

The Future of Computer Trading in Financial Markets

A conference to discuss the Foresight Report



Systemic Risk Centre

Session 1. Impact of CBT on Market Quality

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Key conclusions on market quality

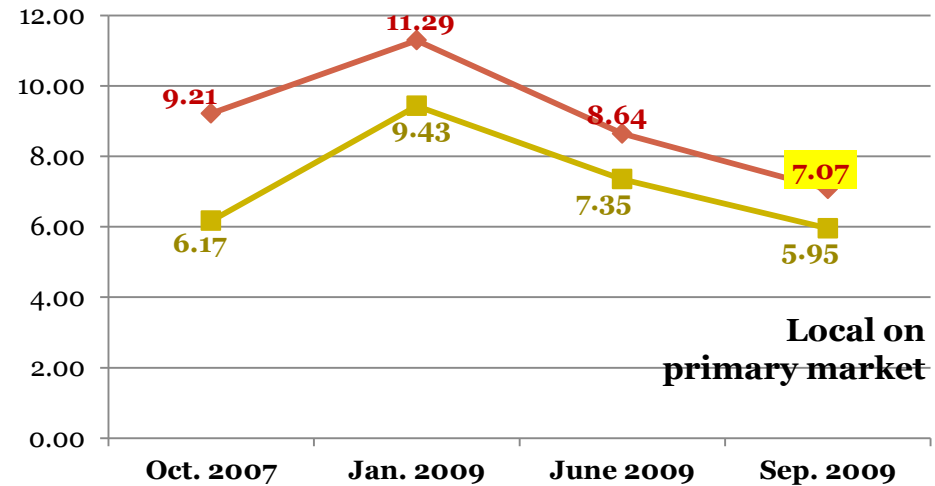
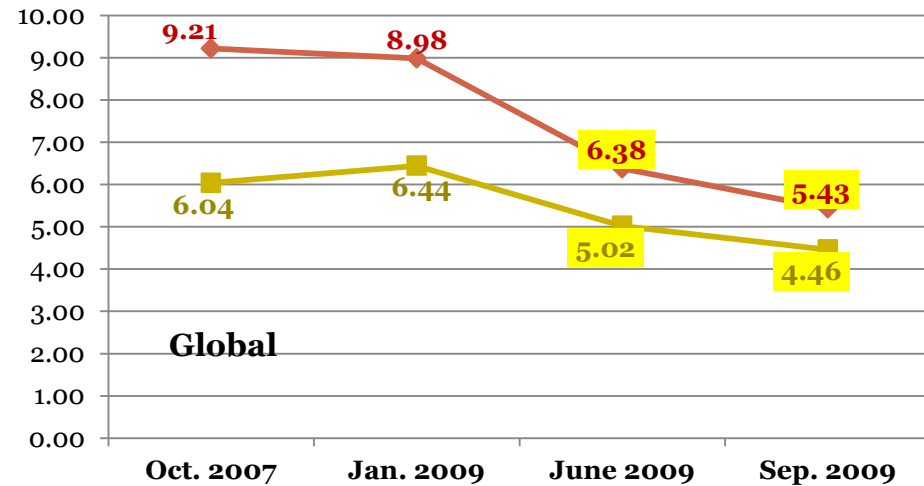


- **Beneficial effects**
 - Liquidity has improved.
(Angel et al., 2010; Castura et al., 2010; Frederich and Payne, DR5; Hendershott, 2011; Linton, DR1; Menkveld, 2012)
 - Transaction costs have fallen. (Angel et al., 2010; Menkveld, 2012)
 - Market prices become more efficient as CBT links markets & facilitates price discovery through information dissemination.
(Brogaard, DR10; Hendershott, DR12)
- **Potential risks**
 - Nature of market making has changed
=> Potential for periodic illiquidity
- **Message to policy makers**
 - Policies should catch up with those realities without undoing advantages brought by CBT/HFT

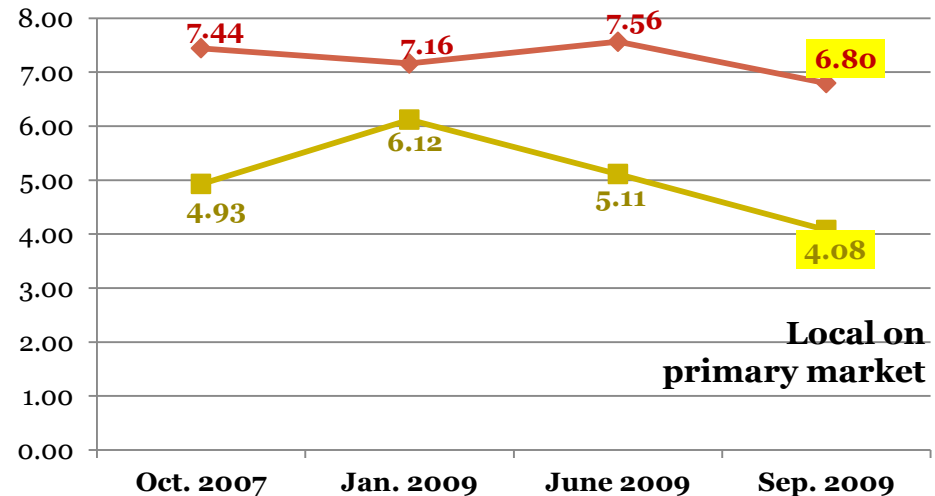
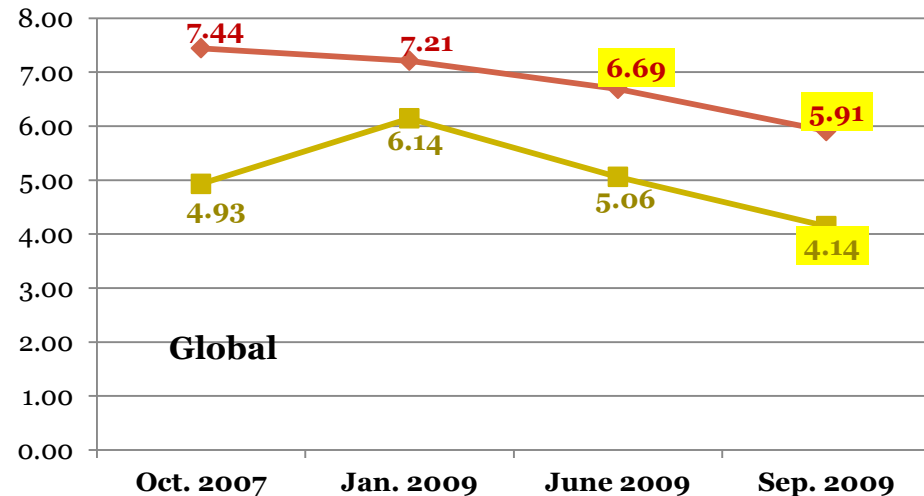
Yes, spreads have fallen.

FTSE 100
CAC 40

Average quoted spreads (in bp)



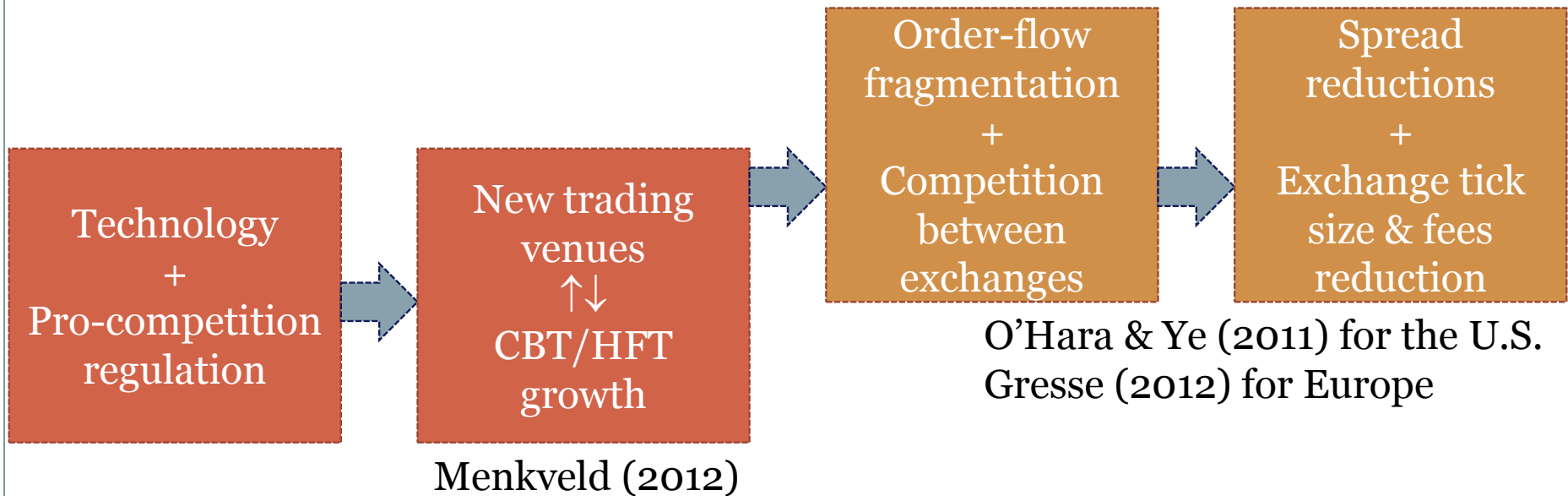
Average effective spreads (in bp) – Order book trades only



By which process?



1. Many HFT act as liquidity providers.
2. More competition



Post-MiFID time series analysis



• Methodology

- Daily observations from 1 Sep. to 30 Nov. 2009
- **152** securities:
64 FTSE-100 stocks / **32** CAC-40 stocks / **56** SBF-120 mid caps

1ST STAGE (OLS-estimated by index)

$$FI_{it} = g(\text{market value; volume; trade size; market competition; } FI_{it-1})$$

$$ITN_{it} = h(\text{market value; volume; trade size; market competition; } FI_{it-1})$$

2ND STAGE: PANEL REGRESSIONS

Liquidity_{it}

$$= \gamma_i + \gamma_t + \gamma(\text{control variables})_{it} + \gamma_1 \text{Liquidity}_{it-1} + \gamma_2 \hat{FI}_{it} + \gamma_3 \hat{ITN}_{it} + u_{it}$$

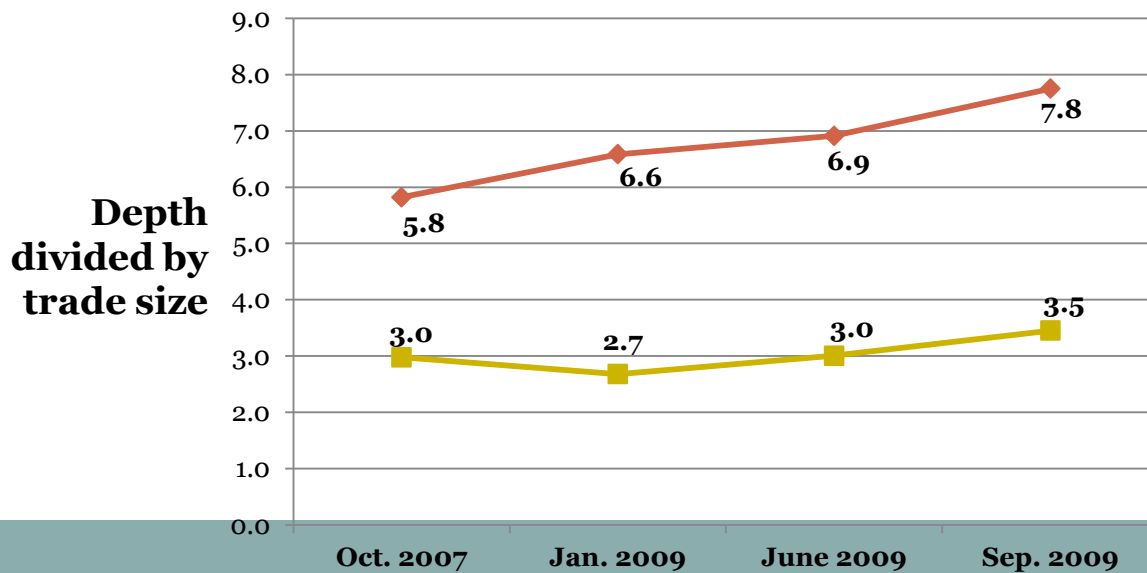
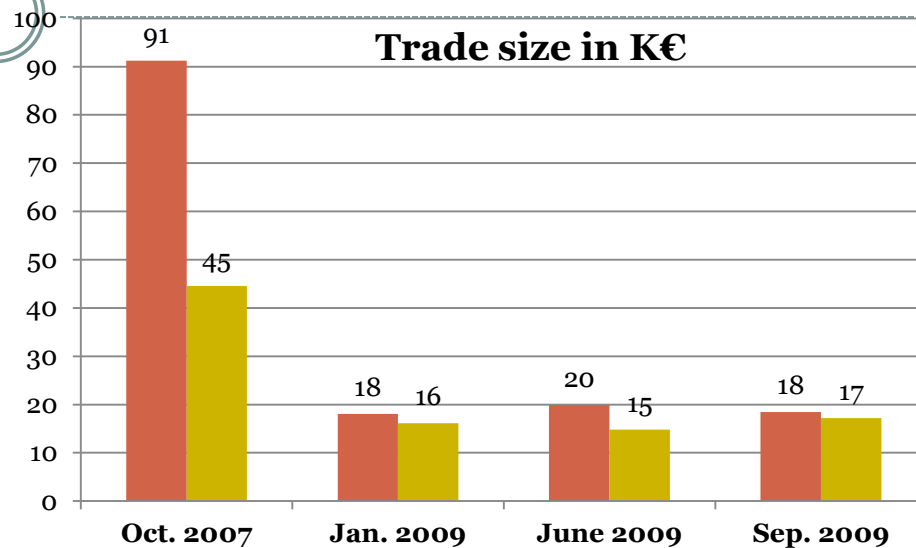
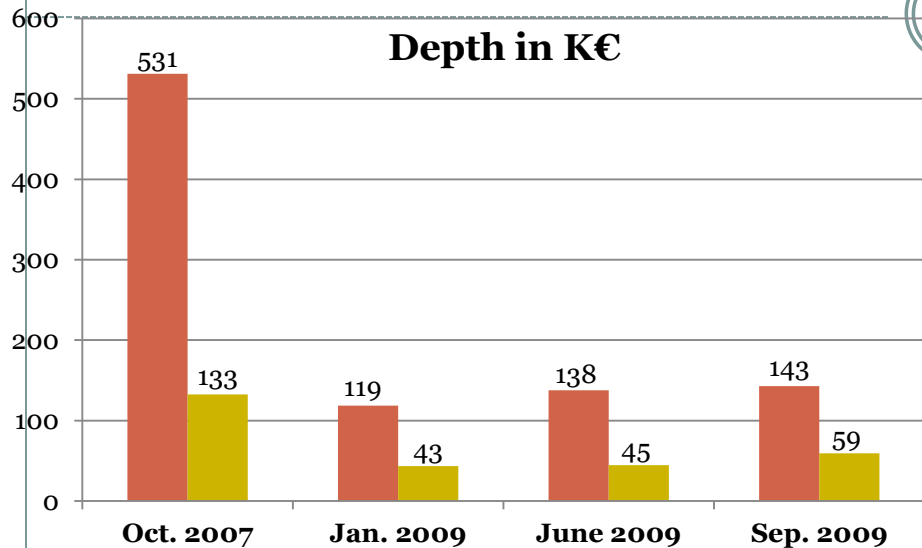
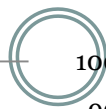
Post-MiFID time series analysis



Dependent variable	Independent variable	All	FTSE 100	CAC 40	SBF 120 (mid caps)
Global quoted spread	Predicted fragmentation ($\hat{F}I_{it}$)	-0.00019***	-0.00015***	-0.00030***	-0.00052***
	Predicted internalization ($\hat{I}TN_{it}$)	+0.00034***	+0.00012**	0.00000 (ns)	+0.00041*
Global effective spread	Predicted fragmentation ($\hat{F}I_{it}$)	-0.00075***	-0.00014***	-0.00288***	0.00109 (ns)
	Predicted internalization ($\hat{I}TN_{it}$)	+0.00041 (ns)	+0.00014***	+0.00089 (ns)	+0.00347*
Global quoted depth	Predicted fragmentation ($\hat{F}I_{it}$)	+0.10661***	+0.10231***	+0.11680**	-0.16491***
	Predicted internalization ($\hat{I}TN_{it}$)	+0.66626***	+0.68358***	+0.10420 (ns)	+0.33596***

Similar findings for local liquidity in the PM


But what about depth?



FTSE 100
CAC 40

What should we investigate more?



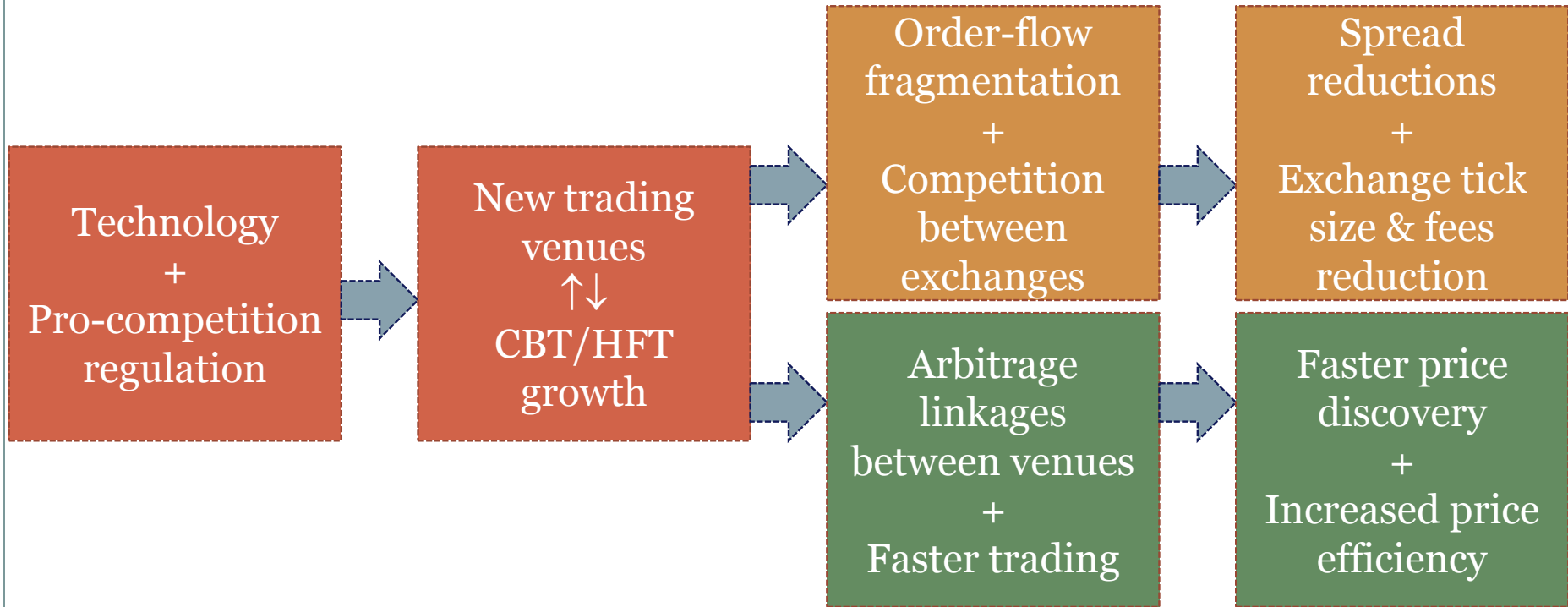
- Differences between Europe and the U.S.
 - O'Hara and Ye (2011) in the U.S.:
Fragmentation benefits are greater for small equities.
 - Degryse et al. (2011), Gresse (2012) in Europe:
Fragmentation may harm depth for small equities
- Trade throughs
- Ghost liquidity
 - Van Kervel (2012): Displayed depth \neq actual depth / overstated
Duplicated limit orders & cancellations
- Use accurate HFT data
 - European Financial Data Centre 

Yes, CBT can improve efficiency & facilitate price discovery.



- HFT trades & quotes contribute more to price discovery than those of others.
(Brogaard, 2010, Hendershott and Riordan, 2012)
- Variance ratios have improved in the U.S. over time.
(Castura et al., 2010)
- MTFs participate in price discovery.
(Riordan et al., 2010; Aitken et al., 2010; Gresse, DR19)

By which process?



O'Hara & Ye (2011)

What should we investigate more?



- **Differences between Europe and the U.S.**
 - Linton (DR1): No trend in price efficiency over time in the UK \neq Castura et al. (2010) in the U.S.
 - O'Hara and Ye (2011) in the U.S.: Price efficiency measured by variance ratios improve with fragmentation.
 - Gresse (2012) in Europe: No deterioration but no improvement.
- **Actual effect?**

Yes, the nature of market making has changed.



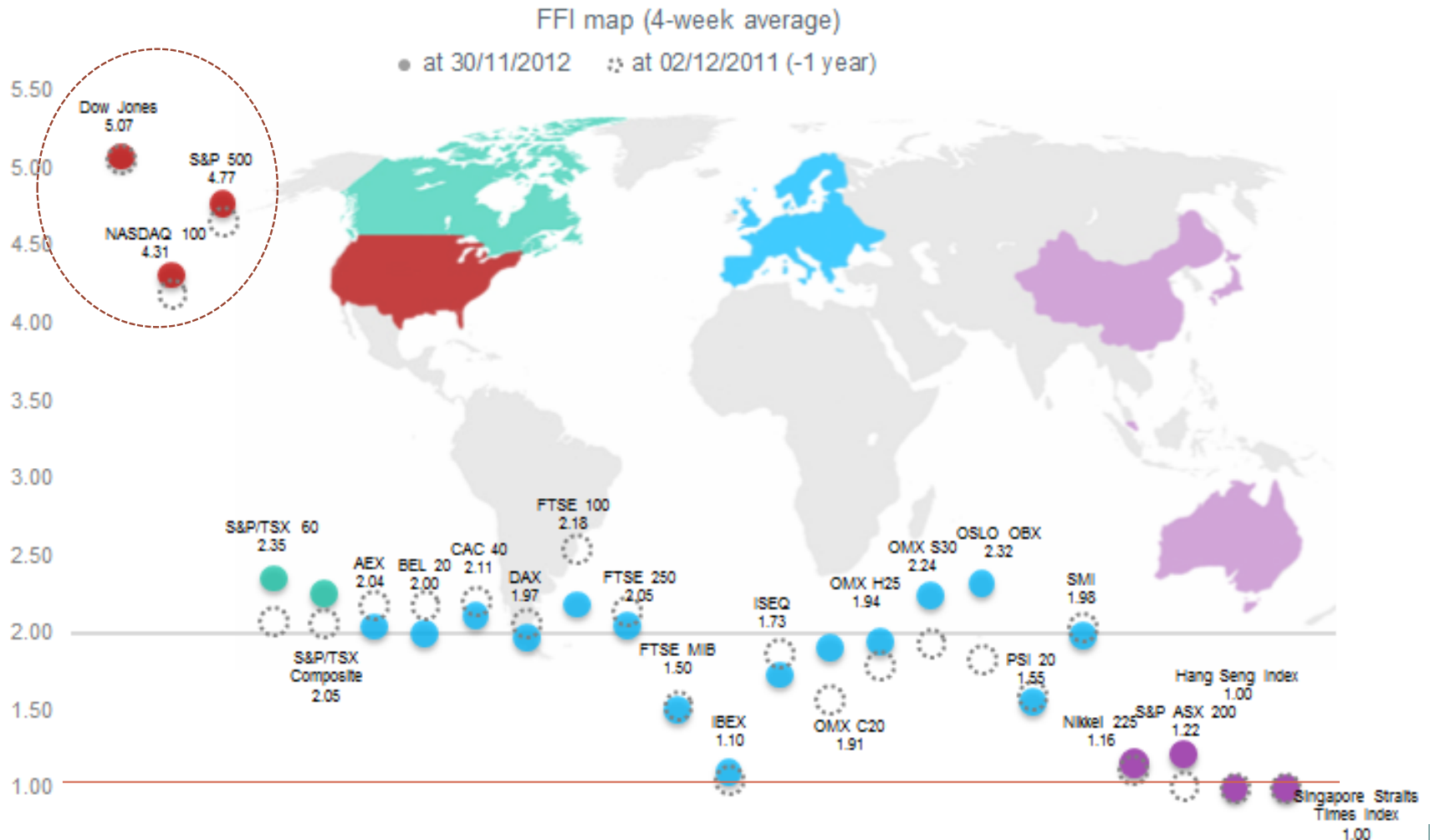
- **HF M-M**
 - Hold positions over very short periods.
 - Operate with very low level of capital.
 - Trade opportunistically / Not permanent M-M / Provide liquidity in good times but take it in bad times
- **Evidence from the Flash Crash of 6 May 2010**
 - Kirilenko et al. (2012):
“HFTs did not trigger the Flash Crash, but their responses to the unusually large selling pressure on that day exacerbated market volatility.”
- **Appropriate answers**
 - Coordinated circuit-breakers as mentioned in the report
 - HF liquidity providers with obligations?

- Fragmentation index

- Reciprocal of the Herfindahl concentration index

$$FI = \frac{1}{\sum(\text{market share in trading volumes})^2}$$

Global fragmentation at a glance



Source: <http://fragmentation.fidessa.com>

Size of OTC trading?

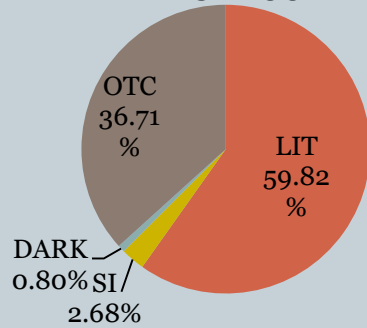


2009

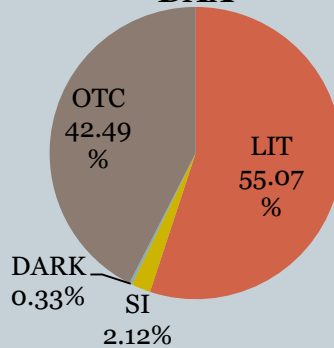
Europe

2012

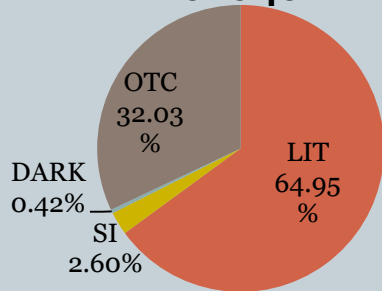
FTSE 100



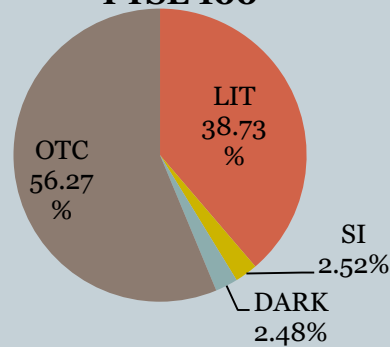
DAX



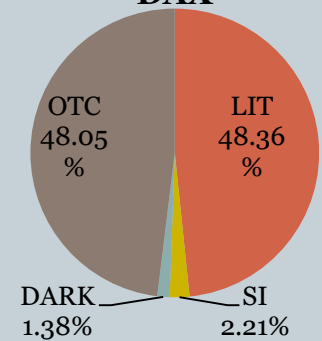
CAC 40



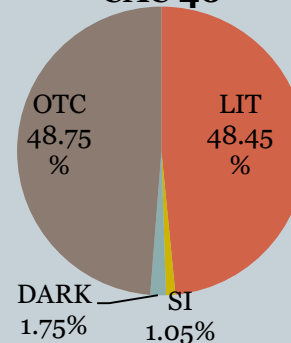
FTSE 100



DAX



CAC 40

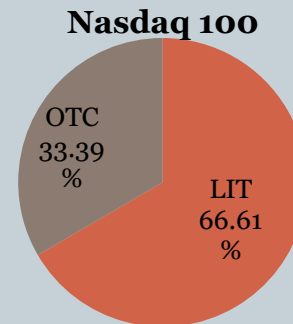
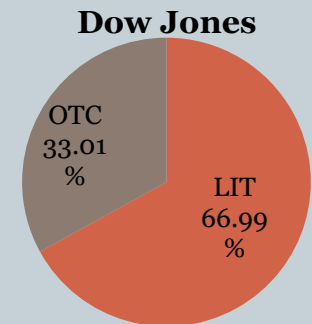
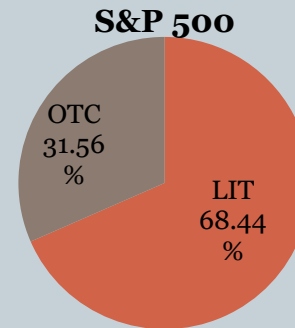
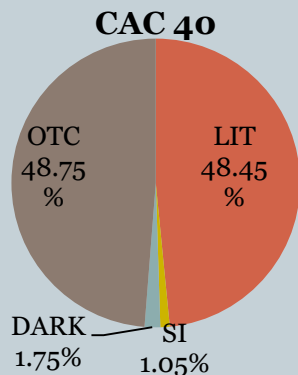
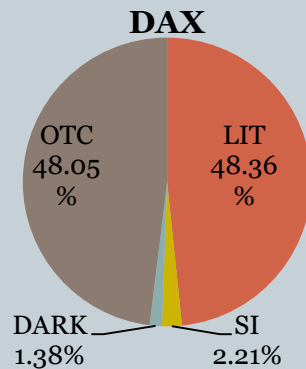
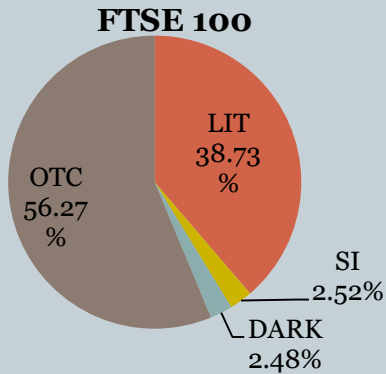


Share of OTC trading? – cont'd

2012

Europe

U.S.



Conclusion – Issues for the future



- **Size of OTC trading**
 - Is it related to CBT?
 - Is depth the problem?
 - Consequences for market quality?
 - Not informed / No impact on the informational content of prices (Jiang et al., 2012)
 - Effect on liquidity: depend on the sample / the period / the liquidity dimension / but generally not negative
 - More research needed
- **Level of fragmentation outside the US?**
- **Actual effect of CBT on depth and price efficiency**
- **Small stocks?**