Trading Activity of Foreign Institutional Investors and Volatility

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"... *With each decade, the role of speculative capital has magnified. For speculative capital, nimbleness is the essential attribute. Rushing in when it sees an opportunity and heading for the exit at the first sign of trouble, speculative capital has too often turned upswings into bubbles and downward cycles into crises...* "

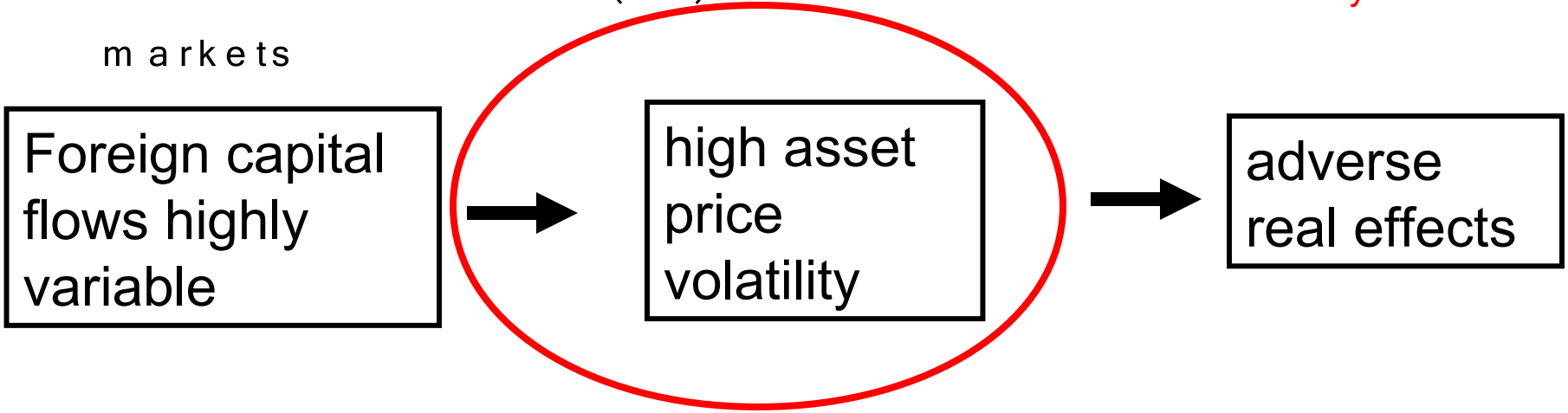
Henry Kissinger, May 29, 2008

(International Herald Tribune)

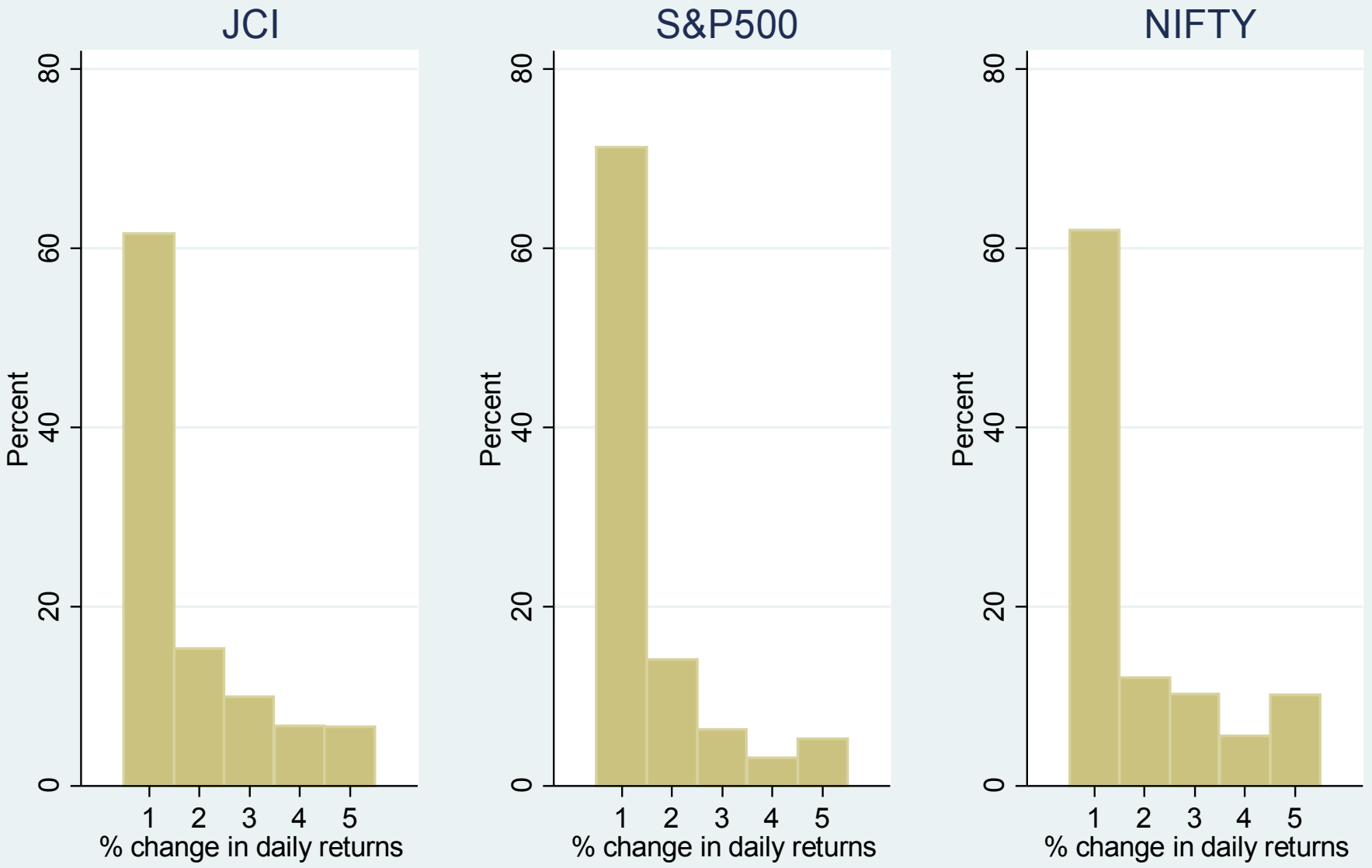
Portfolio flows into emerging markets: Effects

- Investments by foreigners in emerging economies believed to improve market efficiency and lower the cost of capital.

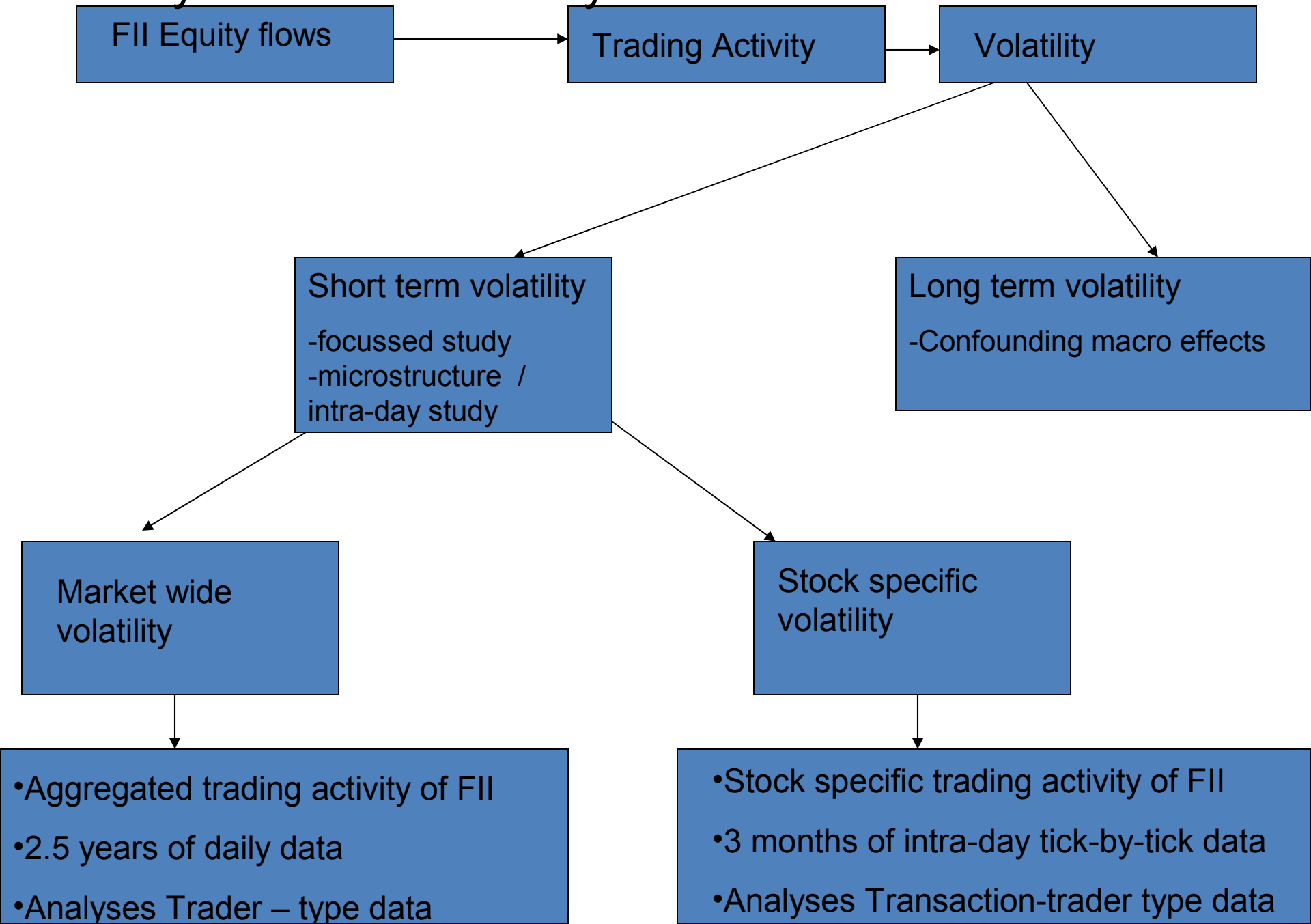
- Counter view, widely held by policy makers, that foreign institutional investor (FII) trades exacerbate volatility in markets



Frequency plot for %(absolute) change in Daily return From 3rd Jan 2005 to 11th Aug 2010



Birds eye view of the story



Questions

- Does the trading activity of FIIs affect the volatility in the Indian Capital Markets?

- If FII trading does affect volatility:
  - Do particular transaction types (buy/sell and counterparty) do it more than others?

  - Do positive and negative shocks have the same effect?

Our approach

- Empirical studies on foreign institutional trading have relied on longer horizon data, either on a daily or a monthly horizon.
  - Choe, Kho, and Stulz (2001) (Korea), Hau (2001) (German), Seasholes (2000) (Taiwan), Grinblatt and Keloharju (2000) (Finland), Froot and Ramadorai (2001) (25 countries), Kang and Stulz (1997) (Japan); Richards (2005) (6 Asian Countries) Wang (2007) (Thailand and Indonesia) with daily data

- Exception: Indonesia intra-day data: Dvorak (2005); Agarwal et al (2009)

- Stock-level intra-day trading data likely to throw greater light on actual information advantages/trading patterns

- Hence we use intraday data for FII trading.

Approach (contd.)

- Policy makers often express concern about market volatility.

- A large amount of foreign trading is directed at individual stock and not necessarily at the market index.

- In order to address this dichotomy, we perform our study as a two-part experiment.

  - First, using daily data over the period 2007-2009, we examine how aggregate trading activity of FIIs, domestic institutions investors (DII) and other investors affects market-wide volatility.

  - Next we focus exclusively on stock specific transactions using a

Answers

- For *aggregate* trading volume on *market-wide* volatility:
  - FII trading activity dampens volatility
  - DII and others' trading activity exacerbates market volatility
  - Positive shocks have greater impact than negative shocks
  - The asymmetric response much stronger for domestic trades than FII trades

- For *intra-day* relationship on *individual* stocks:
  - Trading activity *amongst* FIIs does *not* affect stock volatility adversely
  - FII sales to domestic clients (expected as well as surprises) increases stock volatility.
  - Volatility increases mainly because of trades *amongst* domestic clients and to some extent due to trades amongst domestic proprietary trades.
  - Similar to Wang (2000) for Indonesia

Relevant Literature

- FII investment literature:
  - Brennan and Cao (1998); Wang (2007); Froot et al (2001); Cho et al (2005); Richards (2005), Dvorak (2005), Agarwal et al (2009)...

- Microstructure literature:
  - Karpoff (1987): Positive Relationship between volume and volatility
    - followed by exhaustive empirical studies e.g. Schwert (1990)
    - Anderson and Bollerslev (1998): intraday data volatility better estimate than daily-return based measures
    - Bessembinder and Seguin 91993): expected vs unexpected trading volume

Explanations of volume–volatility relationship

- Mixture of Distributions Hypothesis
  - price changes arise from a mixture of normal distributions
  - the number of information arrivals (or volume per transaction) is the mixing variable.
- Sequential arrival of information models
  - trading helps "discover" new information
  - results in contemporaneous increase in volume and price movements
- Asymmetric information models
  - Admati and Pfleiderer (1988)
  - here informed trades pool their trades

Explanations -- II

- Differences in opinions models
  - Varian, 1985, 1989, Harris and Raviv, 1993, Shalen, 1993
  - divergence of beliefs cause trading volume and the associated positive relationship between volume and volatility.

- Positive feedback trading models
  - strategic trading by informed trader exacerbates volatility.

- Noise trading hypothesis
  - uninformed traders destabilize prices and their trading volume drives volatility (Friedman 1953).

Impact of aggregate trading activity on market volatility

Data:

- Intra-day NSE NIFTY Index data from Apr 16, 2007 to Aug 31, 2009 from the National Stock Exchange

- Trading volume data from the Securities Exchange Board of India of India Ltd.
  - Daily FII and DII buy and sell value (across BSE and NSE) as well as total daily turnover
  - Deduce net trading value of the other traders:
    - Others buy = Total BSE trading value + total NSE trading value – total FII and DII buy value.
    - Others sell = Total BSE trading value + total NSE trading value – total FII and DII sell value.

Table 1A: Gives descriptive statistics of trades of FIIs, DIIs, and Others in terms of the daily summary trading volume in Rs crores

Summary	DII			FII			Other		
	Buy Value	Sell Value	Net Value	Buy Value	Sell Value	Net Value	Buy Value	Sell Value	Net Value
Average	1195.34	990.69	204.61	2777.2	2941.9	-164.64	15469	15509.3	-40.02
Min	21.6	9.21	-1964.2	56.91	12.27	-4265.2	198.79	235.02	-4213
Max	4430.29	4623.2	3399.2	12406	10438	4792.6	36868	39696.8	2328.6
StdDev	474.92	428.23	421.06	1356.2	1441.3	835.73	5330	5391.53	647.71

- Over the period, FII and Others were net sellers while DII were net buyers
- DIIs have greatest “imbalance”
- Institutional trading relatively more volatile

Table 1 B Gives pair-wise correlation between trader-type buy and sell volumes.

Correlation	DII (buy)	FII (buy)	Others (buy)	DII (sell)	FII (sell)	Others (sell)
DII (buy)	1.0000	0.5801	0.6030	0.5695	0.7133	0.5942
FII (buy)		1.0000	0.6208	0.7094	0.8232	0.6399
Others (buy)			1.0000	0.7415	0.5469	0.9928
DII (sell)				1.0000	0.4837	0.7529
FII (sell)					1.0000	0.5048
Others (sell)						1.0000

- DII (buy) and DII (sell) least correlated – directional effect

Table1C :Pair-wise correlation matrix of Nifty Returns and DII, FII and Other net trading values

Correlation	DII	FII	Others	NIFTY returns
DII	1.0000	-0.6482	0.1864	-0.2080
FII		1.0000	-0.8689	0.4319
Others			1.0000	-0.4221
NIFTY returns				1.0000

- FII negatively correlated with both the groups but positively with returns

Descriptive statistics of Nifty daily returns.

Panel A Summary Statistic	Nifty Returns	Daily Total Volume	Daily Net Volume		
			FII	DII	Other
Mean	0.0343	19704.1400	-166.6360	204.6566	-40.0207
StdDeviation	2.4168	6156.6990	835.7319	421.0617	647.7120
Skewness	0.1189	0.6448	-0.0198	1.1926	-0.5610
Kurtosis	8.0138	3.9562	8.9239	12.7482	7.5438
LB(10)	19.2840	3408.6400	433.0700	325.7300	100.0200
LB2(10)	90.0560	--	--	--	--
ADF test statistic	-22.7648	-3.8977	-7.2187	-10.6006	-18.2970

•The average daily returns are positive and very small compared with the return standard deviation.

•The Nifty return series is slightly positively skewed and displays significant excess kurtosis.

•This implies that the Nifty index return series is characterized by a distribution with tails that are significantly heavier than in a normal distribution.

•Additionally, the Ljung-Box Q (10) and $Q^2(10)$ statistics for returns and squared returns indicate linear dependence and volatility clustering in Nifty return series.

Methodology

- Decompose trading volume into *expected* and *unexpected* components
  - Allows us to examine the extent to which surprises versus trend activity variables affect the volatility–volume relation.
  - Bessembinder and Seguin (1993)
  - Chan and Fong (2001): Net traded volumes (buy–sell) of FII, DII and Others, as well as overall trading volume
  - We fit an ARMA model after accounting for day of week effects
  - The fitted net volume is the expected part and the residual volume is the unexpected part.

Cross-correlations between trading activities of trader categories

Correlation (p-value)	FII_EXP	DII_EXP	OTHER_EXP	UNFII	UNDII	UNOTHER
FII_EXP	1 -----					
DII_EXP	-0.699985 0	1 -----				
OTHER_EXP	-0.841723 0	0.392307 0	1 -----			
UNFII	0.003676 0.9297	-0.076331 0.0664	0.003658 0.93	1 -----		
UNDII	-0.164657 0.0001	0.00149 0.9715	0.197443 0	-0.478833 0	1 -----	
UNOTHER	-0.088847 0.0326	0.10122 0.0148	-0.000968 0.9815	-0.848296 0	0.013327 0.749	1 -----

- Strong negative correlation between FII expected (unexpected) net volume and expected (unexpected) components of DII as well as Other.

- However, the correlation is very positive between DII and Other for both expected and unexpected components.

- Apparently, on average, aggregate FII trading activities go in opposite directions to that of DII and Other trading activities.

- The trading beliefs of FII are opposite to that of remaining traders in Indian market.

Measuring Volatility

- Three different volatility proxies based on intra-day data:
  - Parkinson volatility (uses day's high and low $\sigma = \sqrt{\frac{1}{n4\ln 2}\sum_{i=1}^{n}\left(\ln\frac{H_i}{L_i}\right)^2}$
  - Garman Klass Volatility (uses day's open, high, low and close)

$$\sigma = \sqrt{\frac{1}{n}\sum\left[\frac{1}{2}\left(\ln\frac{H_i}{L_i}\right)^2 - (2\ln 2 - 1)\left(\ln\frac{C_i}{O_i}\right)^2\right]}$$

  - Intra-day volatility (5-minute return standard deviation)

Examining the Volatility–Volume Relationship

- Regressing volatility estimate on
  - lagged volatility estimates,
  - expected and unexpected components of market-wide trading volume
  - expected and unexpected components of net trading volumes of FII, DIIs and Others.

  [Bessembinder and Seguin (1993) and Wang (2002)]

$$\sigma_t = \alpha_0 + \sum_{i=1}^{5} \alpha_i \sigma_{t-i} + \beta_1 Tot\_ExpV_t + \beta_2 Tot\_Un\exp V_t + \gamma_1 ExpNVol_{jt} + \gamma_2 Un\exp NVol_{jt} + \gamma_3 Dum * Un\exp NVol_{jt} + \varepsilon_t$$

(*j*=FII, DII and Other)

Volatility and Overall trading activity

$$\sigma_t = \alpha_0 + \sum_{i=1}^{5} \alpha_i \sigma_{t-i} + \beta_1 Tot\_ExpV_t + \beta_2 Tot\_Un\exp V_t + \varepsilon_t$$

Variable	GKV estimate			Parkinson estimate			Intra-day Volatility estimate		
	Coefficient	t-Statistic	Prob.	Coefficient	t-Statistic	Prob.	Coefficient	t-Statistic	Prob.
C	0.017146	4.7407	0.0000	0.022831	6.0441	0.0000	0.003056	4.9717	0.0000
TOTAL_EXP	4.99E-08	0.2966	0.7669	-2.12E-07	-1.2108	0.2265	-3.76E-08	-1.2501	0.2118
UNTOTAL	4.41E-07	4.2692	0.0000	2.32E-07	1.9860	0.0475	-1.85E-07	-5.7563	0.0000
AR(1)	0.497006	11.8523	0.0000	0.39663	9.2990	0.0000	0.275948	6.0846	0.0000
AR(2)	0.003151	0.0667	0.9468	0.080782	1.7617	0.0787	0.043077	0.9630	0.3359
AR(3)	0.099422	2.1315	0.0335	0.117018	2.6112	0.0093	0.069588	1.5860	0.1133
AR(4)	0.053978	1.1533	0.2493	0.112551	2.4977	0.0128	0.03206	0.7362	0.4619
AR(5)	0.10761	2.5705	0.0104	0.046406	1.1038	0.2701	0.029421	0.7000	0.4842
			-			-			-
R-squared	0.406363	AIC	6.6601	0.367751	AIC	6.4798	0.119338	AIC	9.2100
Adjusted R-square	0.399021	DW Stat	2.0276	0.359931	DW Stat	2.0104	0.108446	DW Stat	2.0018

Observations

- The impact of *unexpected* volume (coefficient β_2) on volatility is much higher than that of expected volume (coefficient β_1).

- Unexpected volume (coefficient β_2) has a *positive* (and significant) contemporaneous impact on market volatility whereas expected volume has no significant effect.

- This result holds qualitatively with all proxies of volatility, namely, GKV, Parkinson as well as intra-day volatility proxy.

Volatility and Net trading activity by trader type

$$\sigma_t = \alpha_0 + \sum_{i=1}^{5} \alpha_i \sigma_{t-i} + \beta_1 Tot\_ExpV_t + \beta_2 Tot\_Unexp V_t + \gamma_1 ExpNVol_{jt} + \gamma_2 Unexp NVol_{jt} + \gamma_3 Dum * Unexp NVol_{jt} + \varepsilon_t$$

- Panel A: Garman Klass Volatility Estimator as proxy of Volatility

Variable	FII			DII			OTHER		
	Coefficient	t-Statistic	Prob.	Coefficient	t-Statistic	Prob.	Coefficient	t-Statistic	Prob.
C	0.014287	4.2635	0.0000	0.013649	4.0291	0.0001	0.016797	4.8793	0.0000
TOTAL_EXP	6.24E-08	0.4036	0.6867	4.99E-08	0.3200	0.7491	2.17E-08	0.1339	0.8935
UNTOTAL	4.08E-07	3.8513	0.0001	3.78E-07	3.5882	0.0004	4.27E-07	3.9892	0.0001
Trader_EXP	-6.68E-06	-5.4491	0.0000	1.07E-05	4.6941	0.0000	5.89E-06	2.7062	0.0070
UNEXP	-5.96E-06	-6.9612	0.0000	-8.26E-07	-0.4582	0.6470	-4.19E-08	-0.0448	0.9643
DUMUNEXP	5.94E-06	4.2404	0.0000	9.54E-06	3.3399	0.0009	5.03E-06	3.0102	0.0027
AR(1)	0.430576	10.2741	0.0000	0.415559	9.8030	0.0000	0.473258	11.2664	0.0000
AR(2)	-0.02017	-0.4395	0.6605	0.052229	1.1280	0.2598	-0.01893	-0.4051	0.6856
AR(3)	0.114751	2.5237	0.0119	0.080174	1.7634	0.0784	0.107279	2.3142	0.0210
AR(4)	0.068028	1.4936	0.1358	0.081197	1.7876	0.0744	0.049913	1.0750	0.2828
AR(5)	0.162683	3.8985	0.0001	0.12197	2.9121	0.0037	0.136258	3.2552	0.0012
			-			-			-
R-squared	0.467993	AIC	6.7593	0.44942	AIC	6.7250	0.432113	AIC	6.6940
Adjusted R-sq	0.458543	DW Stat	2.0536	0.43964	DW Stat	2.0336	0.422026	DW Stat	2.0388

Panel B : Parkinson Volatility estimator as proxy for market wide volatility

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Variable	FII			DII			OTHER		
	Coefficient	t-Statistic	Prob.	Coefficient	t-Statistic	Prob.	Coefficient	t-Statistic	Prob.
C	0.019091	5.4411	0.0000	0.019091	5.3925	0.0000	0.021352	5.9670	0.0000
TOTAL_EXP	-1.98E-07	-1.2178	0.2238	-2.18E-07	-1.3416	0.1803	-2.31E-07	-1.3743	0.1699
UNTOTAL	9.40E-08	0.7862	0.4321	1.60E-07	1.3587	0.1748	1.05E-07	0.8735	0.3828
Trader_EXP	-6.84E-06	-5.3125	0.0000	1.08E-05	4.5465	0.0000	7.21E-06	3.1368	0.0018
UNEXP	-7.14E-06	-7.4609	0.0000	-2.11E-06	-1.0556	0.2916	-2.86E-06	-2.7171	0.0068
DUMUNEXP	9.28E-06	5.8695	0.0000	1.23E-05	3.8989	0.0001	9.57E-06	5.0900	0.0000
AR(1)	0.353088	8.2274	0.0000	0.308382	7.1211	0.0000	0.394021	9.2092	0.0000
AR(2)	0.048591	1.0776	0.2817	0.12694	2.8245	0.0049	0.04855	1.0565	0.2912
AR(3)	0.110317	2.4950	0.0129	0.117892	2.6924	0.0073	0.089023	1.9778	0.0484
AR(4)	0.124702	2.7902	0.0054	0.121264	2.7576	0.0060	0.114218	2.5305	0.0117
AR(5)	0.107559	2.5495	0.0111	0.072071	1.7132	0.0872	0.089832	2.1314	0.0335
R-squared	0.439753	AIC	-6.590	0.417472	AIC	-6.551	0.405494	AIC	-6.530
Adjusted R-sq	0.429802	DW Stat	2.0354	0.407125	DW Stat	2.0173	0.394934	DW Stat	2.0266

Panel C : Intra-day Volatility estimator as proxy for market wide volatility

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Variable	FII			DII			OTHER		
	Coefficient	t-Statistic	Prob.	Coefficient	t-Statistic	Prob.	Coefficient	t-Statistic	Prob.
C	0.002374	3.1649	0.0016	0.00195	4.0403	0.0001	0.002585	5.2796	0.0000
TOTAL_EXP	-3.72E-08	-1.0288	0.3040	-1.87E-08	-0.8142	0.4158	-3.50E-08	-1.4154	0.1575
UNTOTAL	-2.36E-07	-1.4674	0.1428	-2.18E-07	-6.8891	0.0000	-2.20E-07	-6.7489	0.0000
Trader_EXP	-5.01E-07	-0.9961	0.3196	1.64E-06	2.9462	0.0033	9.06E-07	1.7249	0.0851
UNEXP	-1.64E-06	-3.5021	0.0005	-9.25E-07	-1.7065	0.0885	-6.23E-07	-2.2163	0.0271
DUMUNEXP	2.39E-06	3.1134	0.0019	3.09E-06	3.6337	0.0003	2.01E-06	4.0035	0.0001
AR(1)	0.267952	5.2257	0.0000	0.256995	5.7288	0.0000	0.292726	6.8170	0.0000
R-squared	0.173491	AIC	-9.283	0.15501	AIC	-9.2663	0.140361	AIC	-9.240
Adjusted R-sq	0.164806	DW Stat	1.9986	0.14618	DW Stat	2.0423	0.131296	DW Stat	2.0099

Findings

- Market volatility is *negatively* related to FII trading activity, both expected (γ_1) and unexpected ($\gamma_2 + \gamma_3$).

- Positive shocks in unexpected volume (γ_3) of FIIs impact volatility much more than negative shocks (γ_2), but the overall impact of unexpected volume of FIIs is a reduction in market volatility.

- The incremental explanatory power of the regression improves by 15% (adjusted R^2 increases from 0.399 to 0.458) after including FIIs trading activity over and above the overall trading activity variables.

Findings

- DII trading activity, expected (γ_1) as well as unexpected ($\gamma_2 + \gamma_3$), *increases* market-wide volatility.

- Negative shocks of DII (γ_2) do not co-vary with market-wide volatility. However, Positive shocks of DII (γ_3) cause a significant increase in market volatility.

- The impact of DII on volatility is similar across other volatility proxies. Market volatility increases significantly with the trading activities of Others (both expected and unexpected net trading volumes).

- Robust across other volatility estimators.

Findings

- Irrespective of the trader type, shocks in net trading volume have *asymmetric impact* on volatility depending on whether the shock is positive or negative.

- The magnitudes and statistical significance of estimated coefficients imply that the impact of positive unexpected net trading volumes are higher than that of negative shocks for DII as well as Others.

- The asymmetry is minimal for FIIs (approximately 0.003) whereas for DIIs it is 10.54 and for Others it is 119.05.

Part II: Impact of trading activity on volatility at individual stock level

Data

- Proprietary dataset that provides us with tick-by-tick data for 50 stocks (NIFTY stocks) during a 3 month period (April-Jun 2006).

- This dataset is unique in the sense that it contains an indicator of trader type (e.g., FII, DII and several different types of trader types)

Data

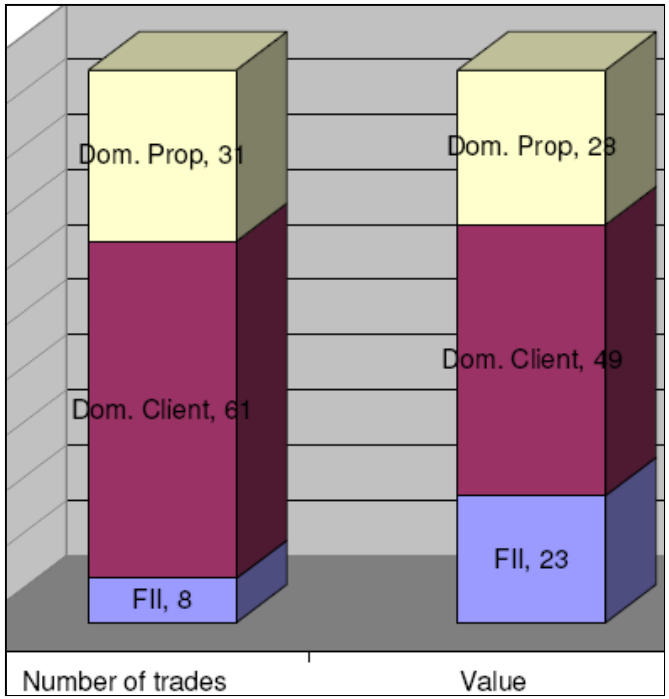
- Order-by-order and trade-by-trade data from the National Stock Exchange of India (NSE)
- NSE is an electronic order-matching limit order book market that operates on a strict price-time priority
- Tick size is INR 0.05
- All unfilled orders expire at market close
- Does not have a pre-open call auction to determine opening price
- Hidden (or iceberg) orders are allowed with at least 10 percent of the order being displayed
- Five best prices and the corresponding depths at those prices on both sides of the book are publicly disseminated

Data

- Consists of all the 50 stocks in the Standard & Poor's CNX Nifty Index
- Sample period is from April 1 through June 30, 2006, covering 63 trading days
- Orders data include
  - the date and time the order was placed
  - a unique order number,
  - whether the record is
    - a new order,
    - a modification to an existing order or,
    - the cancellation of an existing order,
  - whether it was a buy or a sell order,
  - whether it was a market or limit order,
  - the limit price if it was a limit order,
  - the order size in shares,
  - the maximum number of shares to be displayed at any given time,
  - a trading member code that identifies the trading member through whom the order was placed,
  - a client member code that identifies the client member who placed the order, and
  - a trader classification variable. Traders are classified into 14 different clientele categories.

Summary statistics of trading activity by trader type and transaction type

Buyer	Seller	Code
FII	FII	FF
FII	PROP	FP
FII	CLIENT	FC
PROP	FII	PF
PROP	PROP	PP
PROP	CLIENT	PC
CLIENT	FII	CF
CLIENT	PROP	CP
CLIENT	CLIENT	CC



		Mean	Median	Max	stddev
Number of Trades	FF	109	45	1699	161
	FP	519	294	6573	657
	FC	1013	552	14477	1409
	PF	618	338	7424	822
	PP	2093	1271	30471	2585
	PC	3618	2208	33815	4103
	CF	1242	600	35095	2023
	CP	3888	2432	40137	4381
	CC	7239	4191	93335	7812
	Total	**20339**	**13080**	**186953**	**20934**
Trade Value (in Rs lakhs)	FF	726	135	19779	1654
	FP	633	220	17740	1285
	FC	867	313	272812	5455
	PF	783	257	23054	1648
	PP	611	245	20049	1204
	PC	1348	648	23277	2200
	CF	1021	400	31918	2000
	CP	1502	742	27451	2528
	CC	2255	1180	115220	3765
	Total	**9745**	**5152**	**435107**	**16717**

(1 lakh = 0.1 million)

Methodology

- As in Bessembinder and Seguin (1993), we decompose trading volume into expected and unexpected components using the same procedure as in the first experiment.

- As opposed to the earlier experiment, in this stock based experiment, we deal with trading volume rather than net traded value.

- This allows us to find the marginal impact of different types of transactions

Methodology

- To extract the expected and unexpected components of different activity volumes, we regress log (volume) against day dummies, trend, lagged volatility, lagged returns, past (5 lags) volume, where volume refers to volume conditional on trader type (FII, PROP, or CLIENT) and transaction type (BUY/SELL).

- The fitted series is the expected component and the residual component is unexpected component.

Methodology

- We employ two proxies for volatility:

  (i) hourly standard deviation of returns based on five-minute frequency

  (ii) Parkinson measure, computed on a daily basis

Fixed effects panel regression results of the volatility-volume

$$\sigma proxy_{i,t} = FixedEffects + \sum_{p=1}^{3}\sum_{q=1}^{3}\alpha_{0,pq}Exp\_Volume_{pq,it} + \sum_{p=1}^{3}\sum_{q=1}^{3}\beta_{0,pq}Unexp\_Volume_{pq,it} + e_{it}$$

i=stock ; t=day; p =1 for FII purchases; 2 for domestic proprietary purchases & 3 for domestic client purchases; q=1 for FII sales; 2 for domestic proprietary sales & 3 for domestic client sales.

Parameter	Parkinson Volatility Estimate			Intraday volatility Estimate		
	Coefficient	t-Statistic	Prob.	Coefficient	t-Statistic	Prob.
FF_EXP	-0.0168	-0.9543	0.3401	-0.0043	-0.2789	0.7804
FP_EXP	0.0115	0.3531	0.7240	-0.0383	-1.3589	0.1743
FC_EXP	0.0140	0.3968	0.6916	0.0402	1.3182	0.1876
PF_EXP	0.0321	0.9002	0.3682	0.0414	1.3327	0.1828
PP_EXP	0.0011	0.0229	0.9818	0.0175	0.4110	0.6811
PC_EXP	-0.0051	-0.0794	0.9367	-0.0943	-1.6896	0.0913
CF_EXP	**0.1073**	**2.9697**	**0.0030**	**0.0625**	**1.9932**	**0.0464**
CP_EXP	-0.0266	-0.3925	0.6948	0.0685	1.1519	0.2495
CC_EXP	**0.2267**	**3.4576**	**0.0006**	0.0623	1.0921	0.2749
FF_UNEXP	-0.0143	-1.3199	0.1870	0.0006	0.0696	0.9445
FP_UNEXP	0.0222	1.0023	0.3163	0.0063	0.3320	0.7399
FC_UNEXP	0.0192	0.8322	0.4054	0.0171	0.8583	0.3908
PF_UNEXP	0.0119	0.5638	0.5729	0.0058	0.3190	0.7498
PP_UNEXP	0.0078	0.2367	0.8129	**0.0490**	**1.7325**	**0.0833**
PC_UNEXP	-0.0030	-0.0666	0.9469	-0.0052	-0.1337	0.8936
CF_UNEXP	**0.0574**	**2.5648**	**0.0104**	0.0162	0.8382	0.4020
CP_UNEXP	0.0416	0.8777	0.3802	-0.0302	-0.7362	0.4617
CC_UNEXP	**0.2068**	**4.2821**	**0.0000**	**0.0931**	**2.2249**	**0.0262**
AR(1)	0.3646	15.7630	0.0000	0.4524	19.4454	0.0000
AR(2)	0.1497	6.6907	0.0000	0.1100	4.8920	0.0000
Cross section fixed (dummy variable) effects specification						
R-squared	0.3540	AIC	1.3256	R-Square	0.3873	AIC	1.08
Adj R-sq	0.3334	DW Stat	1.9978	Adj R-Sq	0.3677	DW Stat	1.99

Findings

- The coefficient on the variable reflecting FII trades amongst themselves is insignificant.

- In most cases where FII trades are involved either as buyer or seller, the coefficients are insignificant.

- But, FII sales to domestic clients (expected as well as surprises) seem to increase stock volatility.

- Volatility increases mainly because of trades of domestic clients and to some extent due to domestic proprietary trades. Thus it appears that FII investors add to Indian market liquidity (market depth) because they account for as much as 23% of the total traded volume; at the same time their trades are not a major driver of excess

Conclusions

- Trading activity of FIIs dampens market volatility, whereas trading activity of DIIs and others exacerbates *market* volatility.

- Positive shocks in trading activity have a greater impact than negative shocks.

- This asymmetric response is much stronger for domestic trades than for FII trades.

Conclusions

- Trading activity amongst FIIs does not have an adverse impact on *stock* volatility.

- However, FII sales to domestic clients, trade amongst domestic clients, and to some extent trade amongst domestic proprietary trades, increases stock volatility.

- Overall, these results suggest that trading activity among non FII investors is the key

Road ahead

- Developing a likely explanation of the findings
- Examining a forward-looking measure of volatility
  - the market traded volatility index, VIX.
- Market microstructure effects around FII trades
  - the price impact of trades conditional on trader type
  - the degree of price reversal conditional on trader type

Thank you