Données haute fréquence

Analyse et modélisation statistique multi-échelle de séries chronologiques financières

Cours de Master - Paris 6

Transparents des Parties I et II
Marchés - Produits financiers - Carnets d'ordre

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TABLE 2.2 Numbers of archived ticks of main FX rates.

Tick frequencies of main FX rates: (1) main rates against the USD, (2) main cross rates, and (3) main rates against historical currencies now replaced by the Euro (EUR).

FX rate	Period	Number of ticks	Frequency per business day
EUR-USD	Jan 1999 – May 2000	4,794,958	13,300
USD-JPY	Jan 1987 – May 2000	9,585,136	2,800
GBP-USD	Jan 1987 – May 2000	7,892,919	2,310
USD-CHF	Jan 1987 – May 2000	8,310,226	2,430
EUR-JPY	Jan 1999 – May 2000	1,897,007	5,250
EUR-GBP	Jan 1999 – May 2000	1,740,209	4,820
USD-DEM	Jan 1987 – Dec 1998	18,416,814	6,020
USD-FRF	Jan 1987 – Dec 1998	3,655,638	1,190
DEM-JPY	Oct 1992 – Dec 1998	1,316,933	712

Michael Dacorogna, Ramazan Gencay and Ulrich A Muller
An Introduction to High-Frequency Finance Academic Press (May 2001)

Données Sapiance-Capital, Londres

Bund - Euro dollar Order book movie

EuroStox order book movie Données Sapiance-Capital, Londres

Table 5.4. Some data for the two liquid French stocks in February 2001. The transaction volume is in number of shares.

| Quantity	France-Telecom	Total
Initial/final price (Euros)	90-65	157-157
Tick size (Euros)	0.05	0.1
Total # orders	270,000	94,350
# trades	176,000	60,000
Transaction volume	$75,6 \times 10^6$	$23,4 \times 10^6$
Average bid-ask (ticks)	2.0	1.4

Bouchaud J.-Ph. and Potters M.
Theory of Financial Risk and Derivative Pricing : From Statistical Physics to Risk Management Cambridge University Press, (2nd edition) 2003.
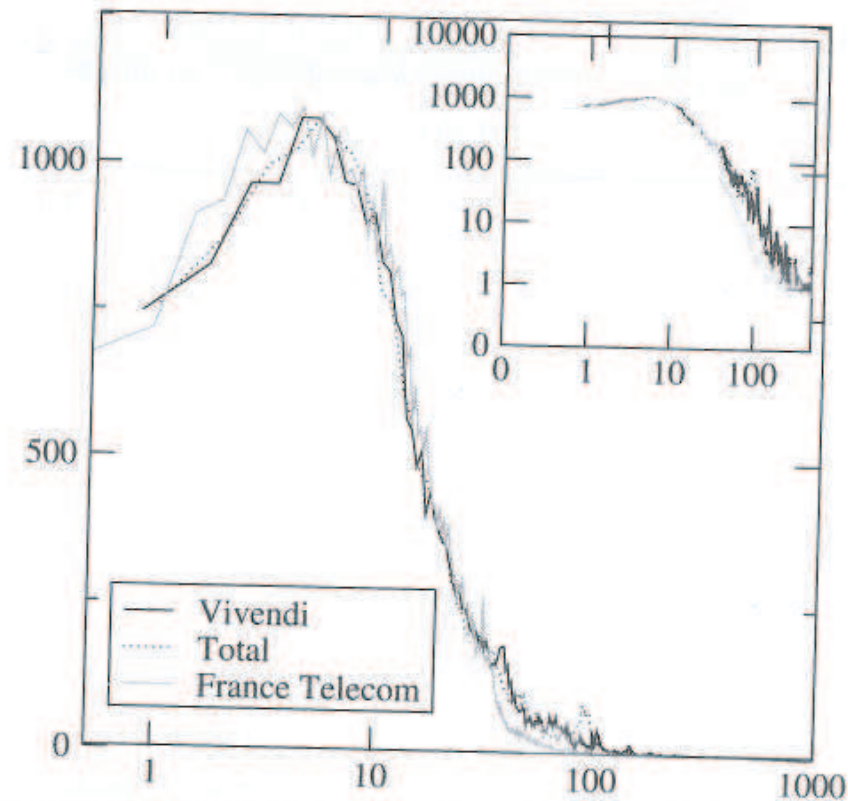
Fig. 5.3. Average size of the queue in the order book as a function of the distance from the best price, in a log-linear plot for three liquid French stocks. The 'buy' and 'sell' sides of the distribution are found to be identical (up to statistical fluctuations). Both axis have been rescaled such as to superimpose the data. Interestingly, the shape is found to be very similar for all three stocks studied. Inset: same in log-log coordinates, showing a power-law behaviour.
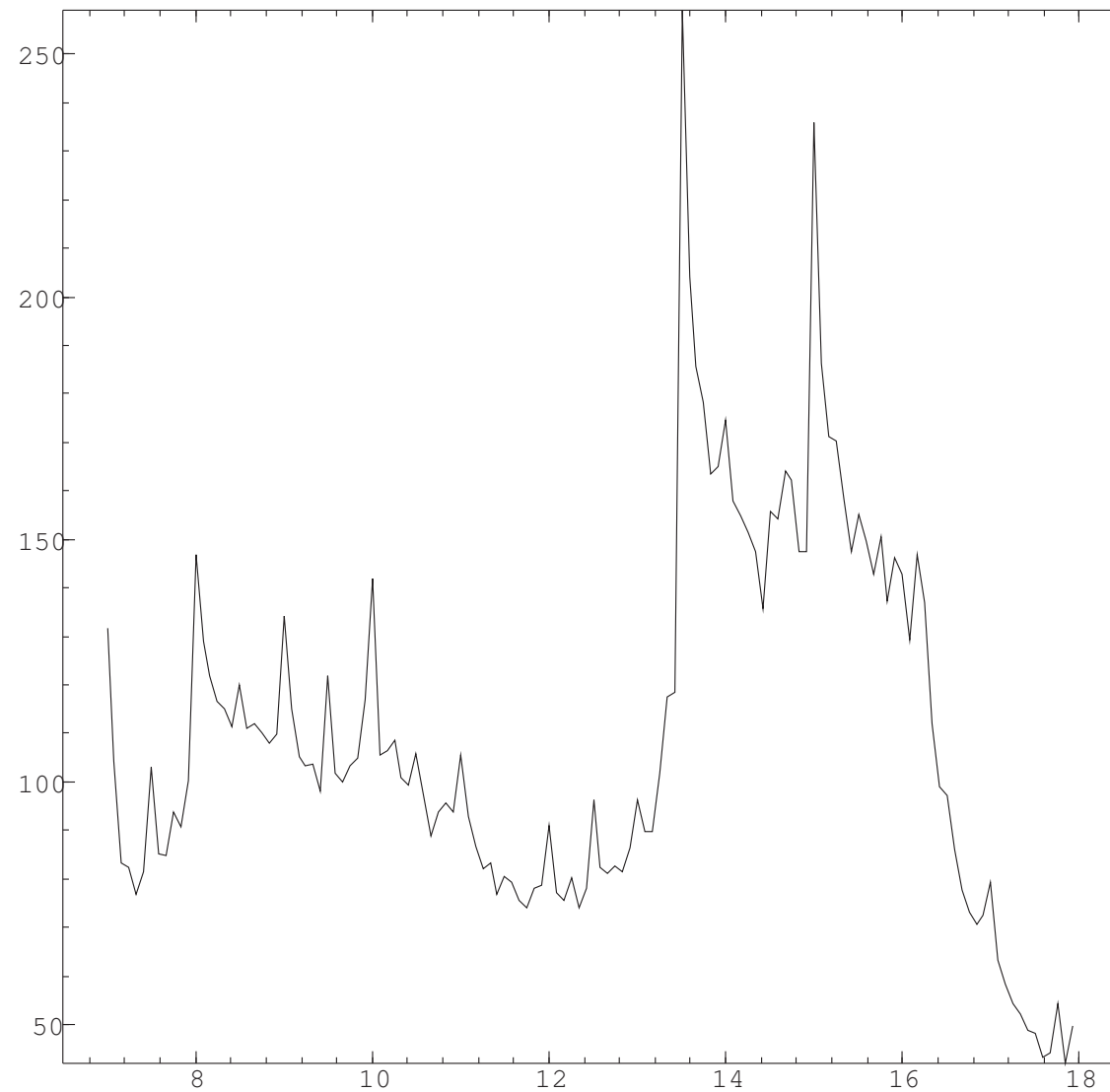
Bouchaud J.-Ph. and Potters M.

Theory of Financial Risk and Derivative Pricing : From Statistical Physics to Risk Management Cambridge University Press, (2nd edition) 2003.
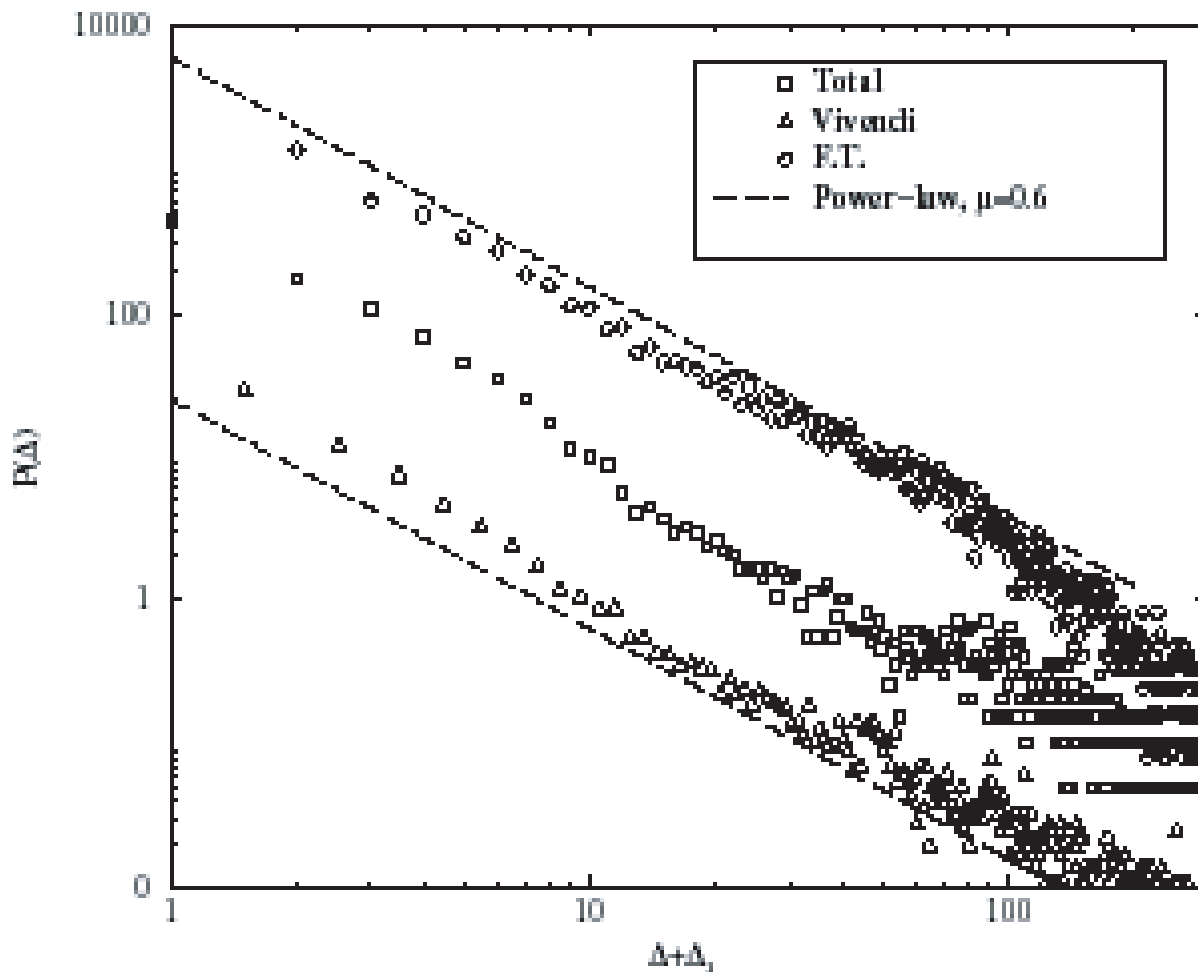
Bouchaud J.-Ph. and Potters M.
Theory of Financial Risk and Derivative Pricing : From Statistical Physics to
Risk Management Cambridge University Press, (2nd edition) 2003.
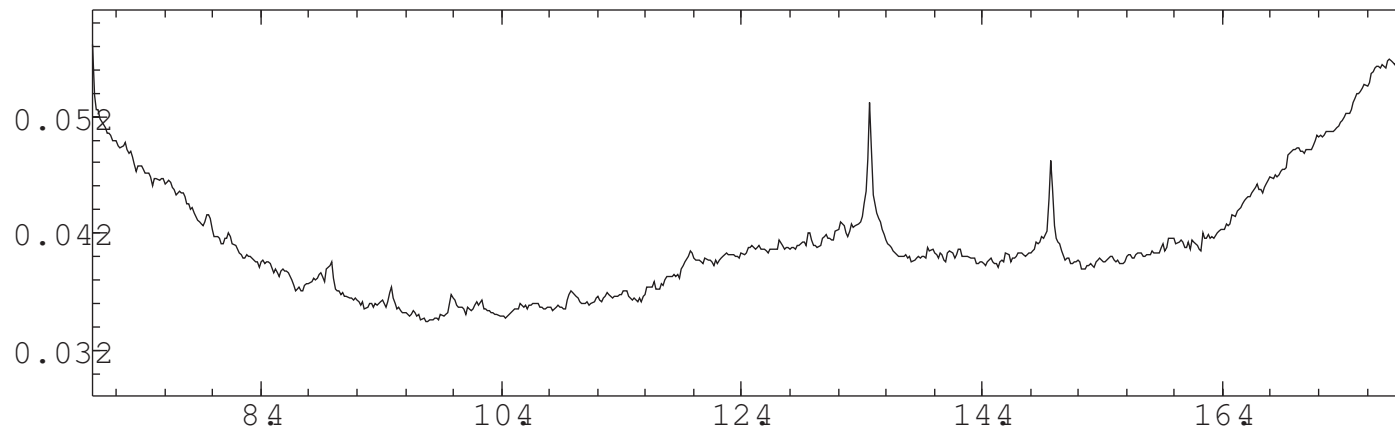
Futur sur Bund 2007 : Nombre d'ordres de marché ($\Delta t = 5$mn)
Données BNP-Paribas FIRST-ETG, Londres.
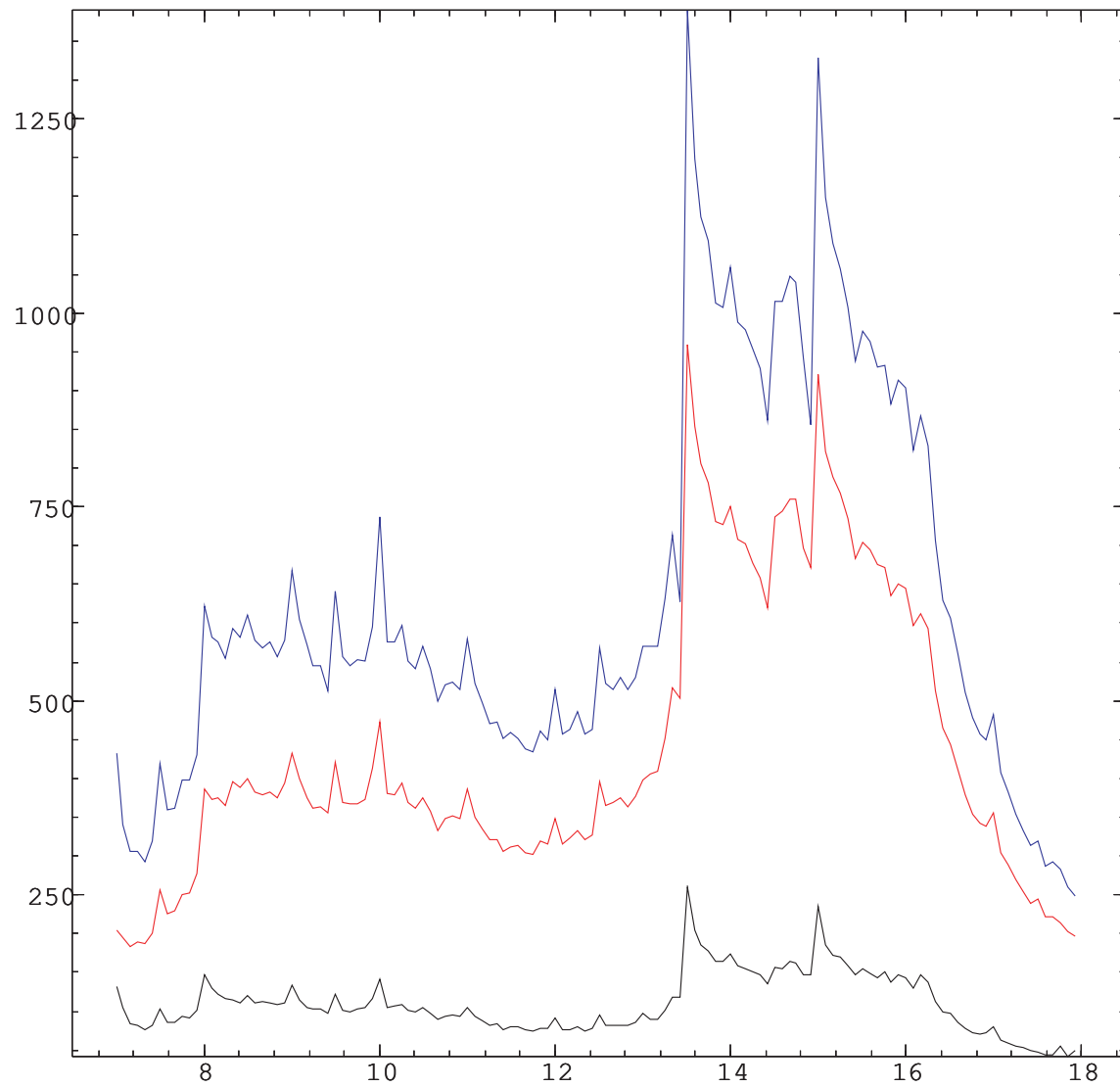
Futur sur Bund 2007 : Nombre d'ordres ($\Delta t = 5$mn)

bleu : ordres limites - rouge : annulations - noir : ordres de marché

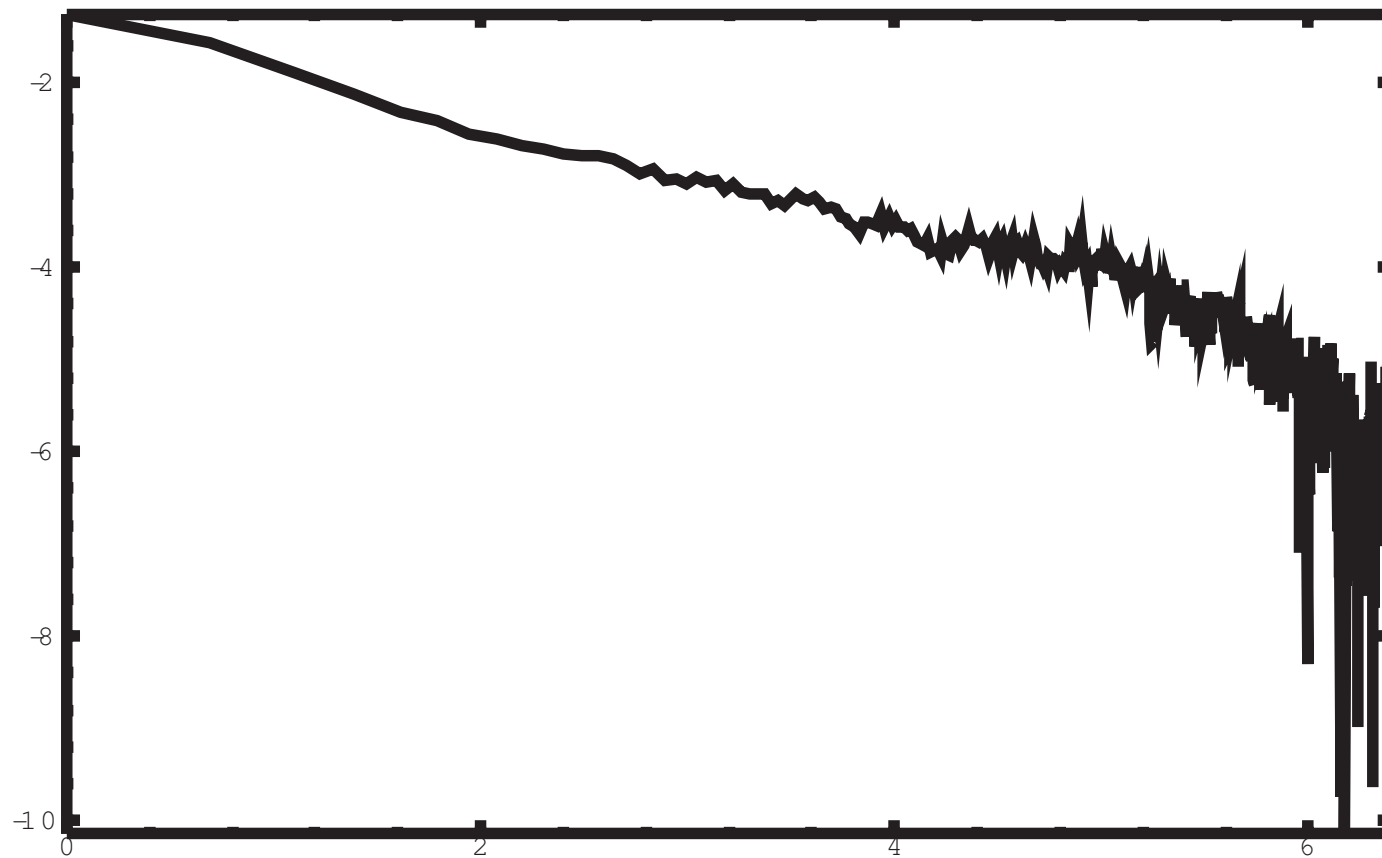Données BNP-Paribas FIRST-ETG, Londres.

Futur sur Bund 2007 : "Liquidité" ($\Delta t = 5$mn)

Prix (1 tick=0.01) par contrats lors de l'achat/vente de 600 contrats
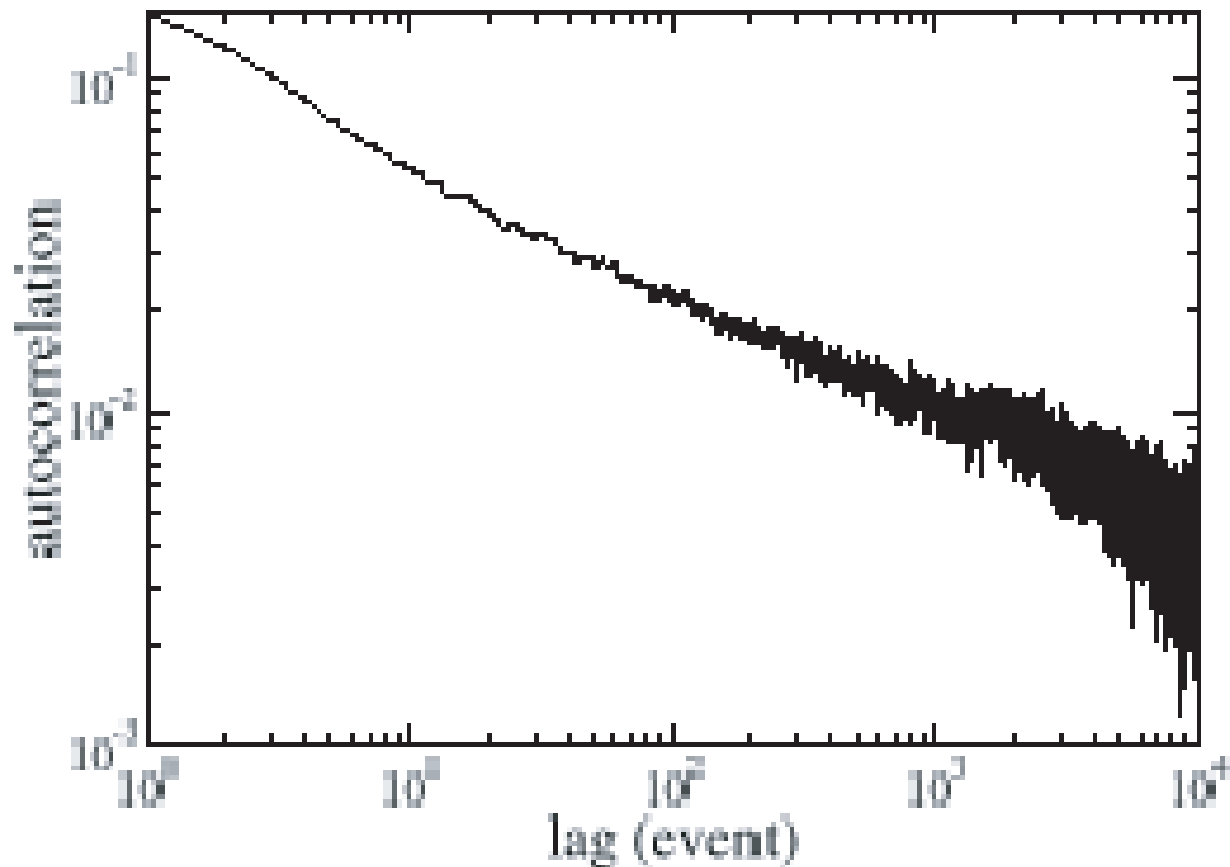
Données BNP-Paribas FIRST-ETG, Londres.

Bund Future February 2007 : Log-log plot of the autocorrelation of the signal $\epsilon[n]$ defined by

$\epsilon[n] = 1$ if nth market order hits ask level

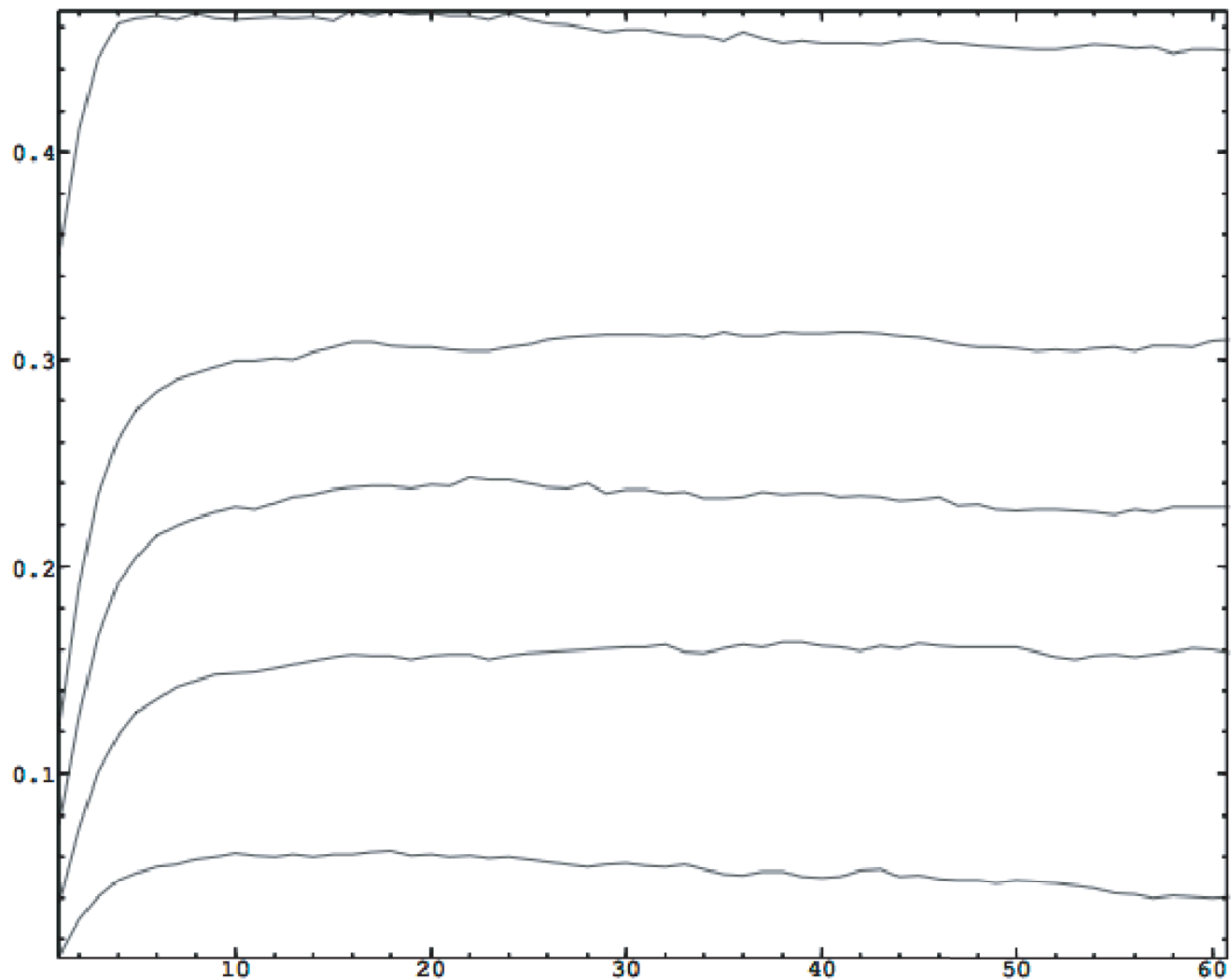$\epsilon[n] = -1$ if nth market order hits bid level

5.7×10^5 transactions $10^{2.6} \simeq 400$ transactions $\simeq 1/2$ hour

Données BNP-Paribas FIRST-ETG, Londres.

Bouchaud J.-Ph. and Potters M. : Theory of Financial Risk, Cambridge
University Press, (2nd edition) 2003

Vodafone Stock (LSE) - May 2000 to December 2002 : 5.8×10^5 transactions

10^4 transactions $\simeq 10$ days

Bund Future February 2007 : Response function $R[\tau]$

$$R[\tau] = < \epsilon[n](MidPrice[n+\tau] - MidPrice[n]) >$$

Données BNP-Paribas FIRST-ETG, Londres.

Market impact profile

– Market impact profile of a (meta)order : variation of the price during and after the execution of the (meta)order

– Market impact profile is generally estimated by aggregating all executions of a certain type (unconditionnally to the market conditions) after time rescaling
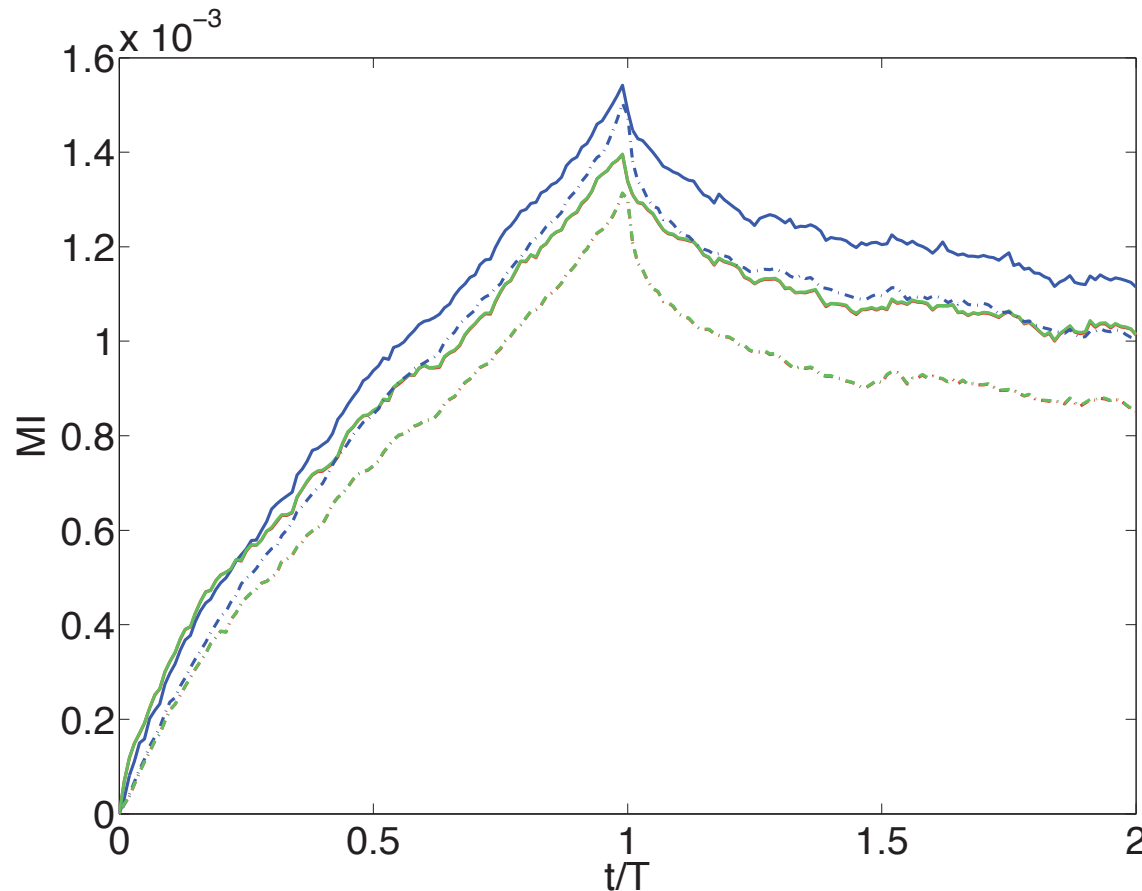
Market impact profile estimation
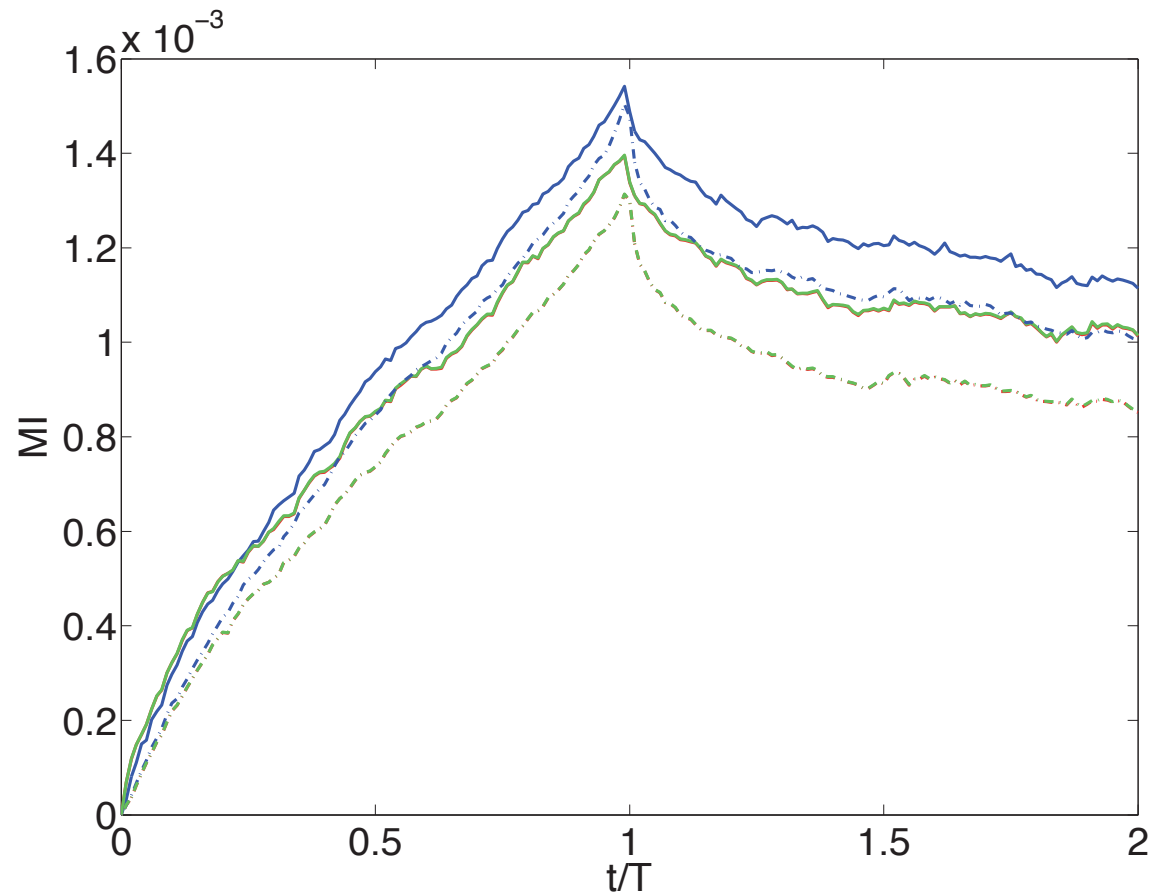
E.B., M.Hoffmann, A.Iuga, M.Lasnier, C.A.Lehalle (working paper) :
Estimation on a pool of European stocks
Data from CA Chevreux.

See also : Moro et al. (2009)

Market impact - "Stylized facts"

- Concave impact while trading - "Square-root" law (Gatheral, 2008)
- Relaxation after trading (power-law ? , Bouchaud et al., 2004)
- Is impact permanent ?

Arbitrage sur le retour à la moyenne de la fourchette bid/ask

N	P_{+-}	P_{-+}	$\#samples$	P^{th}
1	80%	80%	17600	100%
2	60%	61%	1830	75%
3	55%	57%	680	66.6%
4	52%	56%	374	62.5%
5	53%	57%	228	60%
6	53%	57%	145	58.3%

Bund Future February 2007, Données BNP-Paris Bas FIRST-ETG, Londres.