NHH

Liquidity provision: Normal times vs Crashes

Ravi Jagannathan, Loriana Pelizzon, Ernst Schaumburg, Mila Getmansky Sherman, and Darya Yuferova

10th Emerging Markets Finance Conference · Mumbai · 12 December, 2019

Motivation

Handa and Schwartz (1996)

"Investors want three things from the markets: liquidity, liquidity, and liquidity."

Levine (2005)

A liquid and stable stock market promotes economic growth.

The "Flash Crash" of May 6, 2010...

- questions the stability of the financial markets
- and draws regulators attention to the liquidity provision process.

NHH

Motivation

Handa and Schwartz (1996)

"Investors want three things from the markets: liquidity, liquidity, and liquidity."

Levine (2005)

A liquid and stable stock market promotes economic growth.

The "Flash Crash" of May 6, 2010...

- questions the stability of the financial markets
- and draws regulators attention to the liquidity provision process.

Are liquidity providers during normal times different from liquidity providers during crashes?

NHH

Preview of the results

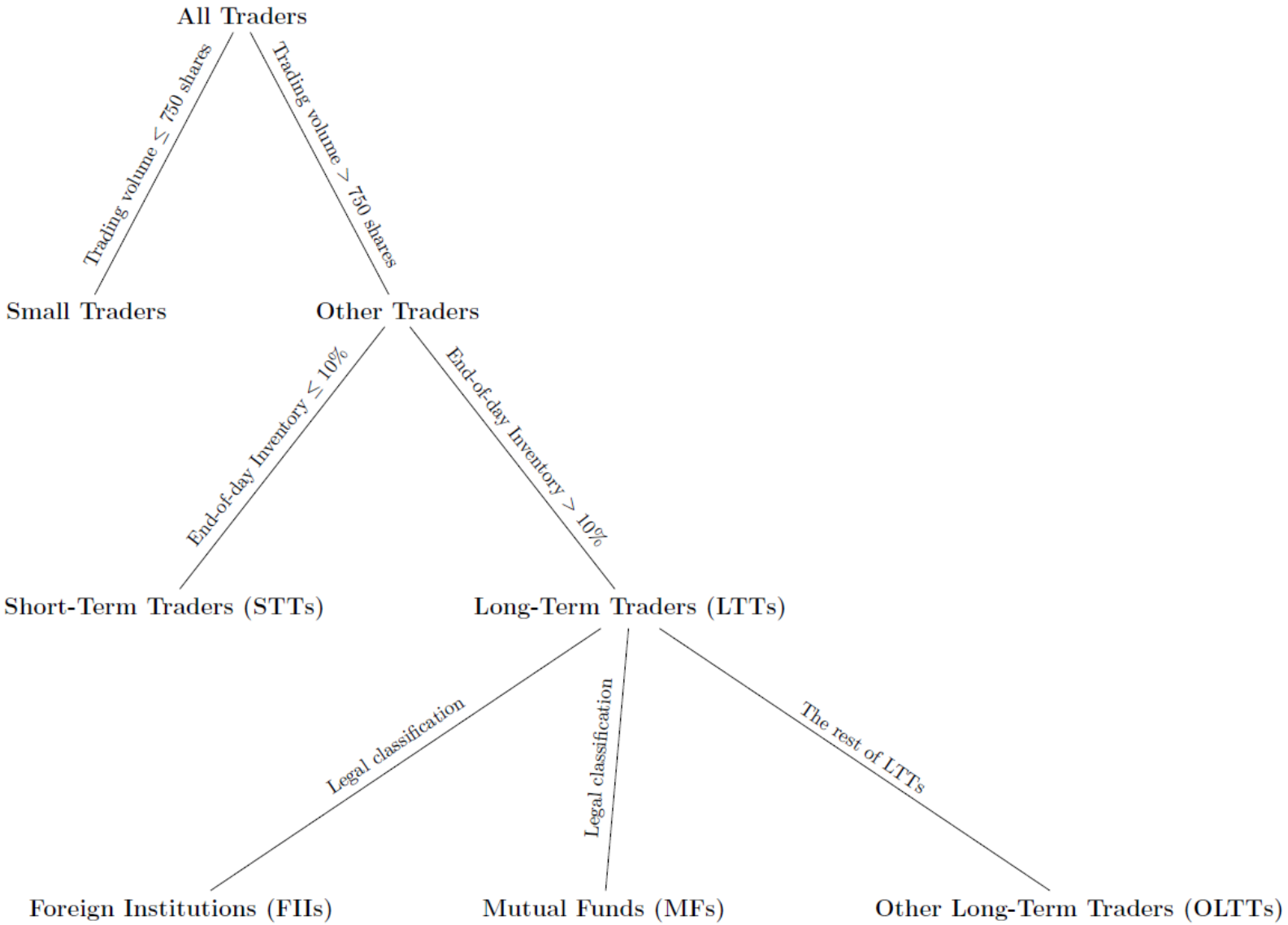
- Short-term traders are the main liquidity providers during normal times.
- During crashes, short-term traders do not have enough capacity to stabilize the market.
- Well-capitalized standby liquidity providers like mutual funds are needed to provide liquidity during crashes, but it takes time for them to move in.

NHH

Data

- Tick-by-tick order level data from National Stock Exchange of India
- Sample: Large anonymous firm
- Period: April-June, 2006 (includes both normal periods and two crash days)
- Markets: spot and single-stock futures
- No algorithmic trading allowed
- **Trader IDs and legal classification**

Traders Classification



Activity of different traders

	Active on spot market only		Active on both markets	
	# of traders	% of trading volume	# of traders	% of trading volume
Panel A: Spot market				
LTT	1,471	15.7%	219	6.7%
FII	107	5.5%	20	1.7%
MF	262	3.6%	6	0.1%
OLTT	1,102	6.6%	193	4.9%
STT	5,597	25.4%	950	35.6%
Small	90,646	16.3%	513	0.2%
Panel B: Futures market				
LTT	6,613	27.2%	219	3.9%
FII	40	0.9%	20	1.0%
MF	9	0.1%	6	0.0%
OLTT	6,564	26.2%	193	2.8%
STT	19,574	39.0%	950	28.6%
Small	5,628	1.2%	513	0.1%

Activity of different traders

	Active on spot market only		Active on both markets	
	# of traders	% of trading volume	# of traders	% of trading volume
Panel A: Spot market				
LTT	1,471	15.7%	219	6.7%
FII	107	5.5%	20	1.7%
MF	262	3.6%	6	0.1%
OLTT	1,102	6.6%	193	4.9%
STT	5,597	25.4%	950	35.6%
Small	90,646	16.3%	513	0.2%
Panel B: Futures market				
LTT	6,613	27.2%	219	3.9%
FII	40	0.9%	20	1.0%
MF	9	0.1%	6	0.0%
OLTT	6,564	26.2%	193	2.8%
STT	19,574	39.0%	950	28.6%
Small	5,628	1.2%	513	0.1%

Activity of different traders

	Active on spot market only		Active on both markets	
	# of traders	% of trading volume	# of traders	% of trading volume
Panel A: Spot market				
LTT	1,471	15.7%	219	6.7%
FII	107	5.5%	20	1.7%
MF	262	3.6%	6	0.1%
OLTT	1,102	6.6%	193	4.9%
STT	5,597	25.4%	950	35.6%
Small	90,646	16.3%	513	0.2%
Panel B: Futures market				
LTT	6,613	27.2%	219	3.9%
FII	40	0.9%	20	1.0%
MF	9	0.1%	6	0.0%
OLTT	6,564	26.2%	193	2.8%
STT	19,574	39.0%	950	28.6%
Small	5,628	1.2%	513	0.1%

Liquidity provision during normal times

STTs are the main liquidity providers during normal times based on...

- Position in the trading network.
- Market-making index (Comerton-Forde, Malinova and Park (2018) and Korajczyk and Murphy (2019)).
- Contribution to the limit order book.

NHH

Liquidity provision during normal times

STTs are the main liquidity providers during normal times based on...

- Position in the trading network.
- Market-making index (Comerton-Forde, Malinova and Park (2018) and Korajczyk and Murphy (2019)).
- Contribution to the limit order book.

Liquidity provision during normal times

STTs are the main liquidity providers during normal times based on...

- Position in the trading network.
- Market-making index (Comerton-Forde, Malinova and Park (2018) and Korajczyk and Murphy (2019)).
- Contribution to the limit order book.

NHH

Liquidity provision during normal times

STTs are the main liquidity providers during normal times based on...

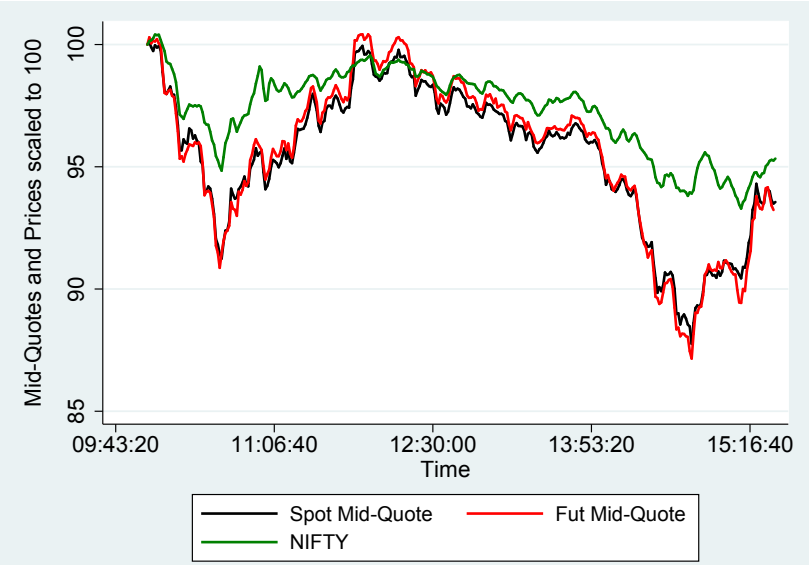
- Position in the trading network.
- Market-making index (Comerton-Forde, Malinova and Park (2018) and Korajczyk and Murphy (2019)).
- Contribution to the limit order book.

Identification of crashes

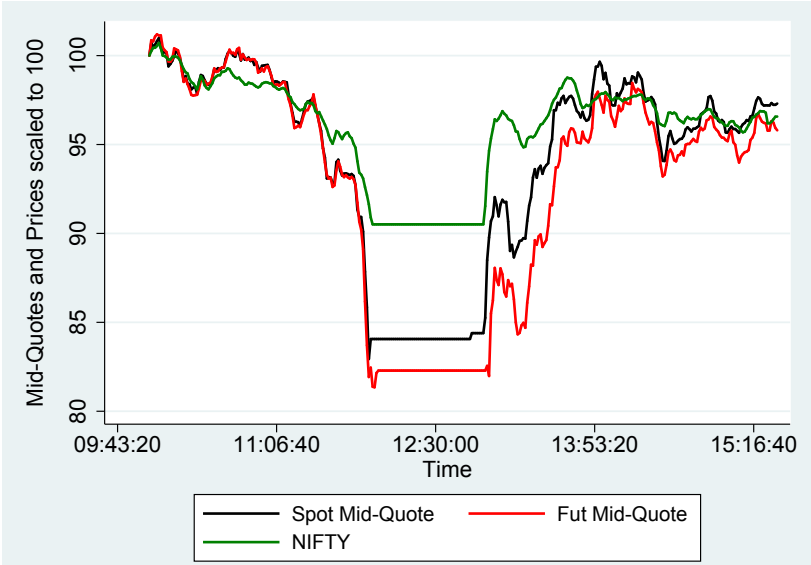
- Using drift-burst, developed by Christensen, Oomen and Renò (2016) and also used in Bellia, Christensen, Kolokolov, Pelizzon and Renò (2018).
- Using intuitive rule: greater than 3% drop in 15 minutes followed by greater than 3% recovery in 15 minutes.
- Both methods identify the same two crashes.

Two crash days

19th of May 2006



22nd of May 2006



Liquidity provision during crashes

- Different measures for liquidity provision during normal times vs crashes
  - Limit order book changes fast
  - Traders who provide liquidity will be buying rather than selling
- Liquidity provision during crashes = the trading volume in the opposite direction of the price decline.

The role of STTs as in Kirilenko et al. (2017)

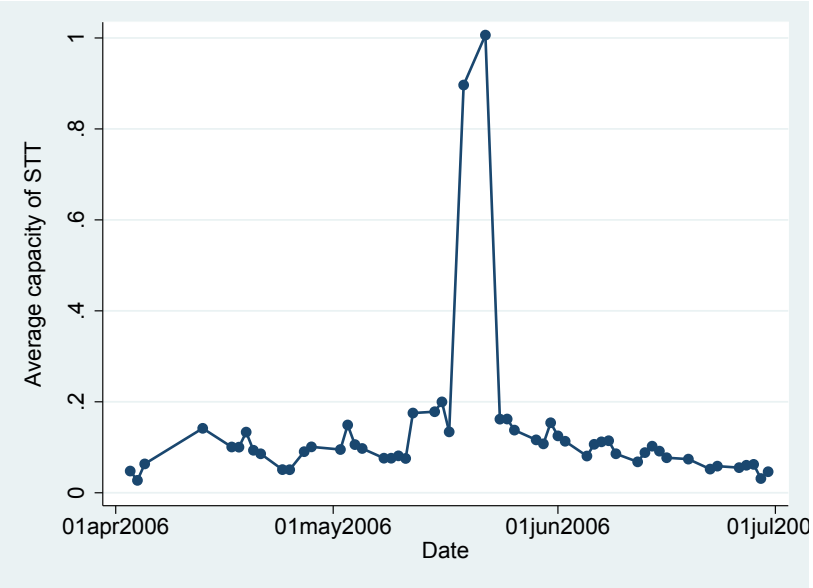
$\triangle Inv$	STT Spot	STT Futures
Return	69.02**	-235.59**
	(2.07)	(-2.44)
Down*Return	-274.02**	161.79
	(-2.53)	(0.63)
Up*Return	-111.07**	3.38
	(-2.50)	(0.02)
Down	3.26**	5.95**
	(2.44)	(1.99)
Up	-0.35	-3.76**
	(-0.33)	(-2.19)
Constant	-0.57	-0.98
	(-1.63)	(-1.22)
Observations	1,909	1,909
Adjusted R^2	0.162	0.099
Day and Time FE	Yes	Yes
Robust SE	Yes	Yes

The role of STTs as in Kirilenko et al. (2017)

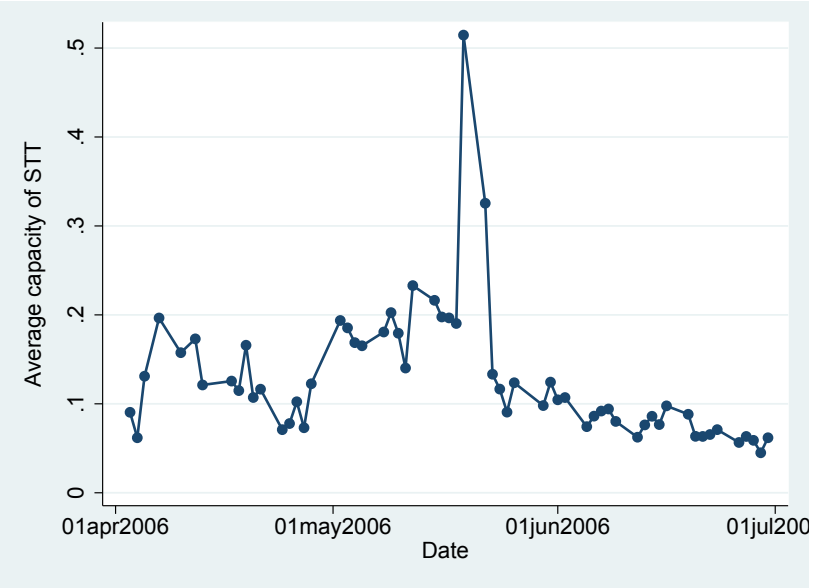
$\triangle Inv$	STT Spot	STT Futures
Return	69.02**	-235.59**
	(2.07)	(-2.44)
Down*Return	-274.02**	161.79
	(-2.53)	(0.63)
Up*Return	-111.07**	3.38
	(-2.50)	(0.02)
Down	3.26**	5.95**
	(2.44)	(1.99)
Up	-0.35	-3.76**
	(-0.33)	(-2.19)
Constant	-0.57	-0.98
	(-1.63)	(-1.22)
Observations	1,909	1,909
Adjusted R^2	0.162	0.099
Day and Time FE	Yes	Yes
Robust SE	Yes	Yes

The role of STTs: Inventory capacity breached on crash days

Spot market

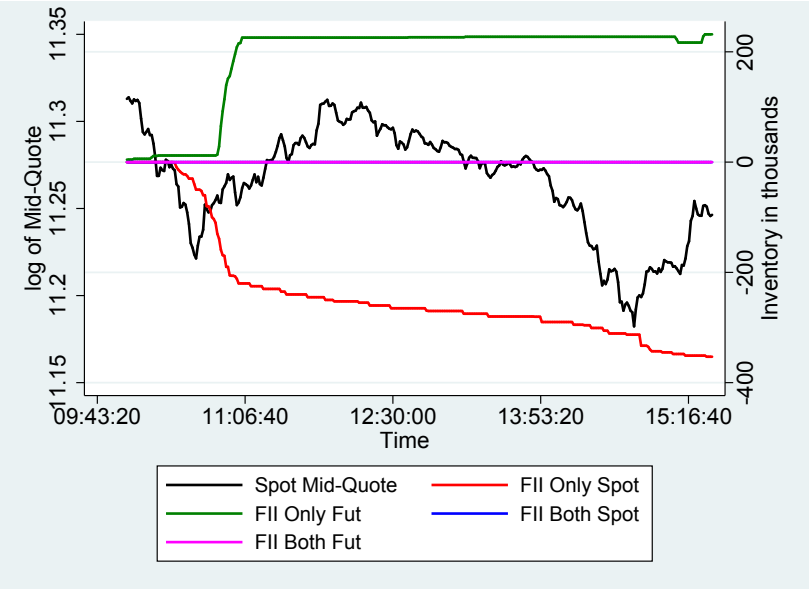


Futures market

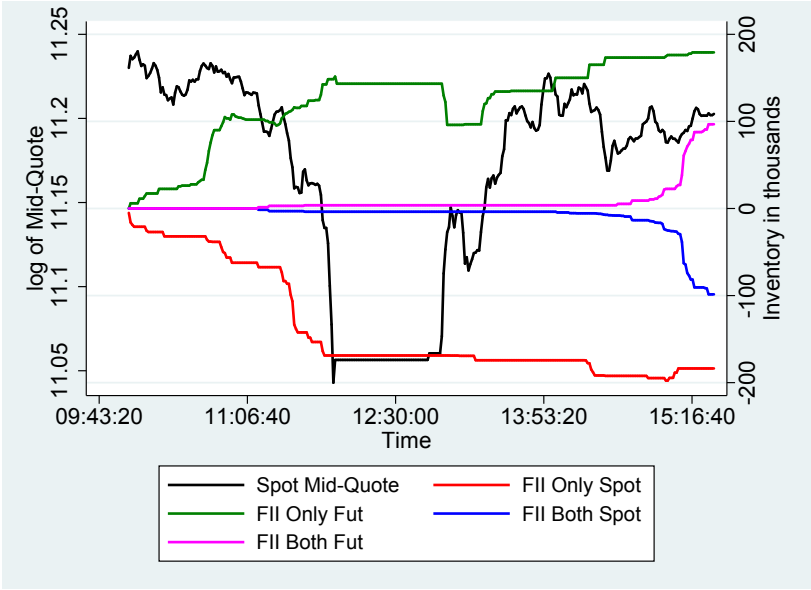


FIIs caused the crash

19th May

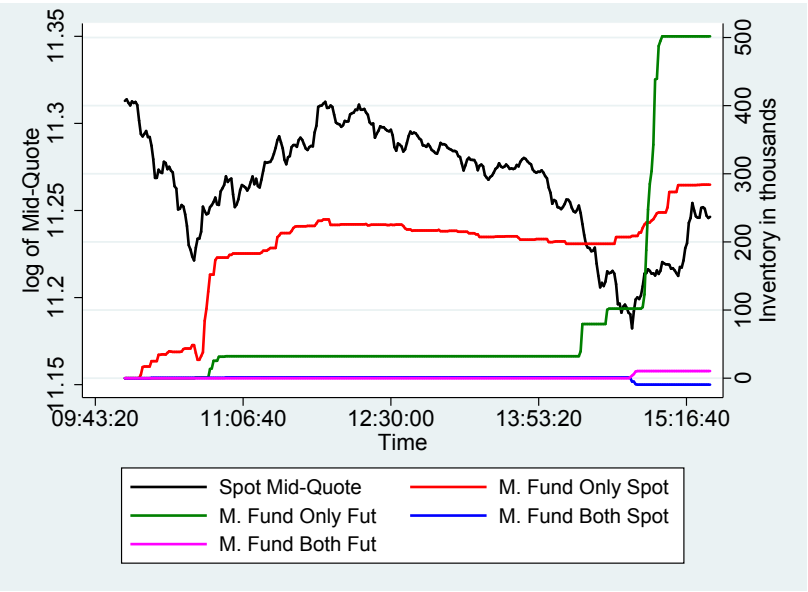


22nd May

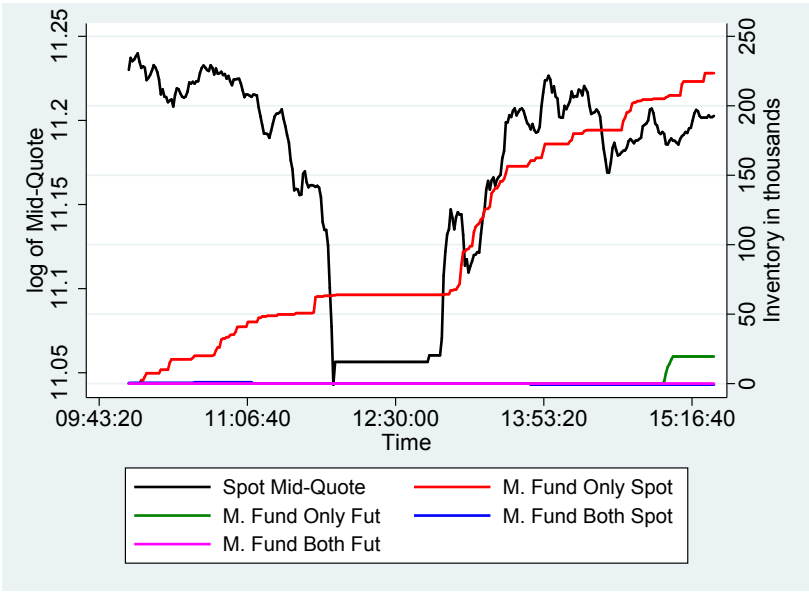


MFs helped recovery

19th May



22nd May



The role of MFs and FIIs: Granger causality on crash days

- Spot market
  - Order flow from MFs and FIIs Granger-causes returns.
  - Returns do not Granger-cause order flow from MFs and FIIs.
- Futures market
  - Order flow from MFs and FIIs does not Granger-cause returns.
  - Returns do not Granger-cause order flow from MFs.

Conclusion

- STTs are the main liquidity providers during normal times.
- Well-capitalized standby liquidity providers like MFs are needed to provide liquidity during crashes.
  - MFs are slow to move in.
  - It takes time to understand the reasons for the crash.
  - MFs may also require a large price concession.
  - Circuit breakers provide extra time, but not necessarily the monetary incentives.

NHH

Thank you

Thank you very much for your attention!

References I

Bellia, M., Christensen, K., Kolokolov, A., Pelizzon, L. and Renò, R. (2018). High-frequrncy trading during flash crashes: Walk of fame or hall of shame?, *Working Paper* .

Christensen, K., Oomen, R. C. and Renò, R. (2016). The drift burst hypothesis, *Working paper* .

Comerton-Forde, C., Malinova, K. and Park, A. (2018). Regulating dark trading: Order flow segmentation and market quality, *Journal of Financial Economics* **130**(2): 347–366.

Handa, P. and Schwartz, R. A. (1996). How best to supply liquidity to a securities market, *Journal of Portfolio Management* **22**(2): 44–51.

Kirilenko, A. A., Kyle, A. S., Samadi, M. and Tuzun, T. (2017). The Flash Crash: The impact of high frequency trading on an electronic market, *Journal of Finance* **72**(3): 967–998.

Korajczyk, R. A. and Murphy, D. (2019). High frequency market making to large institutional trades, *Review of Financial Studies* **32**(3): 1034–1067.

Levine, R. (2005). Finance and growth: Theory and evidence, *Handbook of Economic Growth* **1**: 865–934.