

Effects of Single Stock Circuit Breakers on Market Quality

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Introduction

- A circuit breaker is a mechanism employed to suspend trading temporarily in sudden, deep price falls and rises.
- Effective February 2, 2012, The Investment Industry Regulatory Organization of Canada (IIROC) has implemented single stock circuit breakers (SSCBs) to ensure "fair and orderly" market by:
- preventing extreme volatility (drastic rise and decline) in stock prices by giving investors more time to evaluate market information.
- reducing volatility driven by uninformed (noise) traders.
- protecting markets from periods of extreme illiquidity caused by uncertainty.
- preventing disruptive or erroneous orders in fully automated environments.

2. Circuit Breaker Mechanism

The SSCB is triggered when the price of a security swings 10% or more within 5 minutes, that is, it restricts both upside and downside movements. Once triggered, the trading of the security is halted for five minutes.



3. Objectives and practical contributions

- This study aims to investigate the effects of changing regulations on the performance and efficiency of securities markets.
- Policy makers and general public will have first-hand evidence concerning fundamental questions such as:
- Does the single stock circuit breaker approach accomplish desired results in stabilizing Canadian markets and enhancing pricing efficiency?
- Are the circuit breaker limits in Canada set appropriately?
- Would the markets perform better if price limits were to be removed?
- Can the circuit breakers identify market manipulators?

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4. Data and Methodology

- Sample Period: January 1, 2007 to December 31, 2016 The final sample includes stock returns of 1640 companies and 1,249,726 stock-day observations from trade on Toronto Stock Exchange.
- The daily single stock circuit breaker records from Investment Industry Regulatory Organization of Canada (IIROC).
- Event study analyses
- Short term AARs and CAARs around SSCB trading halts are investigated using the market model with GARCH (1,1).
- * Market Quality Analyses: Difference-in-Difference model to estimate the impact of the SSCB on overall market quality.
- several intraday volatility and liquidity measures are used to avoid possible measurement biases.

5. Price Discovery Results using Event Study Methodology

Average abnormal returns around the event date



Lower limit triggers

Intraday (-30 min, +30 min) returns around SSCB trading halts are also investigated.



Extreme abnormal price fluctuations are confined to the date of the SSCB event.



6. Market Quality Results using Difference in difference test

Pooled regressions including firm fixed effect

- $Perf_{i,t} = a + b_1 \operatorname{Treatment}_{i,t} + b_2 SSCB_{i,t} + b_3 (\operatorname{Treatment}_{i,t} \times SSCB_{i,t}) + u_{i,t}$
- $Perf_{i,t}$: Intraday decline and Intraday ascension as proxies of volatility. Turnover as proxy of liquidity
- $Treatment_{it} = 1$ if the stock i is subject to the SSCB, at time t, 0 otherwise.
- SSCB = 1 if the date t is in the post-breaker period and 0 otherwise.

Intraday decline	Coefficient	Rob.Std.Err	t-stat	p-value	
Treatment	-0.001166	0.000992	-1.1763	0.24	
SSCB	0.000145	0.000317	0.4568	0.648	
SSCB*Treatment	<mark>0.00125</mark>	<mark>0.000404</mark>	<mark>3.0969</mark>	<mark>0.002</mark>	***
R-squared=0.00012					
F=10.906028	p-value=0				
Intraday ascension	Coefficient	Rob.Std.Err	t-stat	p-value	
Treatment	-0.000862	0.000695	-1.2391	0.216	
SSCB	0.000363	0.000378	0.96	0.337	
SSCB*Treatment	<mark>-0.002197</mark>	<mark>0.000437</mark>	<mark>-5.0299</mark>	<mark>0</mark>	<mark>***</mark>
R-squared=0.00012					
F=10.906028	p-value=0				
Turnover	Coefficient	Rob.Std.Err	t-stat	p-value	
Treatment	-0.016617	0.028932	-0.5743	0.566	
SSCB	-0.031491	0.008965	-3.5126	0	***
SSCB*Treatment	<mark>0.022031</mark>	<mark>0.01287</mark>	<mark>1.7118</mark>	<mark>0.087</mark>	1
R-squared=0.00035					
F=4.533371	p-value=0.0036				

7. Conclusions

- The material information that caused the circuit breaker induced trading halt is incorporated in stock prices on the day of the halt.
- Evidence supporting enhanced price discovery
- The implementation of SSCB improves market quality by reducing intraday volatility of the stock market.
- SSCB's effect on improving market liquidity is insignificant

8. Work in Progress using Intraday Data

- Data: TSX trades and quotes data time-stamped in nanoseconds from Jan. 2012 to Dec. 2017.
- Event period: (-20, 20) minutes around the trading halts.
- Market Quality measures:
- Trading activity : number of trades, volume of trades
- Liquidity: quoted, relative and effective spreads
- Short-term volatility: (high-low)/high mid-quotes in a 1-min interval.
- **Research Questions:**
- How do the SSCB halts affect different measures of market quality?
- Are there any differences between pre-halt and post-halt market quality between no-news and news related trading halts?

