers, effective from July 21, 2008 to August 12, 2008. The goal of this analysis was to evaluate the impact of the Emergency Order to understand the potential economic tradeoffs of a pre-borrow requirement such as the one in the Emergency Order.

To address these questions, we examined how various metrics hypothesized to be affected by the Emergency Order have evolved over time for the sample of stocks subject to the Emergency Order. We compared the experience of these stocks to that of two control samples that were not subject to the Emergency Order. One control sample was composed of other financial stocks and the other was composed of large Non-Financial Control stocks. It is important to emphasize, at this point, that the Emergency Order was in effect for only seventeen trading days, making it difficult to draw strong conclusions for some of our measures. Our results suggest that imposing a pre-borrow requirement may have had the intended effect of reducing fails but may have resulted in significant costs on all short sellers even those whose actions were not related to fails. Specifically, our analysis indicated that, compared to stocks in the control samples, stocks subject to the Emergency Order experienced:

- Large and statistically significant decreases in short selling volume
- Dramatic, but temporary, initial increases in stock lending rates followed by rates still higher than before the Order
- Large and significant decreases in fails to deliver
- Little change in short interest
- No significant changes in bid-ask spread or market depth
- No significant migration of trading volume to London for cross-listed securities
- No significant changes in option trading volume or open interest
- No significant changes in volume

Analysis of the Pre-Borrow Emergency Order

- No significant changes in daily volatility
- No changes in returns and no apparent dampening on downward returns

There was also a substantial run-up of short interest for all financial stocks in the months leading up to the Emergency Order.¹

Time permitting; we may continue our analysis of a few of these measures for a period immediately following the expiration of the Order. However, none of the results in this memo include any data following the expiration of the Order.

Note that the stocks included in the Emergency Order had relatively large market capitalization, traded in a liquid market, and tended to be easy to borrow. The results included in this memo may not be fully indicative of how a pre-borrow requirement might affect markets if applied on a broader scale. We believe that a similar requirement imposed on smaller, more illiquid, or hard-to-borrow stocks might cause a significantly larger disruption to short selling and to liquidity.

Finally, our analysis used a method that attempted to control for other events in the market. However, the time period covered by the Order included a number of significant events that might have affected the Order sample more dramatically than our control stocks. We have tried to minimize this by deriving reasonable predictions on the effect of the Order and selecting the measures that best test those predictions.

¹ Interestingly, there was no run-up in non-financial stocks.

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Methods

For many of our tests, we compared the changes in market statistics from the period when the Emergency Order (“Order”) was in effect to periods prior to the Order. The Order became effective on July 21, 2008 and expired on August 12, 2008. We defined four periods for analysis.

1. *Transition*: The Transition period was the week when the Order was announced on July 15, 2008 and included the trading days from July 14, 2008 to July 18, 2008. We excluded that week from our statistical analysis in case the announcement led to a change in behavior but report the averages for that week.
2. *Pre-Order period*: The Pre-Order period was the 20 days before the Transition period and was defined as the trading days from June 12, 2008 to July 11, 2008.
3. *Baseline*: The Baseline period was measured as a second period before the Transition period. The Baseline period was used to assess “normal” trading in these stocks under analysis and was defined as 20 random trading days between October 11, 2007 (when RBS listed) and June 11, 2008.
4. *Post-Order period*: The Post-Order period was the period after the Order became effective and was defined as the trading days from July 21, 2008 to August 12, 2008.

A comparison of changes in market statistics from the Pre-Order period to the Post-Order period allowed us to analyze the effect of the Emergency Order. Further, any significant changes we documented from the Pre-Order period to Post-Order period were then compared to the Baseline period to determine whether the level differed from its normal level.

We further compared our change in market statistics for the Order sample to two control groups of stocks (see Appendix 1 for a list) to ensure that the change in the market statistics was due to the effect of the Order and not due to events in the market during that time. The first control group, the *Financial Control* sample, consisted of stocks in financial industries, primarily banks, broker-dealers, or other credit providers. The stocks in the Financial Control group tended to be smaller than the stocks affected by the Order. The second control group, the *Non-Financial Control* sample, consisted only of large stocks in non-financial industries. These issuers tended to be of comparable size to the issuers in the Order.

Unless otherwise reported, our analyses examined only 17 out of the 20 NYSE-listed stocks in the Emergency Order (as listed in Appendix 1) which we defined as the *Order* sample. The three stocks not analyzed did not have data readily available. We chose only NYSE-listed stocks for our control samples as well.

Results on Market Statistics

Short Selling Constraints and Failures to Deliver

We first tested whether the Order significantly affected short selling constraints and failures to deliver. Specifically, we examined short selling volume, lending rates and failures to deliver. Short selling volume was examined to determine whether an increase in the costs or constraints on short selling from the Order resulted in less short selling volume. We also examined lending rates to directly capture the costs of short selling. One effect of the Order may have been to increase the cost of borrowing. The cost of borrowing may increase, for example, if short sellers borrowed for longer periods of time, or brokers proactively borrowed shares in anticipation of future short sellers. Since the Order was designed to reduce failures to deliver, we examined whether failures to deliver changed in response to the Order. Finally, we examined short interest, which is a measure of the total short positions held overnight.

Short Selling Volume

Our analysis indicated that:

- Short selling declined more for the stocks in the Order than for stocks in the two control groups reducing short selling by almost 9% of volume or about 20% of the pre-Order short selling.
- Short selling began to decline for the stocks in the Order on the day the Order was announced, but dropped significantly when the Order went into effect.

Analysis:

Our first test examined whether the Order affected the level of short selling. On the one hand, the Order may have increased the cost of short selling. On the other, at the time the Order went into effect some in the media claimed that the Emergency Order would make the stocks more attractive to short sellers if the Order communicated a sense of panic in the Order stocks.

To see whether the level of short selling was affected by the Order, we compared the volume of short selling to total volume in both the Pre-Order period and the Post-Order period. We chose to compare changes in short selling relative to volume because such changes might have been driven by changes in volume rather than in short selling per se. In other words, a decline in short selling relative to overall volume may suggest that short sellers are a smaller portion of the market participants, even if the number of shares sold short increased. We collected the short selling volume from NYSE, NASDAQ, ARCA, and FINRA whose data capture the vast majority of trading in NYSE-listed stocks.

Table 1 shows the results of a statistical analysis of changes in short selling volume relative to changes in overall volume. Short selling for the stocks in the Order during the Baseline period was around 40% of volume. In contrast, short selling of other financial stocks was slightly higher at 44% of volume and short selling of Non-Financial Control stocks was lower at 32.5% of volume. The period following the Order implementation was also associated with statistically lower short selling for each group of stocks relative to the period just before the Order was announced. For the Order sample and the Financial Control sample, the short selling level was also lower than during the Baseline period. However, the Order stocks experienced a much larger decrease in short selling than other financial stocks, by a statistically significant 8.82% of volume. Therefore, we attribute this extra 8.82% decline to the Emergency Order. Compared to the Pre-Order level of 41.81%, this represented more than a 20% decline in short selling. In addition, the Emergency Order was associated with a reduction in short selling below normal levels by about 7% of volume.

Table 1: Short Selling as a Percentage of Volume

This table summarizes the average short selling as a percentage of volume for all short selling on NYSE, ARCA, and NASDAQ for three different samples. The Order sample consisted of the 17 NYSE listed stocks given in the Emergency Order. The Financial Control sample consisted of 40 large domestic NYSE listed banks, brokerages, or credit providers that were not included in the Order. The Non-Financial Control sample consisted of 39 large domestic NYSE listed stocks that were not in any financial industry. The Baseline period consisted of 20 randomly selected trading dates between October 11, 2007 and June 11, 2008. The Pre-Order period was from June 12 to July 11. The Transition period, which contained the announcement of the Order, was from July 14 to July 18. The Post-Order period began on July 21 and ended on August 12. Statistical significance of the changes and differences are indicated by * for significance at the 5% level and ** for significance at the 1% level.

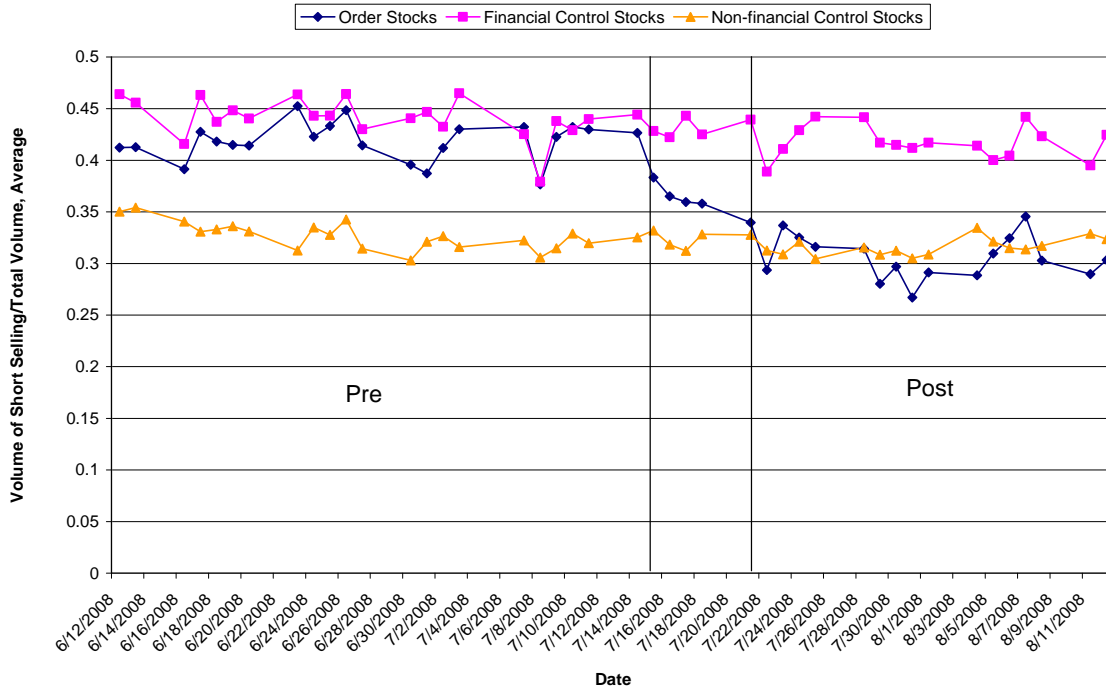
Sample:	Period				Change (Baseline to Post-Order)	Change (Pre-Order to Post-Order)
	Baseline	Pre-Order	Transition	Post-Order		
Order sample	39.98%	41.81%	37.85%	30.74%	-9.24%**	-11.07%**
Financial Control	44.09%	44.12%	43.26%	41.86%	-2.23%*	-2.25%**
Non-Financial Control	32.45%	32.70%	32.33%	31.64%	-0.81%	-1.06%
Differences						
Order - Finance					-7.01%**	-8.82%**
Order - Non-finance					-8.43%**	-10.01%**

The short selling in the Order sample also declined during the Transition period. This could be due to a reaction from the announcement of the Emergency Order or to a trend over time that is not related to the Emergency Order.

To identify when short sales started to decline, we plotted the average short selling levels each day from the beginning of the Pre-Order period to the end of the Post-Order period in Figure 1. The short selling volume of the two control groups was relatively flat, while the short selling in Order stocks began to drop on the announcement day of the Order. This decline could reflect a tightening of the short selling market in anticipation of the Emergency Order. We did not find any evidence that the Order made the Order stocks

more attractive to short sellers. Short selling fell again when the Emergency Order became effective and remained low through the end of the Order.

Figure 1: Short Selling Volume



Caveats:

The results on short selling incorporated only data from the three largest exchanges that reported trades in NYSE-listed stocks plus the TRFs and ADF. The averages reported in the table may be lower than the actual average short selling levels, but the data sources we used captured the majority of trading volume and by .

Effect of market maker short selling:

The analysis above covers all short sales, whether the short sales were subject to the Order or not. In particular, the Order excluded certain market makers. None of the venues supplying data could identify option market-maker short sales, although the NYSE could identify specialist short sales and the NASDAQ had an imprecise way of identifying some equity market-maker short sales. Neither ARCA nor FINRA could identify any short sales likely to be exempt from the Order. Based on the data on market makers from the NYSE and NASDAQ, market-maker and specialist short sales did not decline when the Order went into effect. Removing the market-maker short sales from the analysis made the results on short selling stronger. Thus, our conclusions remain the same.

Stock Lending Rates

Our analysis indicated that:

- Stock lending costs increased around the time that the Order went into effect for all stock groups examined. However, the change in stock lending costs was only statistically significant for the stocks listed in the Order. These stocks saw costs increase by several multiples.
- Much of the increase in the stock lending costs occurred on the first effective day of the Order and appear to have been temporary.
- A plot of the median stock lending costs (where half of stocks have higher rates and half of stocks have lower rates) shows more clearly that the Emergency Order increased the cost of borrowing stock.

Data on stock lending costs:

Our dataset of equity loans contains the date, size, and rebate rate of actual stock loans. The rebate rate is an annual rate representing a daily payment from the lender to the borrower. The mechanics of a stock loan is as follows. In a loan contract, the borrower agrees to put up cash collateral of 102-105% of the value of the shares borrowed. The lender agrees to pay the borrower a portion of the interest earned on the collateral. The lender keeps the rest of the interest as payment for supplying the loan. The payment from the lender to the borrower is called a “rebate” and the rate agreed upon is the “rebate rate.” In general, the more the lender keeps, the lower the rebate rate. Therefore, lower rebate rates mean higher stock lending rates. We report rebate rates below in Table 2 and in Figure 2.

We also estimated lending fees by subtracting the rebate rate from the fed funds average deal rate. We do not report lending fee results in this memo because the conclusions are the same as for rebate rates. These fees run 10-20 basis points for a typical stock. On average, for the stocks listed in the Order, these fees increased by more than 200 basis points from the period before the Order was announced to the period when the Order became effective.

Analysis:

Table 2 shows results for the changes in average rebate rates across sample periods. Rebate rates declined significantly from the beginning of our observation period. Much of this decline was driven by a decline in interest rates. The target Fed Funds rate was 4.75% on October 11, 2007 and 2% from April 30, 2008 to August 12.

From the Pre-Order period to the Post-Order period, rebate rates declined for the stocks in the Order by a statistically significant 1.56%. The declines in the control groups were not statistically significant. In an earlier draft version of this memo, we reported that the average rebate rate during the first ten days of the Order was negative. The average

rebate rate for the stocks in the Order during the entire period the Order was in effect was 0.24%. Therefore, rebate rates recovered somewhat after the beginning of the Order.

Table 2: Rebate Rates

This table summarizes the average rebate rates for three different samples. The Order sample consisted of the 17 NYSE listed stocks given in the Emergency Order. The Financial Control sample consisted of 40 large domestic NYSE listed banks, brokerages, or credit providers that were not included in the Order. The Non-Financial Control sample consisted of 39 large domestic NYSE listed stocks that were not in any financial industry. The Baseline period consisted of 20 randomly selected trading dates between October 11, 2007 and June 11, 2008. The Pre-Order period is from June 12 to July 11. The Transition period, which contains the announcement of the Order, was from July 14 to July 18. The Post-Order period began on July 21 and ended on August 12. Statistical significance of the changes and differences are indicated by * for significance at the 5% level and ** for significance at the 1% level.

Sample:	Period				Change (Baseline to Post-Order)	Change (Pre-Order to Post-Order)
	Baseline	Pre-Order	Transition	Post-Order		
Order sample	2.72	1.8	1.47	0.24	-2.48**	-1.56**
Financial Control	2.33	1.1	0.78	0.54	-1.79**	-0.57
Non-Financial Control	3.19	2.28	2.22	2.21	-0.98**	-0.07
Differences						
Order - Finance					-0.69	-0.99
Order - Non-finance					-1.5**	-1.49**

While the Order stocks declined more than other financial stocks by about 1%, this change was not statistically significant. This contrasts with the results of the earlier version of this study, which documented a large statistical difference between the initial changes in the Order sample and the other financial stocks. The lack of significance in this result is particularly puzzling given the magnitude of the changes.

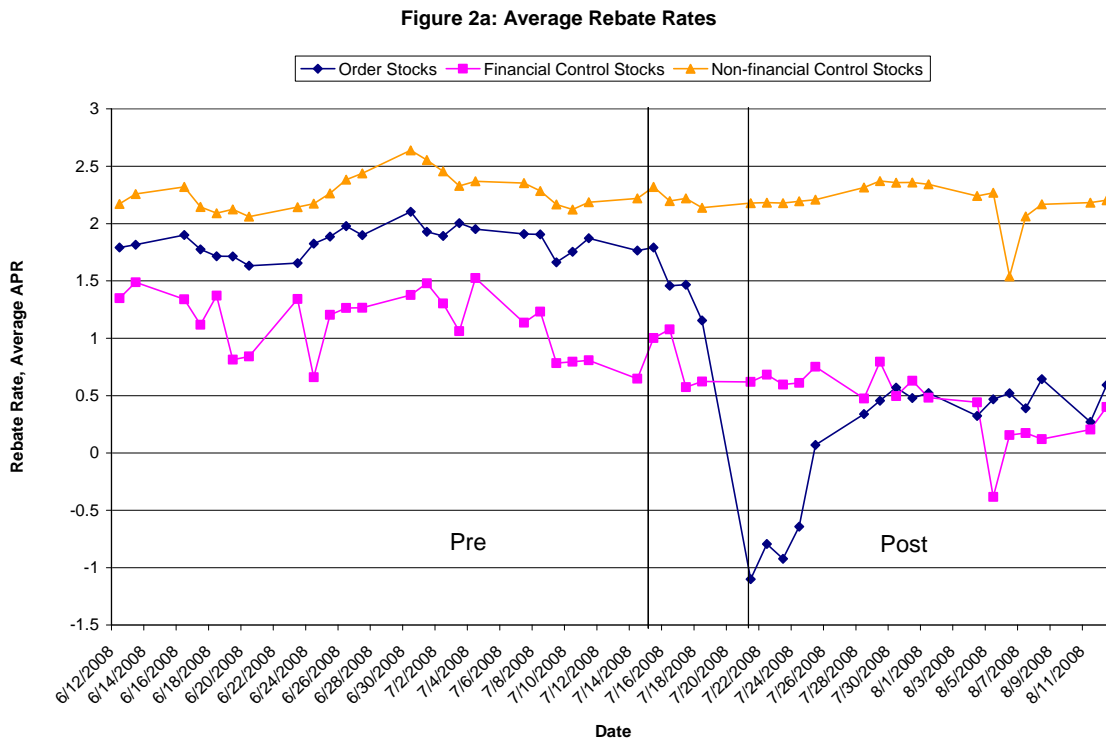
Figure 2a helps us understand why the results seem to change by plotting the average daily rebate rates from June 12 to August 12. The rebate rates of the stocks listed in the Order started to decline on the day after the announcement of the Order. The rates dropped dramatically in the first day of the Order when the average rate was below negative 1%. In fact, the Freddie Mac rebate rate went from positive before the Order to around -13% on the first day of the Order. Rates recovered to above zero before the end of the Order, but were still well below their Pre-Order levels. Overall, this figure, along with the table, is indicative of a temporary shock to the equity lending market followed by an adjustment upward but not to the level of the Pre-Order rebate rate.

Interestingly, the Order resulted in negative average rebate rates early in the Post-Order period for the group of stocks listed in the Order. This means that borrowers would have had to pay each day to maintain collateral even if the stock price did not change. Previous research has indicated that negative rebate rates are rare.²

² See, for example, Gezcy, Musto, and Reed (2002, JFE)

Figure 2a also shows a trend of declining rates in the financial control stocks throughout the sample period, with no obvious shocks caused by the announcement or implementation of the Order. At the end of the Order, the rebate rates of the Order stocks appear similar to the rebate rates of the other financial stocks. This is consistent with Table 2 that shows that the changes in these two samples were not statistically different, despite a large difference in the magnitudes of the changes.

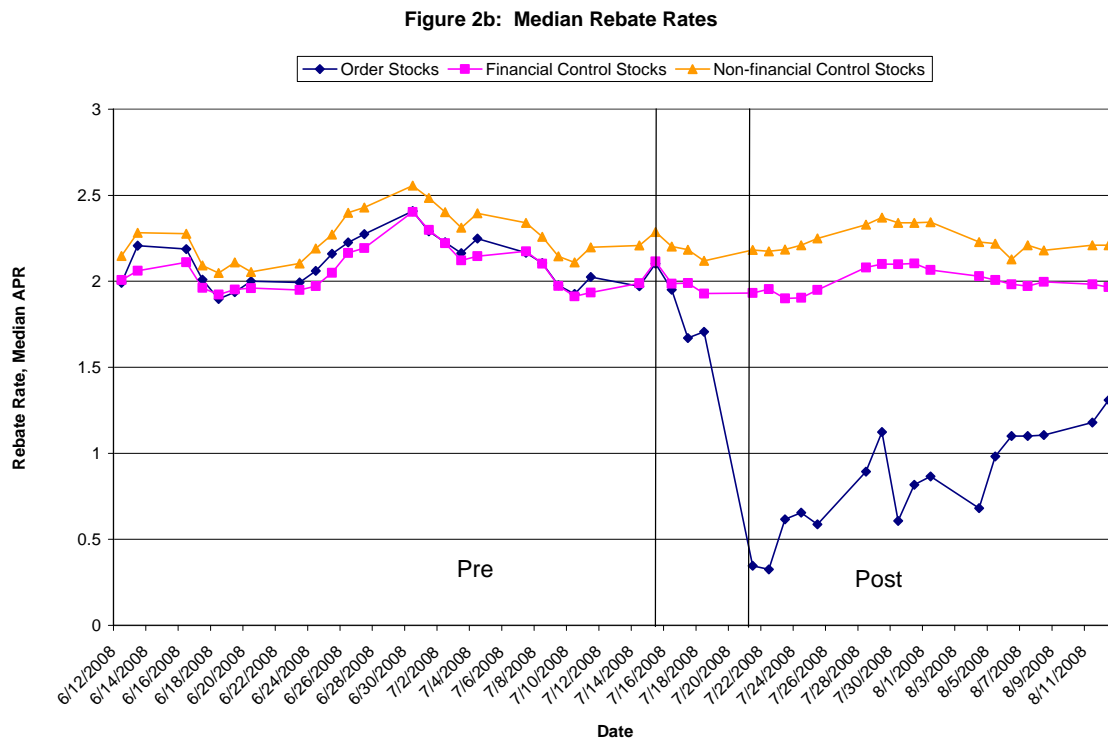
Figure 2a also contains a few dates where rebate rates changed noticeably and then reversed. In particular, the financial control stocks experienced a one-day drop in average rebate rates on August 5 and the Non-Financial Control stocks experienced a one-day drop in average rebate rates on August 6. An analysis of these specific data points revealed that each of these one-day drops was driven by outliers. One stock in the Financial Control sample experienced a 20 point drop in its rebate rate on August 5 with a significant increase on August 6. Likewise, another stock in the Non-Financial Control sample experienced a 25 point drop in its rebate rate on August 6, which was almost entirely reversed on August 7. These outliers show that a large average change can be driven by only a few stocks.



Thus, to ensure that the change in rebate rates at the time of the Emergency Order was not simply due to just a few of the Emergency Order stocks, we plotted the median rebate rates in Figure 2b. A median is the value given to the observation that is lower than half of the sample and higher than half of the sample. The median is not as likely to be affected by a few outliers as is the average.

Analysis of the Pre-Borrow Emergency Order

Figure 2b reveals that while the financial control stocks had lower median rebate rates than the Non-Financial Control stocks, the median rebate rates of the financial control stocks did not decline as much as the average did. Therefore, the trend toward lower rebate rates in the Financial Control sample was driven by a small set of stocks. For the Order stocks, however, the median rebate rate declined dramatically with the introduction of the Emergency Order. The median rebate rate was not as low as the average rebate rate. Figure 2b shows that rebate rates declined after the Order became effective and recovered over time but to a level lower than they were before the Emergency Order. Overall, Figure 2b gives the clearest picture of a dramatic temporary increase in the costs of borrowing following the Emergency Order followed by a rebound in level of rebate rates but not to the Pre-Order level.



Caveats:

The results incorporated only data from one data consolidator who does not capture the full market. This means that our data consolidator, and thus our data, did not capture information on all equity loans and may not have included all days with loans in a particular stock.

Failures to Deliver

Our analysis indicated that:

- Significant reductions in fails to deliver were associated with the Emergency Order.

Analysis:

We examined aggregate fails across the 19 issuers in the Order using data from NSCC. In this analysis, we treated every day as an observation and tested whether the aggregate fails on a typical Pre-Order day differed from the aggregate fails on a typical Post-Order day. The results are shown in Table 3. Even though the Order ended on August 12, we report statistics as if the rule remained in effect for settlement through August 15, which was the settlement day for trading on August 12.

For all measures in Table 3, we found significant reductions in fails to deliver. Prior to the Order, the 19 issuers in the Order sample had 2.8 million in fails valued at \$64.2 million per day. With the Order in effect, these 19 issuers had 1 million in fails valued at \$28.4 million per day, representing decreases of about 64% and 56% respectively. The number of securities with fails declined from 12 to 4.5 per day, representing a decline of about 63%. The number of open fail positions declined from 73 to 14.2 per day, representing a decline of about 80%.

Table 3 also reports statistics for new fails. We calculated new fails as any increase in fails from one settlement day to the next for each clearing firm position. Prior to the Order, new fails averaged 1.8 million shares valued at \$41 million per day in the Order securities. With the Order in effect, new fails dropped by 0.4 million shares valued at \$10 million per day, representing decreases of about 78% and 76% respectively. The number of new fail positions declined from 55.6 to 10.7 per day, representing a decline of about 81%.

Table 3: Summary Statistics on Fails to Deliver

This table examines measures of *aggregate* fails across all 19 firms (20 securities). The Pre-Order period consisted of settlement dates June 17 to July 16. The Post-Order period consisted of July 24 to August 15. The table and figure include securities with aggregate daily fails to deliver of 10,000 shares or more. A security with no fails data record from NSCC was assumed to have zero fails. New fails were defined as a positive change in the fails per security-clearing firm from the previous day. ** indicates statistical significant at the 1% level using the Wilcoxon-Mann-Whitney test (nonparametric).

Measure	Pre	Post	Change	Percent Change
Number of Days	21	17		
Average Daily Dollar Value of Aggregate Fails (\$millions)	64.2	28.4	-35.8**	-55.8%**
Average Daily Aggregate Fails (millions)	2.8	1.0	-1.8**	-64.3%**
Average Daily Number of Securities	12.0	4.5	-7.5**	-62.5%**
Average Daily Number of Fail Positions	73.0	14.2	-58.8**	-79.5%**
New Fails:				
Average Daily Dollar Value of New Fails (\$millions)	41.0	10.0	-31.0**	-75.6%**
Average Daily New Fail Shares (millions)	1.8	0.4	-1.4**	-77.8%**
Average Daily New Fail Positions	55.6	10.7	-41.9**	-80.8%**

In summary, we found that the Emergency Order led to a large reduction in fails to deliver and significantly reduced the frequency of new fails. The results implied that the Order requirements had a profound impact on the creation of fails. Most notably, unlike the close-out requirements that addressed fails after-the-fact, the Order requirements appeared to have prevented new fails from being established. While the Order appeared to have been quite successful at reducing fails to deliver, we note that the success came with significant trade-offs – most notably a large increase in lending fees and a large decline in short sales.

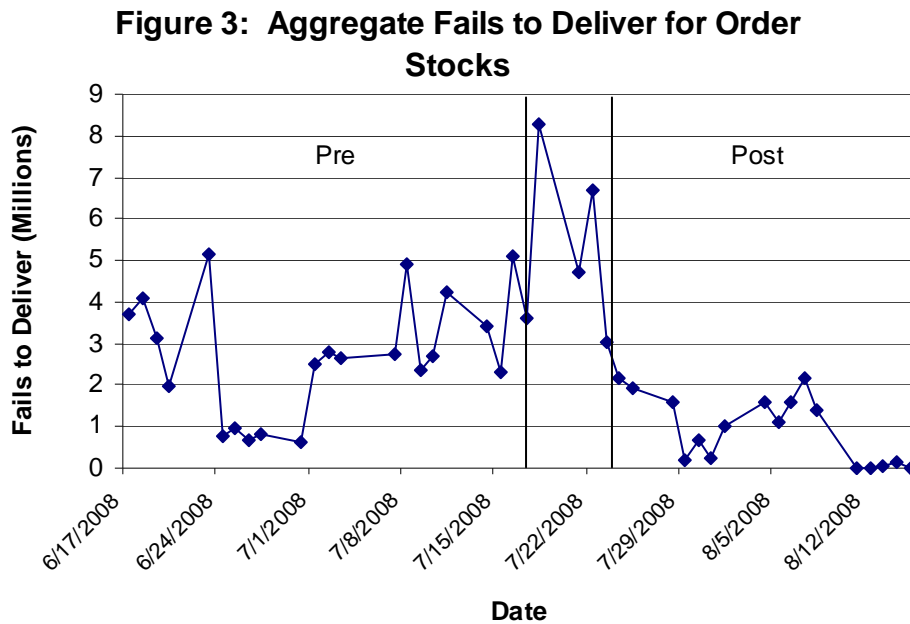
Note that while the decreases in new fails were dramatic, we still observed new fails being created even when the Order was in effect. These new fails, however, could have come from long sales, which we know fail occasionally, or market maker short sales, which were exempt from the Order. Alternatively, these new fails could have represented potential violations of the Order, but nothing in our data allowed us to make this determination.

While these new fails could potentially be violations of the Order, we preliminarily concluded that a certain amount of fails to deliver appeared to be endemic to the trading and clearing process rather than the result of abusive short selling. In other words, a certain amount of “slack” in the system may be appropriate to facilitate liquid trading.

On the other hand, endemic fails to deliver may deserve our attention if we are concerned about systemic risk in the clearing and settlement process for equity trades. We note that the NSCC closely monitors its risks and adjusts clearing and settlement fees to limit risk.

However, if the Commission believes that fails to deliver impose significant systemic risk, then one option would be to require that the NSCC impose an additional risk-based “systemic” fee on fails to deliver, irrespective of who or what caused the fail to deliver.

Figure 3 plots the aggregate fails to deliver of the Order securities. Prior to the announcement of the Order, aggregate fails fluctuated from less than 1 million shares to about 5 million shares. Fails temporarily jumped after the Order was announced but dropped to pre-announcement levels by the first settlement day under the Order. Fails continued to stay low during the effectiveness of the Order, fluctuating from less than 1 million shares to 2 million shares. At the end of the Order, aggregate fails were much lower and approached zero from August 11 to August 15.



We also examined new fails as they compared to the new fails of our control samples. Unlike the aggregate analysis above, this analysis examined the changes in each stock and tested whether the average was statistically significant. For this analysis, we focused on several measures of new fails. Table 4 reports the new fails in number of shares. During the Baseline period, the securities in the Order experienced twice the amount of new fails than did the Financial Control sample. Each of the control samples experienced more new fails in the Pre-Order period than during the Baseline period, while the Order sample had a slightly smaller number of new fails in the Pre-Order period as compared to the Baseline period.

Table 4: New Fails to Deliver (Shares)

This table summarizes the new fails around the effectiveness of the Emergency Order. New fails were defined as a positive change in the fails per security-clearing firm from the previous day. A position was assumed to be zero if it did not exist the previous day. The Order sample consisted of the 17 NYSE listed stocks given in the Emergency Order. The Financial Control sample consisted of 40 large domestic NYSE listed banks, brokerages, or credit providers that were not included in the Order. The Non-Financial Control sample consisted of 39 large domestic NYSE listed stocks that were not in any financial industry. The Baseline period consisted of 20 settlement dates corresponding to the randomly selected trading dates between October 11, 2007 and June 11, 2008. The Pre-Order period is from June 17 to July 16. The Transition period, which contained the announcement of the Order, was from July 17 to July 23. The Post-Order period was from July 24, 2008 to August 15, 2008. Statistical significance of the changes and differences are indicated by * for significance at the 5% level and ** for significance at the 1% level.

Sample:	Period:				Change (Baseline to Post-Order)	Change (Pre-Order to Post-Order)	
	Baseline	Pre-Order	Transition	Post- Order			
Order sample	111,011	104,331	195,706	22,290	-88,720*	-82,041**	
Financial Control	51,277	149,308	314,097	130,560	79,283	-18,748	
Non-Financial Control	31,949	35,086	40,798	128,875	96,925	93,789	
Differences							
Order - Finance						-168,004**	-63,293
Order - Non-finance						-185,646	-175,830

Fails increase for all of the samples during the week when the Order was announced. During the period when the Order was in effect, fails dropped significantly for the Order stocks relative to both the Pre-Order period and the Baseline period. Neither control sample saw a significant change in fails during the Order. However, the change in new fails from Pre- to Post-Order of the Order sample does not statistically differ from the changes in either control sample. Given the relative size of the differences in Table 4, the lack of statistical significance was mainly due to the significant volatility in new fails across individual stocks.

The erratic patterns in new fails implies that new fails are not constantly created across days. Rather, new fails tended to be very sporadic across days for a given stock, which suggests that the fail creation process was not simply a function of trading volume but a much more complex mechanism. For example for Non-Financial Control firms, new fails ranged from 0 to 39 million on any given stock-day during the Order period. We note that the largest new fail (39 million) was associated with a corporate action by that firm, a share exchange tender offer. Thus, fails could be the result of certain corporate actions and a more complete explanation of potential causes of fails is contained in the caveats section that follows.

We also analyzed new fails by standardizing them by total shares outstanding (TSO) which allows a useful comparison to the threshold standard in Regulation SHO of 0.5% of TSO. These results are reported in Table 5. During the Baseline period, the Order stocks and the other stocks experienced new fails of less than a tenth of one percent of shares outstanding. New fails as a percentage of shares outstanding generally increased or stayed the same for the control groups during the Post-Order period. When comparing the change in Order stocks to the change in control groups during the Post-Order period,

we found that the Order stocks experienced statistically significant declines in three out of four comparisons. These relative declines generally ranged from about 0.07% to 0.10%. These results are consistent with the conclusion that the Order had a profound effect on the creation of new fails, so much so that they represented less than 0.01% of shares outstanding for the average Order stock during the Post-Order period.

Table 5: New Fails as a Percent of TSO

This table summarizes the new fails around the effectiveness of the Emergency Order. New fails were defined as a positive change in the fails per security-clearing firm from the previous day. A position was assumed to be zero if it did not exist the previous day. The Order sample consisted of the 17 NYSE listed stocks given in the Emergency Order. The Financial Control sample consisted of 40 large domestic NYSE listed banks, brokerages, or credit providers that were not included in the Order. The Non-Financial Control sample consisted of 39 large domestic NYSE listed stocks that were not in any financial industry. The Baseline period consisted of 20 settlement dates corresponding to the randomly selected trading dates between October 11, 2007 and June 11, 2008. The Pre-Order period was from June 17 to July 16. The Transition period, which contained the announcement of the Order, was from July 17 to July 23. The Post-Order period was from July 24, 2008 to August 15, 2008. Statistical significance of the changes and differences are indicated by * for significance at the 5% level and ** for significance at the 1% level.

Sample:	Period:				Change (Baseline to Post-Order)	Change (Pre-Order to Post-Order)
	Baseline	Pre-Order	Transition	Post- Order		
Order sample	0.087%	0.070%	0.078%	0.007%	-0.079%*	-0.063%
Financial Control	0.015%	0.036%	0.069%	0.032%	0.017%**	-0.004%
Non-Financial Control	0.002%	0.002%	0.002%	0.008%	0.006%	0.006%
Differences						
Order - Finance					-0.096%*	-0.059%
Order - Non-finance					-0.085%*	-0.069%*

We also analyzed the dollar value of new fails. This measure effectively gave greater weight to fails in higher prices stocks. The results are reported in Table 6. During the Baseline period, Order stocks experienced about \$3.3 million in new fails per day, about 2 to 3 times higher than the control group firms. The Order stocks saw a statistically lower dollar value of new fails under the Order while the dollar value of new fails increased or stayed the same for the control groups.

When comparing the change in Order stocks to the change in control groups during the Post-Order period, we found that the Order stocks experienced statistically significant declines in two out of four comparisons. These relative declines generally ranged from about \$1 to \$3.5 million. The results that were not statistically significant were consistently in the same direction of the statistically significant results. These results are consistent with the conclusion that the Order had a profound effect on the creation of new fails as measured in dollars, so much so that they represented less than \$ 0.6 million for the average Order stock during the Post-Order period.

Table 6
Dollar Value of New Fails to Deliver (\$Millions)

This table summarizes the new fails around the effectiveness of the Emergency Order. New fails were defined as a positive change in the fails per security-clearing firm from the previous day. A position was assumed to be zero if it did not exist the previous day. The Order sample consisted of the 17 NYSE listed stocks given in the Emergency Order. The Financial Control sample consisted of 40 large domestic NYSE listed banks, brokerages, or credit providers that were not included in the Order. The Non-Financial Control sample consisted of 39 large domestic NYSE listed stocks that were not in any financial industry. The Baseline period consisted of 20 settlement dates corresponding to the randomly selected trading dates between October 11, 2007 and June 11, 2008. The Pre-Order period was from June 17 to July 16. The Transition period, which contains the announcement of the Order, was from July 17 to July 23. The Post-Order period was from July 24, 2008 to August 15, 2008. Statistical significance of the changes and differences are indicated by * for significance at the 5% level and ** for significance at the 1% level.

Sample:	Period :				Change (Baseline to Post-Order)	Change (Pre-Order to Post-Order)
	Baseline	Pre-Order	Transition	Post-Order		
Order sample	3.34	2.41	3.34	0.59	-2.75**	-1.82**
Financial Control	1.02	2.19	3.65	1.74	0.71**	-0.45
Non-Financial Control	1.65	1.54	2.24	4.61	2.96	3.07
Differences						
Order - Finance					-3.46**	-1.37*
Order - Non-finance					-5.71	-4.89

We can also learn about the dynamics of fails under the Order by examining the number of new fail to deliver positions. Fail to deliver positions represent the number of unique clearing firms with fails for a particular stock on a particular date. New fail to deliver positions are measured as the number of unique clearing firms with fails for a particular stock on a particular date that did not exist on the prior settlement date.

The results are reported in Table 7. During the Baseline period, Order stocks experienced about 3 new fail to deliver positions per day, about 2 times that of the control group firms. The Order stocks saw statistically lower new fail to deliver positions under the Order while the new fail to deliver positions increased or stayed the same for the control groups. When comparing the change in Order stocks to the change in control groups during the Post-Order period, we find that the Order stocks experienced statistically significant declines in all four comparisons. These relative declines generally ranged from about 2 to 3 positions. These results are consistent with the conclusion that the Order had a profound effect on the creation of new fail to deliver positions, so much so that they represented less than 1 new position for the average Order stock during the Post-Order period.

Table 7
New Fail to Deliver Positions

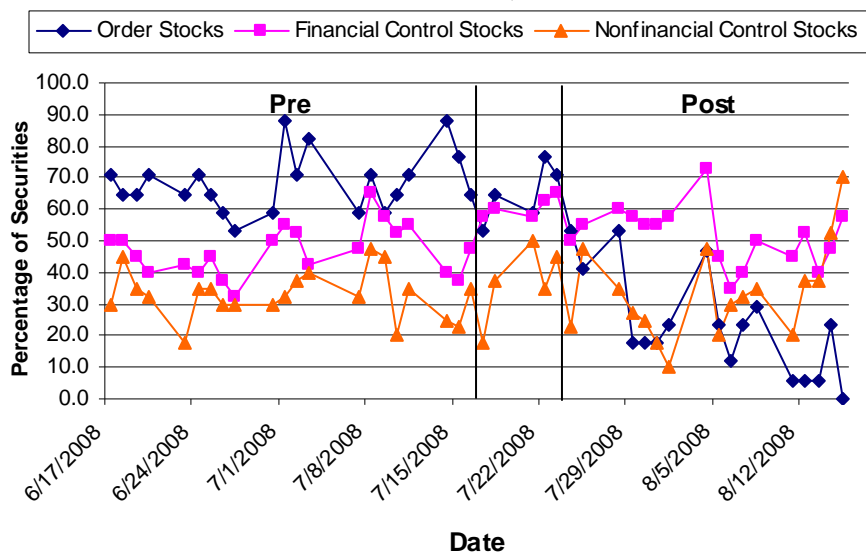
This table summarizes the new fail positions at the clearing member level around the effectiveness of the Emergency Order. New fails are defined as a positive change in the fails per security-clearing firm from the previous day. A position is assumed to be zero if it did not exist the previous day. The Order sample consisted of the 17 NYSE listed stocks given in the Emergency Order. The Financial Control sample consisted of 40 large domestic NYSE listed banks, brokerages, or credit providers that were not included in the Order. The Non-Financial Control sample consisted of 39 large domestic NYSE listed stocks that were not in any financial industry. The Baseline period consisted of 20 settlement dates corresponding to the randomly selected trading dates between October 11, 2007 and June 11, 2008. The Pre-Order period was from June 17 to July 16. The Transition period, which contained the announcement of the Order, was from July 17 to July 23. The Post-Order period was from July 24, 2008 to August 15, 2008. Statistical significance of the changes and differences are indicated by * for significance at the 5% level and ** for significance at the 1% level.

Sample:	Period:				Change (Baseline to Post-Order)	Change (Pre-Order to Post-Order)
	Baseline	Pre-Order	Transition	Post- Order		
Order sample	2.88	3.27	2.67	0.63	-2.26**	-2.64**
Financial Control	1.55	2.55	3.76	2.73	1.17**	0.18
Non-Financial Control	1.30	1.24	1.26	1.30	-0.01	0.06
Differences						
Order - Finance					-3.43**	-2.82**
Order - Non-finance					-2.25**	-2.70**

Finally, we examined the percentage of stocks in each group with and without fails on a given day and we report these results in Figure 4.³ The firms subject to the Emergency Order saw significant decreases in the likelihood of having *any* fails to deliver on a particular day. The control groups showed very little change in the likelihood of having a fail to deliver on a particular day. Prior to the Order, about 68% of firms subject to the Emergency Order had fails. During the last settlement week of the Order, only 8.2% of Order stocks had fails. This measure reached its lowest point on the settlement date of August 15, 2008 (corresponding to standard settlement of trades on August 12, 2005) when none of the 17 NYSE-listed Order firms had fails. These results are consistent with the conclusion that the Order had a profound effect on the creation of new fail to deliver positions and that the full effect of the Order may not have been fully felt until the latter half of the Post-Order period since pre-existing fails take time to be closed out.

³ Note that the data we used only reported a stock as having fails if it was in excess of 10,000 shares. Thus, if a stock had fails of less than 10,000 shares we counted it as not having any fails.

Figure 4: Percentage of Securities with Fails at Least 10,000 Shares



Caveats:

The securities subject to the Emergency Order did not experience high fails prior to the Order. Only one stock, DB, was even on the threshold list prior to the Order announcement. Therefore, it is not clear that the experience of the Order securities can be generalized to securities that have persistent fails. This is especially true if persistent fails are from long sales or the result of persistent illiquidity in the lending market.

Caution should be used in equating fails to deliver to naked short selling as fails to deliver are not necessarily indicative of abusive naked short selling. (Although abusive "naked" short selling is not defined in the federal securities laws, it refers generally to selling short without having stock available for delivery and intentionally failing to deliver stock within the standard three-day settlement cycle.)

Other reasons why fails to deliver may occur include:

- Fails to deliver can happen on long sales as well as on short sales that followed the proper locate requirements at the time of the trade.
- Fails to deliver can also occur as a result of liquidity provision by market makers and may be particularly acute during times of abnormally high trading activity.
- Fails to deliver can also happen as a result of the underwriting process where underwriters typically sell shares in excess of the offering amount. This underwriter short position is typically covered through stabilizing purchases in the open market or through the exercise of the overallotment option.
- Fails to deliver are also more prevalent around corporate events where trading activity can temporarily overwhelm the shares available for sale or lending. In particular, fails to deliver can occur in merger arbitrage as arbitrageurs' typically

short the acquirer and buy the target. Once the merger is completed, the arbitrageur can cover the acquirer short position with the acquirer shares received from their long position in the target firm.

Data limitations:

The NSCC fails data contains a clearing firm's *net* fail position on a given day. This netting can make it difficult to attribute the *net* fail position to a specific trade or trades because many clearing firms clear for multiple clients. Therefore, the NSCC fails data does not indicate whether the fail came from long sales or short sales nor does it indicate whether the fail came from market maker or investor trades. In addition, the NSCC data includes only securities with aggregate daily fails to deliver of 10,000 shares or more. A security with no fails data record from NSCC was assumed to have zero fails in our analysis. We calculated new fails as any net positive change in fails from one settlement day to the next for each clearing firm position.

We also note that the results could be subject to the "Hawthorne effect." That is, firms could have been on their best behavior during the time of the Emergency Order because of the likelihood of intense scrutiny by regulators of failed positions. Therefore, the results on fails to deliver may be indicative of a best case outcome and may not represent a long-term equilibrium.

Analysis of the Pre-Borrow Emergency Order

Short Interest

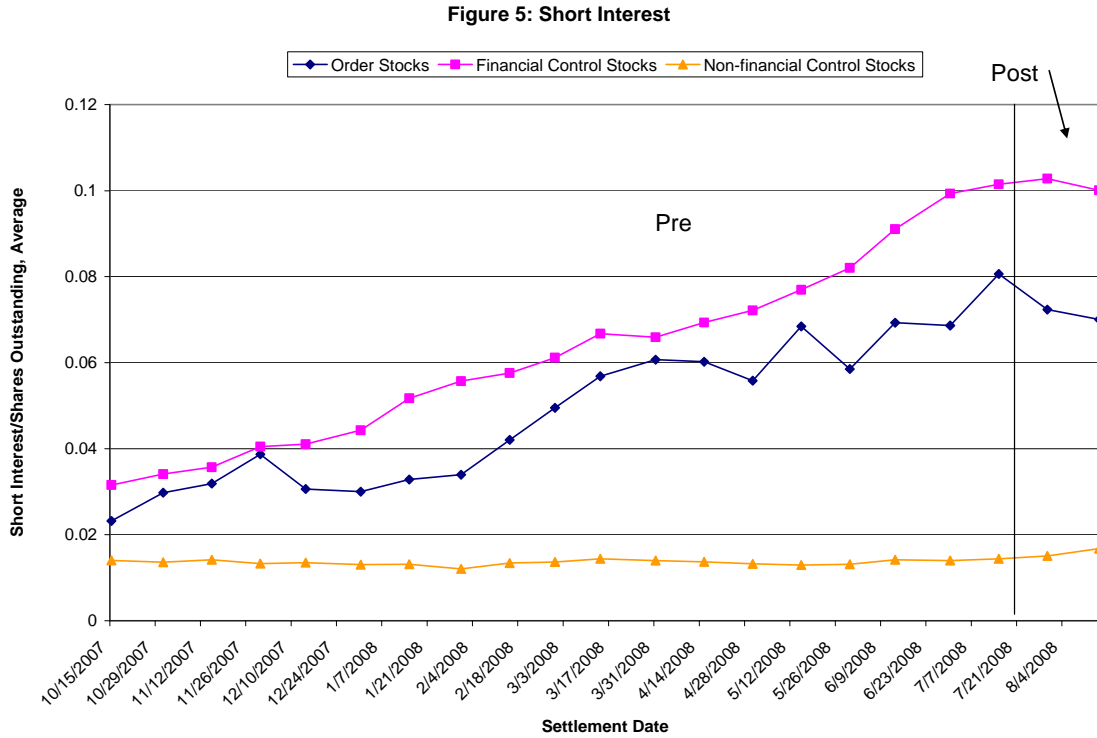
Our analysis indicated that:

- Short interest increased for both the Order sample and the Financial Control sample from October 2007 to July 15, 2008, but did not change significantly during the Order period.
- Short interest did not increase for the Non-Financial Control sample during this same time period, suggesting that recent market-wide increases in short interest are driven by financial stocks and are thus, most likely related to the credit crisis, as opposed to regulatory changes.

Analysis:

The data on short interest is made available only twice a month and the announcement date of the short interest lags the settlement date on which the announcement is based. Short interest represents the outstanding number of shares in short positions held at the end of the trading day three days before the designated settlement date. We collected short interest data beginning in October 2007 because one of the Order Stocks, the Royal Bank of Scotland, listed in early October. We standardized the short interest by total shares outstanding so that the number was comparable across stocks. The average short interest for each of our samples is plotted in Figure 5.

Since October, the short interest as a percentage of shares outstanding has been increasing steadily for financial stocks, including the stocks in the Order. Because of the timing of the release of the short interest data, there were only two short interest data points that could be affected by trading during the Order. These short interest calculations did not show substantial changes. Therefore, the Order does not appear to have affected short interest.



This result was not surprising, even given the large decrease in short selling reported above. On average, short interest was many times larger than daily volume. Therefore, a drop in short selling volume of 9% of daily volume was only a fraction of a percent of the short interest. Therefore, it would most likely take longer than the seventeen days of the Order for such a decrease in short selling volume to appear in short interest.

Another potential reason for finding very little change in short interest could be that the Order had a larger impact on shorter-term short selling than longer-term short selling, which is more likely to show up in short interest. When costs increase, the short sellers with the least to gain will be the first to stop short selling. If it is the short-term short sellers as opposed to the long-term short sellers who would be the first to change their behavior, then short interest is less likely to change materially.

Interestingly, the Non-Financial Control sample experienced no substantive change in short interest since October 2007. This suggests that the increase in overall short interest reported by the media is driven by financial stocks and most likely the result of negative sentiment induced by the credit crisis.

Shorting in Other Markets

Tests in this section attempt to measure whether short sellers were using other markets outside of the U.S. to create short positions. Specifically, we compared volume changes in the U.S. to volume changes on the London Stock Exchange (LSE) in order to determine whether short sellers traded overseas as a way of circumventing the Order. Further, we examined changes in option volume and open interest to infer whether short sellers have moved to the option markets as a substitute for short selling. These tests do not capture all possible markets for creating a short position, but they do represent some of the least costly substitutes for short selling in U.S. equity markets.

Cross-listed Volume

Our analysis indicated:

- No increase in short selling overseas.

Analysis:

If short sellers believed that shorting in the U.S. equity market became too expensive as a result of the Order, they may have chosen, instead, to send their orders overseas where short selling was less restricted. In order to test this, we determined any foreign market in which the Order stocks were listed. Only one exchange, the London Stock Exchange, listed more than a few of the stocks. Further, the regulations in the U.K. and on the London Stock Exchange did not require a pre-borrow and generally allowed naked short selling. Therefore, the London Stock Exchange may have been an attractive alternative to the U.S. markets if the Order had the effect of increasing the cost of short selling.

We were unable to acquire short selling volume information on the London Stock Exchange, so we were limited to examining whether volume changed. Because short selling makes up a significant percentage of volume, a large migration of short selling to London might have been detectable in volume.

We limited our analysis of volume to stocks listed on both NYSE and LSE. The sample of stocks included 7 Order stocks and 77 other stocks, not in the Order sample, that were listed on both the NYSE and the LSE. We examined the 77 other stocks without regard to the industry or home country of the issuer. We collected data on the daily volume of each of the cross-listed stocks for each of our sample periods.

Table 8 reports the average volume of the samples in both the U.S. and London markets and compares volume statistics before and after the Order. The stocks in the Order had much higher volume on both exchanges than the control stocks. This could affect the interpretation of the comparison. In addition, London had a higher volume in cross-listed

stocks than the U.S. This was potentially driven by the relatively larger number of cross-listed U.K. firms than U.S. firms.

Both the U.S. and London saw an increase in volume in the stocks included in the Order from the Pre-Order period to the Post-Order period, but neither increase was statistically significant. This is contrary to what would be expected if short selling had migrated overseas in order to circumvent the Order. Under those circumstances, we would expect to observe an increase in London volume and a decrease in U.S. volume.

Interestingly, the table also shows that the volume increased dramatically for the stocks in the Order on both the U.S. and the London during the week the Order was announced. This could reflect increased uncertainty in the market for these stocks.

Table 8
U.S. - London Cross-Listing Volume Comparison

This table summarizes the average volume of stocks cross-listed on the NYSE and LSE in thousands of shares. The Order sample consisted of the 7 NYSE and LSE listed stocks given in the Emergency Order. The Control Sample consisted of 77 other NYSE and LSE listed stocks. The Control Sample was not restricted to financial stocks. The Baseline period consisted of 20 randomly selected trading dates between October 11, 2007 and June 11, 2008. The Pre-Order period was from June 12 to July 11. The Transition period, which contained the announcement of the Order, was from July 14 to July 18. The Post-Order period was from July 21 to August 12.

Sample:	Period:				Change (Baseline to Post-Order)	Change (Pre-Order to Post-Order)
	Baseline	Pre-Order	Transition	Post-Order		
Order sample						
U.S.	15,507	24,658	45,656	28,442	12,935	3,784
London	32,496	43,043	72,982	44,381	11,885	1,338
Difference					1,050	2,446
Control Sample						
U.S.	4,216	5,409	5,414	4,852	636	-556
London	6,376	7,379	7,520	7,404	1,028	25
Difference					-392	-581
Difference of Differences					1,442	3,027

Data limitations:

We cannot definitively test whether short selling volume migrated from one exchange to another merely by examining total volume. However, volume may give us a clue. In this case, we do not observe any signs of a migration.

As a robustness check, we converted ADR volume into equivalent ordinary shares for Order stocks if the ADR ratio was different than 1:1. The results were nearly the same and continued to show an increase in U.S. relative to London for Order stocks. While we did not apply the same robustness check to the control sample, we believe that our difference of difference methodology mitigates any concerns related to ADR ratio.

Option Market Activity

Our analysis indicated:

- No change in option activity and no evidence that short sellers migrated from the equity markets to the option markets.

Analysis:

Option market activity is typically measured using open interest and volume. Open interest is similar to short interest as it measures shares in contracts outstanding. If the Order induced short sellers to switch to the option markets, we would expect to see an increase in both open interest and volume. Open interest measures the outstanding positions, while volume measures the trading activity. A short seller could either write a call and buy a put to mimic a short position, or could buy a put to benefit from a price decrease while limiting losses from a price increase. While an analysis of option activity should include both puts and calls, we focused more of our attention on puts.

Tables 9 and 10 present the average put and call open interest in our sample periods and reports the results of tests on changes in open interest. Put open interest in the Post-Order period was statistically higher than in the Baseline period for financial stocks, but statistically similar for non-financial stocks. This potentially captures a general change in the sentiment toward financial firms and is consistent with the short interest results reported above. Call open interest also increased for the Order stocks, but not for other financial stocks.

From the Pre-Order to the Post-Order period, the open interest in put options on the Order stocks did not change statistically. The same was true for open interest in call options. Therefore, based on open interest, it appears unlikely that short sellers switched from equities to options because of the Order.

Table 9
Put Open Interest

This table summarizes the average put open interest for three different samples. The open interest was reported as the number of shares in contracts in open positions divided by the number of shares outstanding of the underlying stock. The numbers were reported as percentages. The Order sample consisted of the 15 NYSE listed stocks given in the Emergency Order. The Financial Control sample consisted of 39 large domestic NYSE listed banks, brokerages, or credit providers that were not included in the Order. The Non-Financial Control sample consisted of 39 large domestic NYSE listed stocks that were not in any financial industry. The Baseline period consisted of 20 randomly selected trading dates between October 11, 2007 and June 11, 2008. The Pre-Order period was from June 12 to July 11. The Transition period, which contained the announcement of the Order, was from July 14 to July 18. The Post-Order period was from July 21 to August 12. Statistical significance of the changes and differences are indicated by * for significance at the 5% level and ** for significance at the 1% level.

Sample:	Period:				Change (Baseline to Post-Order)	Change (Pre-Order to Post-Order)	
	Baseline	Pre-Order	Transition	Post- Order			
Order sample	3.35%	4.53%	5.15%	4.72%	1.37%**	0.20%	
Financial Control	1.18%	1.70%	2.05%	1.95%	0.77%**	0.25%**	
Non-Financial Control	1.73%	1.67%	1.76%	1.76%	0.03%	0.09%	
Differences							
Order - Finance						0.60%	-0.05%
Order - Non-finance						1.34%*	0.11%

Table 10
Call Open Interest

This table summarizes the average call open interest for three different samples. The open interest was reported as the number of shares in contracts in open positions divided by the number of shares outstanding of the underlying stock. The numbers were reported as percentages. The Order sample consisted of the 15 NYSE listed stocks given in the Emergency Order. The Financial Control sample consisted of 39 large domestic NYSE listed banks, brokerages, or credit providers that were not included in the Order. The Non-Financial Control sample consisted of 39 large domestic NYSE listed stocks that were not in any financial industry. The Baseline period consisted of 20 randomly selected trading dates between October 11, 2007 and June 11, 2008. The Pre-Order period was from June 12 to July 11. The Transition period, which contained the announcement of the Order, was from July 14 to July 18. The Post-Order period was from July 21 to August 12. Statistical significance of the changes and differences are indicated by * for significance at the 5% level and ** for significance at the 1% level.

Sample:	Period:				Change (Baseline to Post-Order)	Change (Pre-Order to Post-Order)	
	Baseline	Pre-Order	Transition	Post- Order			
Order sample	2.84%	3.76%	4.60%	3.98%	1.14%**	0.22%	
Financial Control	1.67%	1.67%	1.93%	1.85%	0.18%	0.18%*	
Non-Financial Control	2.24%	2.09%	2.22%	2.19%	-0.05%	0.10%	
Differences							
Order - Finance						0.97%*	0.04%
Order - Non-finance						1.20%**	0.13%

Tables 11 and 12 indicate how put and call option volume changed around the Emergency Order. Put option volume decreased from before the Order announcement to after the effective date of the Order, but this change was not statistically significant. Likewise, call option volume did not change statistically from the Pre-Order period to the

Post-Order period. The insignificant decline in option volume is not consistent with a migration of short sellers to the option markets.

Table 11
Put Volume

This table summarizes the average put volume for three different samples. The volume was reported as the number of shares in contracts traded divided by the number of shares outstanding of the underlying stock. The numbers were reported as percentages. The Order sample consisted of the 15 NYSE listed stocks given in the Emergency Order. The Financial Control sample consisted of 39 large domestic NYSE listed banks, brokerages, or credit providers that were not included in the Order. The Non-Financial Control sample consisted of 39 large domestic NYSE listed stocks that were not in any financial industry. The Baseline period consisted of 20 randomly selected trading dates between October 11, 2007 and June 11, 2008. The Pre-Order period was from June 12 to July 11. The Transition period, which contained the announcement of the Order, was from July 14 to July 18. The Post-Order period was from July 21 to August 12. Statistical significance of the changes and differences are indicated by * for significance at the 5% level and ** for significance at the 1% level.

Sample:	Period:				Change (Baseline to Post-Order)	Change (Pre-Order to Post-Order)	
	Baseline	Pre-Order	Transition	Post- Order			
Order sample	0.24%	0.44%	0.73%	0.27%	0.03%	-0.16%	
Financial Control	0.06%	0.12%	0.20%	0.10%	0.04%*	-0.01%	
Non-Financial Control	0.06%	0.06%	0.07%	0.08%	0.02%	0.02%	
Differences							
Order - Finance						-0.01%	-0.15%
Order - Non-finance						0.01%	-0.18%

Table 12: Call Volume

This table summarizes the average call volume for three different samples. The volume was reported as the number of shares in contracts traded divided by the number of shares outstanding of the underlying stock. The numbers were reported as percentages. The Order sample consisted of the 15 NYSE listed stocks given in the Emergency Order. The Financial Control sample consisted of 39 large domestic NYSE listed banks, brokerages, or credit providers that were not included in the Order. The Non-Financial Control sample consisted of 39 large domestic NYSE listed stocks that were not in any financial industry. The Baseline period consisted of 20 randomly selected trading dates between October 11, 2007 and June 11, 2008. The Pre-Order period was from June 12 to July 11. The Transition period, which contained the announcement of the Order, is from July 14 to July 18. The Post-Order period was from July 21 to August 12. Statistical significance of the changes and differences are indicated by * for significance at the 5% level and ** for significance at the 1% level.

Sample:	Period:				Change (Baseline to Post-Order)	Change (Pre-Order to Post-Order)	
	Baseline	Pre-Order	Transition	Post- Order			
Order sample	0.18%	0.27%	0.55%	0.25%	0.06%	-0.03%	
Financial Control	0.05%	0.07%	0.14%	0.10%	0.05%**	0.03%	
Non-Financial Control	0.11%	0.09%	0.10%	0.11%	0.00%	0.02%	
Differences							
Order - Finance						0.02%	-0.05%
Order - Non-finance						0.07%	-0.05%

Analysis of the Pre-Borrow Emergency Order

Caveats:

The Transition period included an option expiration, so the option volume and open interest changes during the Transition period cannot be linked to the Order.

The Order did cover put option exercise, so the buyer of a put would have had to pre-borrow before exercising the put. This might have discouraged some option trading and made the options less desirable as a short selling option. Options can be exercised at any time, but much of the exercise occurs close to the expiration. The Order period, itself, did not contain any option expirations, but there could have been an expectation that the Order may extend to an option expiration.

General Market Quality

The tests in this section measure whether the Emergency Order had an effect on general market quality. We measured market quality using bid-ask spreads, quoted depth, and volume. Together, spreads and depths measure various aspects of liquidity. Spreads are imprecise measures of transaction costs and competition between liquidity providers. Quoted depths measure the willingness of specialists, market makers, and investors to post depth at the best prices.

Bid-Ask Spreads

Our analysis indicated that:

- Neither quoted nor effective spreads changed as a result of the Order. Therefore, average transaction costs do not appear to be affected by the Order.

Analysis:

The Emergency Order might have affected transaction costs for several reasons. Bid-ask spreads depend on the costs of market makers and specialists as well as the tradeoffs of investors who supply liquidity by placing limit orders that improve bid-ask spreads. To the extent that short sellers supply liquidity, the decline in short selling above may result in less liquidity supply, increasing bid-ask spreads. Conversely, the academic literature describes short sellers as informed relative to other market participants. Therefore, other market participants such as investors who place limit orders, market makers, and specialists may face lower costs with less short selling because they are less likely to trade with those with more information. These lower costs could translate into lower bid-ask spreads.

To get a quoted spread, we estimated a BBO (best bid and offer) for the stocks in each of our samples for quotes posted on NYSE, ARCA, Nasdaq, ADF, and ISE. We did not calculate an NBBO (national best bid and offer) because these five markets are responsible for almost all of the inside quotes in NYSE-listed stocks and the data contains fewer stale quotes for these markets than for others.

Table 13 reports the average quoted BBOs for each of our samples in each of our periods. The Order stocks had average quoted spreads of only a few cents as do the Non-Financial Control stocks, but the financial control stocks have spreads that were, on average, higher. Quoted bid-ask spreads increased from the Pre-Order to the Post-Order periods. However, the increase for the Order stocks was not statistically different from the increase in other financial stocks. Therefore, average transaction costs do not appear to be affected by the Order.

Table 13
Quoted Bid-Ask Spreads

This table summarizes the time-weighted average quoted bid-ask spreads in cents for three different samples. The quoted spreads were an average daily BBO including only NYSE, ARCA, Nasdaq, ADF and ISE. The Order sample consisted of the 17 NYSE listed stocks given in the Emergency Order. The Financial Control sample consisted of 40 large domestic NYSE listed banks, brokerages, or credit providers that were not included in the Order. The Non-Financial Control sample consisted of 39 large domestic NYSE listed stocks that were not in any financial industry. The Baseline period consisted of 20 randomly selected trading dates between October 11, 2007 and June 11, 2008. The Pre-Order period was from June 12 to July 11. The Transition period was from July 14 to July 18, but currently does not contain data from July 15, the announcement day of the Order. The Post-Order period was from July 21 to August 12. Statistical significance of the changes and differences are indicated by * for significance at the 5% level and ** for significance at the 1% level.

Sample:	Period:				Change (Baseline to Post-Order)	Change (Pre-Order to Post-Order)	
	Baseline	Pre-Order	Transition	Post- Order			
Order sample	2.29¢	1.92¢	2.06¢	2.26¢	-0.03¢	0.34¢*	
Financial Control	4.86¢	4.75¢	6.14¢	5.83¢	0.97¢	1.08¢*	
Non-Financial Control	1.73¢	1.83¢	2.01¢	1.82¢	0.09¢	-0.01¢	
Differences							
Order - Finance					-1¢	-0.74¢	
Order - Non-finance					-0.12¢	0.35¢*	

Quoted spreads show the transaction costs posted in the market, but these can differ from actual transaction costs for several reasons. Investors may get better prices than those quoted because a specialist might choose to improve the price or the order interacts with hidden liquidity. Investors may get worse prices than those quoted if their order size exceeds the quoted depth. Finally, time-weighted average quoted spreads might not match average transaction costs because volume can be greater when spreads are higher.

To measure the transaction costs actually paid by investors, we estimated effective spreads. Effective spreads compare a transaction's execution price to the midpoint of the BBO at the execution time. This value is doubled to capture the whole effective bid-ask spread and, thus, measures the cost for a round trip transaction. Table 14 gives the sample effective spreads in cents. Average effective spreads for the Order stocks and Non-Financial Control stocks were slightly higher than quoted spreads, while those for the other financial stocks were slightly lower.

Average effective spreads for the Order stocks in the Post-Order period were lower than the Baseline period effective spreads but no different than effective spreads in the Pre-Order period. In fact, none of the samples experienced a significant change from the Pre-Order period to the Post-Order period. Therefore, this table suggests that the Order had no effect on effective spreads.

Table 14
Effective Spreads

This table summarizes the size-weighted average effective spreads in cents for three different samples. Effective spread compared a transaction's execution price to the midpoint of the BBO at the execution time. This value was doubled to capture the whole effective bid-ask spread. The Order sample consisted of the 15 NYSE listed stocks given in the Emergency Order. The Financial Control sample consisted of 39 large domestic NYSE listed banks, brokerages, or credit providers that were not included in the Order. The Non-Financial Control sample consisted of 39 large domestic NYSE listed stocks that were not in any financial industry. The Baseline period consisted of 20 randomly selected trading dates between October 11, 2007 and June 11, 2008. The Pre-Order period was from June 12 to July 11. The Transition period was from July 14 to July 18, but currently does not contain data from July 15, the announcement day of the Order. The Post-Order period was from July 21 to August 12. Statistical significance of the changes and differences are indicated by * for significance at the 5% level and ** for significance at the 1% level.

Sample:	Period:				Change (Baseline to Post-Order)	Change (Pre-Order to Post-Order)
	Baseline	Pre-Order	Transition	Post- Order		
Order sample	3.00¢	2.57¢	2.81¢	2.56¢	-0.44¢*	-0.01¢
Financial Control	3.98¢	4.00¢	5.60¢	4.36¢	0.38¢	0.36¢
Non-Financial Control	2.80¢	1.37¢	3.99¢	2.50¢	-0.30¢*	1.13¢
Differences						
Order - Finance					-0.82¢**	-0.36¢
Order - Non-finance					-0.14¢	-1.14¢

Caveats:

Some of the statistically significant changes in Tables 13 and 14 are smaller than a penny. Such small changes in spreads may not be economically meaningful.

Quoted Depth

Our analysis indicated that:

- Neither quoted ask depth nor quoted bid depth changed significantly for the Order stocks. Therefore, the willingness to post depth at the best prices does not appear to be affected by the Order.

Analysis:

If the Emergency Order discouraged short selling, this may change the quoted depth of the market. An increase in total quoted depth or quoted depth at the bid price may indicate that more investors are willing to supply liquidity when short sales are more restricted. Economically, this would occur if investors are afraid of trading with short sellers who may have better information, or simply if greater short selling restrictions boost investor confidence. On the other hand, the Emergency Order may have reduced quoted depth if it discourages the short selling that supplies liquidity at the ask when opening the position and supplies liquidity at the bid when covering the position.

To examine the depth, we accumulated the depth that matches the BBO ask or bid from NYSE, NASDAQ, ARCA, ADF, and ISE. Table 15 presents the average ask depth for our samples. The Baseline period quoted depth for the Order stocks was 45.48 round lots, or 4,548 shares. The period before the Order was associated with higher than Baseline period quoted ask depth for each of our samples, with small decreases in each sample from the Pre-Order period to the Post-Order period. None of these decreases are statistically significant and the decrease in the Order sample was not statistically different from the decrease in the control samples. Therefore, the Order appears to have had no impact on quoted ask depth.

Table 15
Quoted Ask Depth

This table summarizes the quoted ask depths at the estimated BBOs in round lots (100 share units) for three different samples. The Order sample consisted of the 17 NYSE listed stocks given in the Emergency Order. The Financial Control sample consisted of 40 large domestic NYSE listed banks, brokerages, or credit providers that were not included in the Order. The Non-Financial Control sample consisted of 39 large domestic NYSE listed stocks that were not in any financial industry. The Baseline period consisted 20 randomly selected trading dates between October 11, 2007 and June 11, 2008. The Pre-Order period was from June 12 to July 11. The Transition period was from July 14 to July 18, but currently does not contain data from July 15, the announcement day of the Order. The Post-Order period was from July 21 to August 12. Statistical significance of the changes and differences are indicated by * for significance at the 5% level and ** for significance at the 1% level.

Sample:	Period:				Change (Baseline to Post-Order)	Change (Pre-Order to Post-Order)
	Baseline	Pre-Order	Transition	Post- Order		
Order sample	45.48	68.03	59.91	53.6	8.12	-14.43
Financial Control	28.34	54.73	37.62	40.96	12.62	-13.77
Non-Financial Control	62.38	72.53	51.4	57.68	-4.7	-14.85
Differences						
Order - Finance					-4.5	-0.66
Order - Non-finance					12.82	0.42

We examine quoted bid depth separately in Table 16. The averages and each of the changes were similar to the findings on quoted ask depth above. Likewise, the results indicate that quoted bid depth was not affected by the Order.

Table 16
Quoted Bid Depth

This table summarizes the quoted bid depths at the estimated BBOs in round lots (100 share units) for three different samples. The Order sample consisted of the 17 NYSE listed stocks given in the Emergency Order. The Financial Control sample consisted of 40 large domestic NYSE listed banks, brokerages, or credit providers that were not included in the Order. The Non-Financial Control sample consisted of 39 large domestic NYSE listed stocks that were not in any financial industry. The Baseline period consisted 20 randomly selected trading dates between October 11, 2007 and June 11, 2008. The Pre-Order period was from June 12 to July 11. The Transition period was from July 14 to July 18, but currently does not contain data from July 15, the announcement day of the Order. The Post-Order period was from July 21 to August 12. Statistical significance of the changes and differences are indicated by * for significance at the 5% level and ** for significance at the 1% level.

Sample:	Period:				Change (Baseline to Post-Order)	Change (Pre-Order to Post-Order)
	Baseline	Pre-Order	Transition	Post- Order		
Order sample	49.26	67.17	57.02	52.75	3.49	-14.42
Financial Control	28.51	59.03	37.11	42.35	13.84	-16.68
Non-Financial Control			51.65k			
	63.7	69.48		57.62	-6.08	-11.86
Differences						
Order - Finance					-10.35	2.26
Order - Non-finance					9.57	-2.56

Limitations:

We did not examine depth beyond the estimated BBO. Some researchers advocate expressing depth in terms of distance from the mid-point of the BBO. For example, depth within 10 cents of the quote mid-point. This approach was robust to changes in the quoted spread but it required more information than was contained in our data. Therefore, we were confined to examining the depth at the BBO. Given the results above, we are not concerned that our results are any different than if we had considered depth beyond the BBO.

Volume

Our analysis indicated that:

- Despite the significant decrease in short selling volume, the Emergency Order did not affect stock volume, as measured by turnover.

Analysis:

In addition to the measures examined above, we also looked at volume. Volume may be impacted by the Emergency Order if there is a decline in short selling, as indicated above, or if the Order improves investors' confidence enough to encourage more investors to enter the market.

Table 17 shows how the Order affected volume. We measured volume as the turnover, which is the daily share volume divided by the shares outstanding, because this allowed us to standardize the volume across securities. The turnover of financial stocks seems to be much larger than the turnover of Non-Financial Control stocks and the turnover increased substantially during the week that the Order was announced. The table shows a decline in turnover for the Order stocks from the Pre-Order period to the Post-Order period but this decline was not statistically significant. In addition, while the two control samples saw small statistically insignificant increases in volume from the Pre-Order period to the Post-Order period, the changes for the Order stocks and the control samples were not statistically different. This indicates that the Emergency Order did not have an impact on volume.

Table 17: Turnover

This table summarizes the average turnover volume for three different samples. Turnover was measured as the daily share volume divided by the shares outstanding. The Order sample consisted of the 17 NYSE listed stocks given in the Emergency Order. The Financial Control sample consisted of 40 large domestic NYSE listed banks, brokerages, or credit providers that were not included in the Order. The Non-Financial Control sample consisted of 39 large domestic NYSE listed stocks that were not in any financial industry. The Baseline period consisted of 20 randomly selected trading dates between October 11, 2007 and June 11, 2008. The Pre-Order period was from June 12 to July 11. The Transition period, which contained the announcement of the Order, is from July 14 to July 18. The Post-Order period begins on July 21 and ends on August 12. Statistical significance of the changes and differences are indicated by * for significance at the 5% level and ** for significance at the 1% level.

Sample:	Period:				Change (Baseline to Post-Order)	Change (Pre-Order to Post-Order)
	Baseline	Pre-Order	Transition	Post- Order		
Order sample	2.45%	3.77%	7.02%	3.43%	0.97%	-0.35%
Financial Control	1.30%	2.08%	3.51%	2.21%	0.91%**	0.13%
Non-Financial Control	0.72%	0.78%	0.86%	0.81%	0.09%	0.03%
Differences						
Order - Finance					0.06%	-0.48%
Order - Non-finance					0.88%	-0.38%

Return Dynamics

Tests in this section examine returns and the distribution of returns. Several members of the media have claimed either success or failure of the Emergency Order based on return-based measures. We caution against drawing such strong conclusions, but report the statistics for comparison with those reported in the media. In particular, we focused on return volatility, returns, and asymmetry in returns or return volatility. Volatility is informative about the ability of the market to absorb temporary liquidity shocks, the rate that significant new information reaches the market, and the level of uncertainty about expected returns. Studying the asymmetry in returns and returns themselves might reveal whether the rule appeared to have dampened downward price pressure relative to upward price pressure.

Returns

Our analysis indicated that:

- Neither the expectation of the Emergency Order nor the implementation of the Emergency Order affected the stock returns of the stocks listed in the Emergency Order.

Analysis:

Some in the financial media have used price changes or returns to tout the success or failure of the Emergency Order. While we recognize that the purpose of the Emergency Order was not to artificially prop up the stock prices of the securities included in the Order, an examination of returns might still be useful, if only to respond to claims that returns can be used to judge the success or failure of the Order.

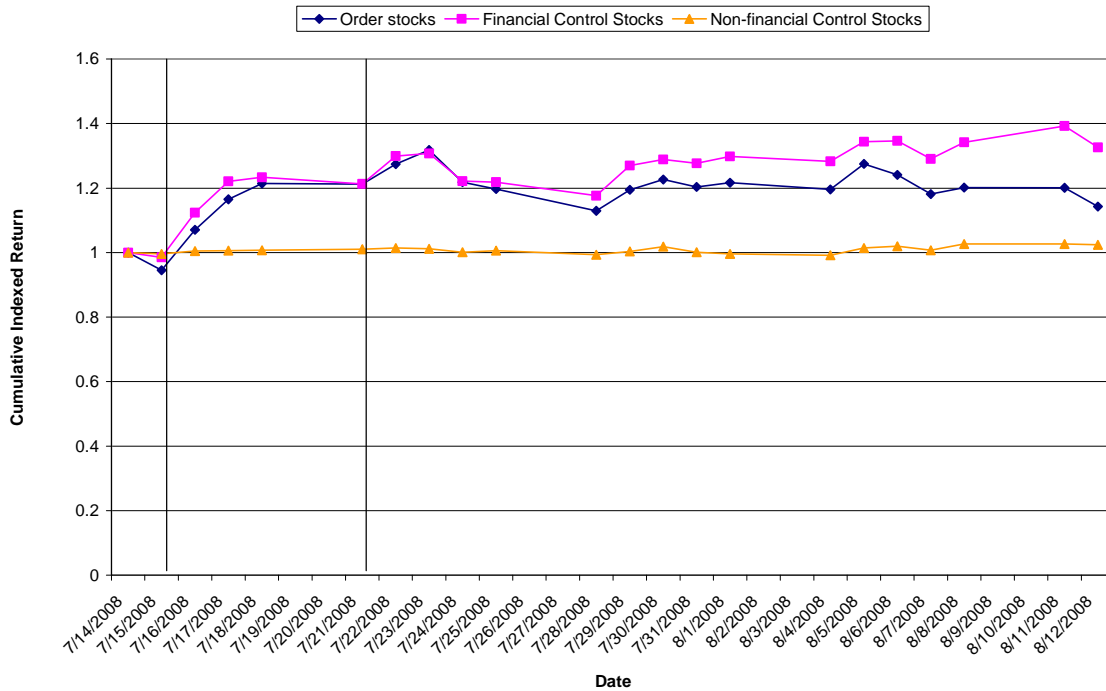
In general, we believe returns should not be used for this purpose. If there had been a major downward market break during this period, we could measure whether the rule slowed it down or made it less severe for one group of stocks. However, there was not.

Further, the reason for disagreement among members of the media stems from different observation or computation methods and different interpretations of the same results. Some have based their conclusions from looking at the number of Order stocks with prices that increased after the announcement of the Order. However, this type of analysis is flawed because it did not take into account what happened in the market in general or in other financial stocks, specifically. Others count the number of Order stocks with prices that fell relative to other financial stocks after the Order was implemented, but these analyses failed to consider when we would expect to see Order stocks deviate from other stock prices. In addition, the Order was not meant to prevent prices from falling.

Nonetheless, our returns analysis attempts to clarify the seemingly mixed results suggested by the media with the obvious caveat that our analysis will not allow us to ultimately judge the success of the Order as we do not believe this judgment can be made using returns.

Under certain economic assumptions, the market should fully anticipate future events at the announcement of the event. For the Order, this would predict that the market should have fully anticipated the mechanical effects of the Order on stocks prices upon hearing about the impending Order. Thus, market prices would have adjusted to the Order either mid-day on July 15 when the Order was first announced or overnight from the 15th to the 16th when the details of the Order were released. Therefore, we first examined the returns starting from those on July 15, 2008. These cumulative returns are shown in Figure 6.

Figure 6: Cumulative Returns during the Order, beginning at the Announcement.

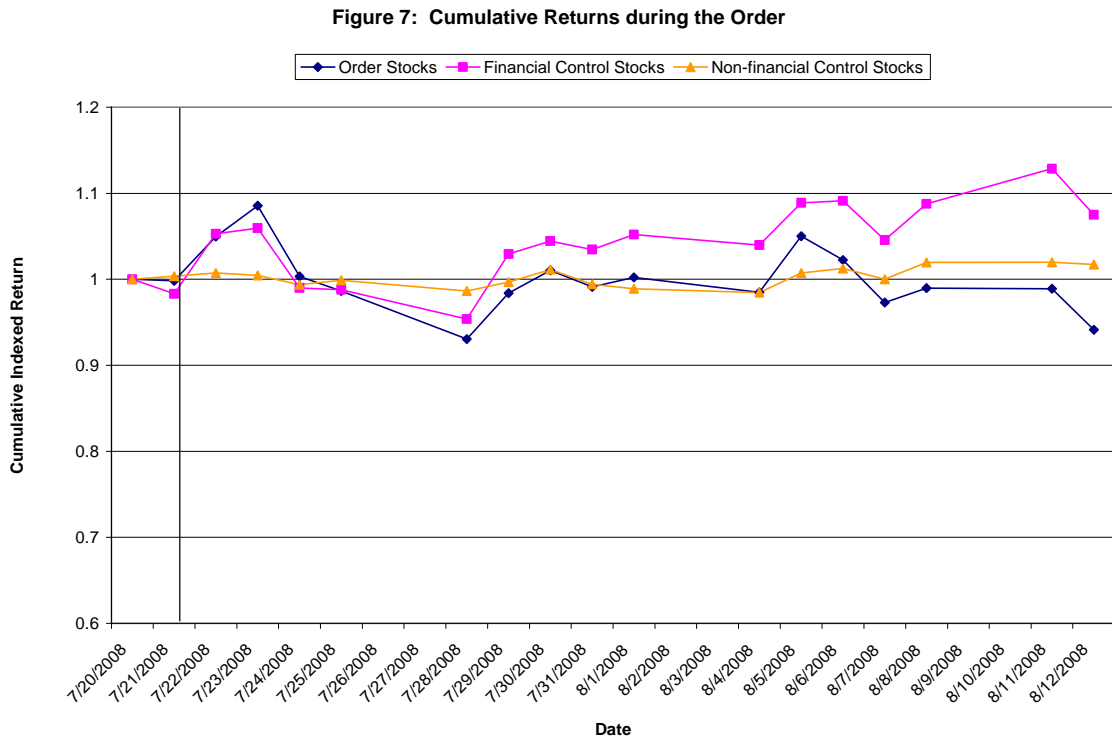


Returns were accumulated as equally weighted portfolios that have a value of 1 prior to trading on July 15. Therefore, any value greater than one represents positive cumulative returns and any value less than one represents negative cumulative returns. The Non-Financial Control stocks had almost no change in cumulative returns during this period. We interpret this as signifying a flat market, in general. The Order stocks experienced a slight drop in price on the announcement day but rallied in the days that followed with large positive returns. This rally was closely matched by other financial stocks, indicating that the rally was driven by factors that affected all financial stocks, not just those in the Order.

By the time the Order became effective, financial stocks were up an average of 20%. The returns of the Order stocks continued to track the returns of other financial stocks for

approximately another week, but then began to underperform other financial stocks. By the end of the Order, the financial control group was up about 40% since the announcement of the Order, while the Order stocks were up about 14%. The divergence in returns starts much later than would be expected if it was caused by the Order.

Some may argue that it would be more appropriate to assess the performance of the Order by measuring returns only during the Order. This approach is not consistent with the financial theory that the market would fully anticipate the Order, but it may capture any mechanical effect of the Order that were not anticipated. Figure 7 shows returns accumulated during the Order. In this figure, the returns were still accumulated as equally weighted portfolios that have a value of 1 prior to trading on July 21, 2008.



The returns of financial stocks were positive for the first few days of the Order, but the positive returns did not continue. Again, the chart shows flat returns for a portfolio of Non-Financial Control stocks. Starting in the second week of the Order, the Order stocks had cumulative returns that were lower than those of the other financial control stocks. This difference persisted and appeared to grow for the rest of the Order period. The Order stocks experienced an average negative cumulative return of 6% during the Order, other financial stocks experienced an average positive cumulative return of 7.5% and Non-Financial Control stocks saw positive cumulative returns of 1.7%. Again, we cannot attribute the underperformance of Order stocks to the Order because any effects of the Order should have begun immediately upon effectiveness of the Order.

Volatility

Our analysis indicated that:

- For most of our daily volatility measures, volatility increased for both the Order sample and the Financial Control sample. However, these increases were not statistically different from each other. Therefore, we can not attribute this increase in volatility to the Emergency Order.

Analysis:

We analyzed volatility over both daily and intraday periods to examine whether volatility changed at various horizons. Our first measure captures the daily volatility by examining the standard deviation of the returns measured from one day's closing price to the next day's closing price. Table 18 reports the results of this analysis. The Baseline period standard deviation of financial firms was much higher than that of Non-Financial Control firms. This is not a surprise since the Baseline period was still within the credit crisis. The volatility of financial stocks jumped dramatically during the Transition period around the Order announcement.

Table 18: Close to Close Daily Volatility

This table summarizes the average daily return standard deviations for three different samples. The standard deviations are reported as percentages. The Order sample consisted of the 17 NYSE listed stocks given in the Emergency Order. The Financial Control sample consisted of 40 large domestic NYSE listed banks, brokerages, or credit providers that were not included in the Order. The Non-Financial Control sample consisted of 39 large domestic NYSE listed stocks that were not in any financial industry. The Baseline period consisted of 20 randomly selected trading dates between October 11, 2007 and June 11, 2008. The Pre-Order period was from June 12 to July 11. The Transition period, which contained the announcement of the Order, is from July 14 to July 18. The Post-Order period was from July 21 to August 12. Statistical significance of the changes and differences are indicated by * for significance at the 5% level and ** for significance at the 1% level.

Sample:	Period:				Change (Baseline to Post-Order)	Change (Pre-Order to Post-Order)
	Baseline	Pre-Order	Transition	Post- Order		
Order sample	3.49%	3.81%	8.89%	4.88%	1.39%**	1.07%**
Financial Control	3.40%	3.82%	9.79%	4.94%	1.54%**	1.12%**
Non-Financial Control	1.83%	1.65%	1.68%	2.18%	0.36%**	0.53%**
Differences						
Order - Finance					-0.15%	-0.05%
Order - Non-finance					1.03%*	0.54%*

This result may reflect the tremendous uncertainty in these stocks. From the Pre-Order period to the Post-Order period, daily volatility increased for each of our samples. The increase in the Order Stocks was not statistically different from the increase for other financial stocks and was statistically larger than the change in the Non-Financial Control stocks. Therefore, Table 18 suggests that the Order did not dampen daily volatility.

The daily return volatility above captures the volatility during both trading and non-trading hours. The pre-borrow requirement in the Emergency Order would arguably have affected the volatility more during regular trading hours. While the pre-borrow requirement applied even after-hours, much of the volatility from the close one day to the open the next day was not due to trading at all, but rather to the release of new information. Therefore, to focus more on where the Order might have more of an effect we also examined whether it changed the volatility only during regular trading hours.

For this test, we estimated the returns on each day for each stock from the quote mid-point at the market open to the quote mid-point at the market close. We then calculated the standard deviation of these returns for each stock in each period and averaged across stocks. The magnitudes of the open to close volatilities, shown in Table 19, were similar to those of the daily volatilities in Table 18 above. However, the open to close volatility did not change as the daily volatility did. In particular, while daily volatility increased from the Pre-Order to the Post-Order period for all three samples, the open to close volatility did not increase for the Order stocks. The Order sample did experience higher open to close volatility than in the Baseline period, as did the two control samples. However, as with daily volatility, the changes in the Order sample did not differ from other financial stocks. Therefore, we cannot attribute any change in open to close volatility to the Emergency Order.

Table 19: Open to Close Daily Volatility

This table summarizes the average standard deviation of returns measured from the market open to the market close for three different samples. The numbers are reported as percentages. The Order sample consisted of the 17 NYSE listed stocks given in the Emergency Order. The Financial Control sample consisted of 40 large domestic NYSE listed banks, brokerages, or credit providers that were not included in the Order. The Non-Financial Control sample consisted of 39 large domestic NYSE listed stocks that were not in any financial industry. The Baseline period consisted of 20 randomly selected trading dates between October 11, 2007 and June 11, 2008. The Pre-Order period was from June 12 to July 11. The Transition period was from July 14 to July 18, but currently does not contain data from July 15, the announcement day of the Order. The Post-Order period was from July 21 to August 12. Statistical significance of the changes and differences are indicated by * for significance at the 5% level and ** for significance at the 1% level.

Sample:	Period:				Change (Baseline to Post-Order)	Change (Pre-Order to Post-Order)
	Baseline	Pre-Order	Transition	Post- Order		
Order sample	2.27%	4.38%	8.22%	4.40%	2.14%**	0.02%
Financial Control	2.75%	3.99%	9.02%	4.79%	2.03%**	0.79%*
Non-Financial Control	1.45%	1.41%	1.48%	1.70%	0.24%**	0.28%**
Differences						
Order - Finance					0.10%	-0.78%
Order - Non-finance					1.89%**	-0.26%

Another method to measure volatility during regular trading hours is to estimate the daily price range. This measure captures the difference between the high price of the day and the low price of the day. We standardized this difference by the midpoint of the high and

low prices. The high price tends to differ more from the low price when volatility is higher.

As we would expect, the daily price range magnitudes reported in Table 20 were higher than the standard deviations reported in Tables 18 and 19. As with the daily volatility reported in Table 18, the volatility was higher than the Baseline period for all samples around the Emergency Order and the volatility increased for all samples after the Order became effective. Because the increase in Order stocks was statistically similar to the increase in volatility in other financial stocks, the daily price range results support the earlier conclusions that volatility measured over daily periods was not dampened by the Order.

Table 20: Daily Price Range

This table summarizes the average daily price range for three different samples. The average daily price range was the difference between the highest trade price and the lowest trade price. The numbers are reported as percentages by dividing the difference by the midpoint of the high and low prices. The Order sample consisted of the 17 NYSE listed stocks given in the Emergency Order. The Financial Control sample consisted of 40 large domestic NYSE listed banks, brokerages, or credit providers that were not included in the Order. The Non-Financial Control sample consisted of 39 large domestic NYSE listed stocks that were not in any financial industry. The Baseline period consisted of 20 randomly selected trading dates between October 11, 2007 and June 11, 2008. The Pre-Order period was from June 12 to July 11. The Transition period, which contained the announcement of the Order, was from July 14 to July 18. The Post-Order period was from July 21 to August 12. Statistical significance of the changes and differences are indicated by * for significance at the 5% level and ** for significance at the 1% level.

Sample:	Period:				Change (Baseline to Post-Order)	Change (Pre-Order to Post-Order)
	Baseline	Pre-Order	Transition	Post- Order		
Order sample	3.84%	5.66%	10.65%	6.92%	3.08%**	1.26%**
Financial Control	4.40%	6.22%	12.02%	7.24%	2.85%**	1.02%**
Non-Financial Control	2.42%	2.55%	3.22%	2.86%	0.44%**	0.32%**
Differences						
Order - Finance					0.23%	0.24%
Order - Non-finance					2.64%**	0.94%**

Caveats:

As mentioned above, volatility can change for many reasons, including changes in the uncertainty regarding the economy. Therefore, changes in volatility are difficult to interpret and often controversial.

Asymmetry in Returns and Volatility

Our analysis indicated that:

- Return skewness appears to be unaffected by the Order.
- The Order does not seem to have affected either positive or negative semi-variance, suggesting that the Order did not dampen downward volatility.

Analysis:

The section above examined whether the Emergency Order affected overall volatility. However, the Order was arguably designed with the intent to dampen downward volatility as opposed to overall volatility. Further, the literature on short selling constraints has shown that the level of asymmetry in returns can be affected by the regulation of short selling. Therefore, we examine statistics in this section that attempt to measure the asymmetry in downward returns and volatility.

Our first measure of asymmetry, skewness, is a statistical measure that captures whether returns tend to be extreme in one direction but not the other. A value of zero indicates that returns are symmetric, or just as likely to be positive as negative and the positive returns are typically just as extreme as the negative returns. In general, skewness values that are higher than zero indicate more extreme positive returns with most returns being slightly negative. The opposite is true for negative skewness. Theoretically, short selling constraints create negative skewness because they can dampen negative returns resulting in frequent small positive returns with infrequent, but large, negative corrections. If the Order imposed a significant enough constraint on short selling to affect returns in this manner, we would expect to observe lower return skewness after the Order became effective.

Table 21 reports the skewness results for daily returns. We estimated skewness for returns measured over both five minute and daily horizons, but the results do not differ and thus, we show only the results for the daily intervals. The skewness in the returns for our samples tended to be positive instead of negative for many of the periods. The skewness of the Order stocks drops from 0.36 to 0.03, but this change was not statistically significant. Even though the Financial Control stocks had increasing skewness during this period, the difference in the changes was not statistically significant. Therefore, the Order appears to have had no effect on the symmetry of returns.

Table 21: Skewness in Daily Returns

This table summarizes the average skewness of returns for three different samples. The Order sample consisted of the 17 NYSE listed stocks given in the Emergency Order. The Financial Control sample consisted of 40 large domestic NYSE listed banks, brokerages, or credit providers that were not included in the Order. The Non-Financial Control sample consisted of 39 large domestic NYSE listed stocks that were not in any financial industry. The Baseline period consisted of 20 randomly selected trading dates between October 11, 2007 and June 11, 2008. The Pre-Order period was from June 12 to July 11. The Transition period, which contained the announcement of the Order, was from July 14 to July 18. The Post-Order period was from July 21 to August 12. Statistical significance of the changes and differences are indicated by * for significance at the 5% level and ** for significance at the 1% level.

Sample:	Period:				Change (Baseline to Post-Order)	Change (Pre-Order to Post-Order)
	Baseline	Pre-Order	Transition	Post- Order		
Order sample	0.51	0.09	0.00	0.10	-0.41*	0.01
Financial Control	0.33	0.53	0.26	0.18	-0.15	-0.35*
Non-Financial Control	0.03	0.02	0.32	0.16	0.13	0.14
Differences						
Order - Finance					-0.26	0.36
Order - Non-finance					-0.54*	-0.13

As mentioned above, the Order may also have dampened volatility on the downward side. Semi-variance measures return volatilities separately for positive returns and negative returns. As with skewness, we measured semi-variance over both daily and five-minute return horizons, but we report only the daily results. The negative semi-variance results are provided in Table 22.

Table 22: Negative Semi-Variance

This table summarizes the variance of negative daily returns for three different samples. The numbers are reported as basis points. The Order sample consisted of the 17 NYSE listed stocks given in the Emergency Order. The Financial Control sample consisted of 40 large domestic NYSE listed banks, brokerages, or credit providers that were not included in the Order. The Non-Financial Control sample consisted of 39 large domestic NYSE listed stocks that were not in any financial industry. The Baseline period consisted of 20 randomly selected trading dates between October 11, 2007 and June 11, 2008. The Pre-Order period was from June 12 to July 11. The Transition period, which contained the announcement of the Order, was from July 14 to July 18. The Post-Order period was from July 21 to August 12. Statistical significance of the changes and differences are indicated by * for significance at the 5% level and ** for significance at the 1% level.

Sample:	Period:				Change (Baseline to Post-Order)	Change (Pre-Order to Post-Order)
	Baseline	Pre-Order	Transition	Post- Order		
Order sample	3.61	9.81	26.78	10.29	6.68**	0.48
Financial Control	4.71	5.47	21.48	7.47	2.77**	2.01
Non-Financial Control	1.78	1.20	1.22	2.60	0.83	1.41*
Differences						
Order - Finance					3.91	-1.53
Order - Non-finance					5.85	-0.93

The results in Table 22 suggest that negative semi-variance has increased over time, but the Emergency Order did not reduce the semi-variance. Financial Control stocks experienced statistically significant increases from the Baseline period to the Post-Order period, but neither experienced changes from the period just before the Order to the period when the Order was in effect. None of the changes in any sample differed from other samples. The overall conclusions from this table are consistent with the overall variance results.

As one additional check, we also examined positive semi-variance to assess how asymmetric were the volatilities. Positive semi-variance results are found in Table 23. The results for the financial control stocks are similar to those in Table 22, but the positive semi-variance of the Order sample increased following the implementation of the Order, though this change was not statistically larger than the changes in other samples. Overall, this table does not find strong evidence suggesting that the Emergency Order resulted in a change in positive semi-variance. Therefore, the Emergency Order did not change the positive or negative semi-variance and did not affect the symmetry of volatilities.

Table 23: Positive Semi-Variance

This table summarizes the variance of positive returns for three different samples. The numbers are reported in basis points. The Order sample consisted of the 17 NYSE listed stocks given in the Emergency Order. The Financial Control sample consisted of 40 large domestic NYSE listed banks, brokerages, or credit providers that were not included in the Order. The Non-Financial Control sample consisted of 39 large domestic NYSE listed stocks that were not in any financial industry. The Baseline period consisted of 20 randomly selected trading dates between October 11, 2007 and June 11, 2008. The Pre-Order period was from June 12 to July 11. The Transition period, which contained the announcement of the Order, was from July 14 to July 18. The Post-Order period was from July 21 to August 12. Statistical significance of the changes and differences are indicated by * for significance at the 5% level and ** for significance at the 1% level.

Sample:	Period:				Change (Baseline to Post-Order)	Change (Pre-Order to Post-Order)
	Baseline	Pre-Order	Transition	Post- Order		
Order sample	8.34	5.86	30.12	9.57	1.24	3.71**
Financial Control	5.38	8.93	49.15	11.73	6.36**	2.80
Non-Financial Control	1.37	1.10	1.77	2.48	1.11*	1.38**
Differences						
Order - Finance					-5.12*	0.91
Order - Non-finance					0.13	2.33

Caveats:

Measures of skewness and semi-variance generally require a long time-series before they can detect any asymmetry in return dynamics. The mostly positive average skewness in Table 21 may be an indication that the sample periods were not long enough to accurately measure these statistics. Therefore, if the Order did result in more asymmetric returns or return volatility, our tests might not be able to detect it.

Appendix 1

Below is the list of the stocks affected by the Emergency Order (Order sample):

1. Included in the analysis

AZ
BAC
BCS
C
CS
DB
FNM
FRE
GS
HBC
JPM
LEH
MER
MFG
MS
RBS
UBS

2. Excluded from the analysis

BNPQF
BNPQY
DSECY

Financial Control sample

AF
AXP
BBT
BK
BLK
BOH
BXS
CFR
CMA
COF
CYN
DFS
DRL
GHL
JEF
KEY
LM
MI
MTB

Analysis of the Pre-Borrow Emergency Order

NAL
NCC
NYB
PNC
RF
RJF
SLM
SNV
SOV
STI
STT
STU
TCB
UB
USB
VLY
WB
WDR
WFC
WL
WM

Non-Financial Control sample

ABT
BA
BAX
BMY
CAT
COP
CVS
CVX
DIS
DNA
EXC
GE
HD
HPQ
IBM
JNJ
KFT
KO
LLY
LMT
MCD
MDT
MMM
MO
MON
MOS
MRK

Analysis of the Pre-Borrow Emergency Order

OXY
PEP
PFE
PG
PM
RIG
T
TWX
UPS
UTX
VZ
WMT
WYE
XOM