

Equities

1 June 2011 | 28 pages

Asia Pacific Volatility Outlook and Review

June Update

■ Quantitative Analysis
■ Monthly

- **Normal Service Continues** — Compared to the last few months, May was relatively boring with no major shocks impacting markets. Accordingly, the volatility and correlation was little changed and generally Asia looks set to remain a fairly benign environment for stock pickers.
- **Correlations Normalize in Japan** — The post-earthquake spike in both correlations and volatility was fortunately short-lived, and stability has returned remarkably quickly. This should help both fundamental and quant processes, and our short-term model performance suggests this is the case.
- **Dispersions High in Australia** — Correlations and dispersion rose in Australia – but this was largely a super-sector effect. The increasing dichotomy between the onshore and off-shore economies was behind a sell-off among domestic cyclical names, while rising inflationary pressures and continuing commodity demand is also exacerbating the sectoral divergence in Australia.
- **Thailand** — The upcoming election is impacting investor sentiment, with correlations and volatility having generally risen. However, our abnormal-vol indicator remains low, so we don't believe there is any evidence of major underlying market stresses building.
- **Elsewhere in the Region** — In China, despite a spike in short-term correlations, the longer-term trend still seems to be down. In Korea, both index volatility and stock correlations have risen – at the margins this may make it harder to select stocks.
- **Sectoral Overview** — The earthquake-effect (which was more pronounced at the sector level) seems to be passing. However, asset plays generally remain more correlated than the other sectors.

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Volatility Summary

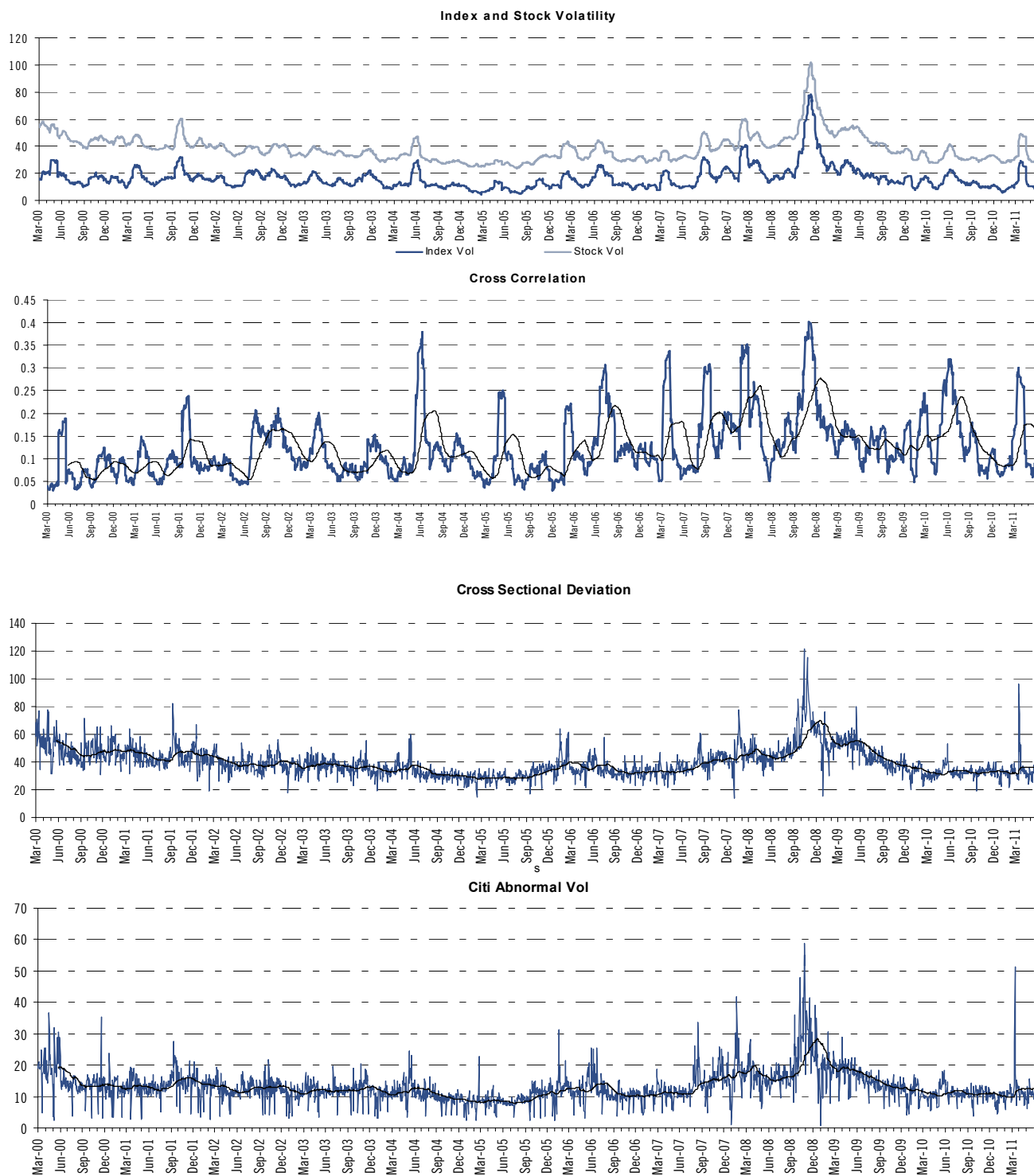
Index Volatility	End of Last Month	End of Prior Month	3 Months Ago	6 Months Ago	12 Months Ago
Pan Asia	11.98	10.64	28.12	6.69	17.47
Japan	13.58	14.82	54.11	8.90	21.20
APACxJ	12.77	10.52	14.85	7.22	15.76
Australia	15.03	12.46	15.68	9.58	19.55
Hong Kong	12.90	10.85	17.18	11.63	14.99
Singapore	13.05	9.24	16.55	7.83	16.68
China	14.74	13.96	18.59	14.03	20.80
India	16.36	14.12	14.96	15.24	16.61
South Korea	22.97	13.71	19.13	10.17	15.50
Taiwan	11.13	14.26	18.25	6.58	19.71
Thailand	19.01	12.37	14.85	12.70	16.64
Malaysia	7.03	8.11	9.33	8.16	9.55
Indonesia	14.73	11.68	15.95	20.00	23.20
Philippines	14.85	14.47	12.82	17.53	16.02
Assets	17.59	13.60	15.98	8.99	19.49
Cyclicals	14.80	12.38	18.21	7.56	16.42
Financials	7.56	6.68	10.76	4.99	10.37
Defensives	12.03	10.73	14.40	9.05	17.57
Non Cyclicals	10.41	9.00	14.03	6.60	12.19
Stock Volatility					
PanAsia	29.85	30.13	48.27	27.75	32.34
Japan	26.19	30.53	77.99	22.31	31.42
APACxJ	31.45	30.38	35.28	30.38	32.83
Australia	34.16	30.17	39.02	29.27	39.21
Hong Kong	33.44	32.91	38.49	34.76	34.57
Singapore	24.62	23.15	30.60	23.19	34.57
China	32.15	31.19	34.88	31.24	34.44
India	31.64	30.97	30.73	35.89	29.49
South Korea	39.17	40.29	42.60	33.65	35.49
Taiwan	28.39	27.12	36.39	26.75	29.45
Thailand	28.37	24.72	26.65	28.33	30.19
Malaysia	21.52	23.37	24.27	24.77	22.81
Indonesia	30.02	26.48	31.68	33.99	39.43
Philippines	26.85	28.20	26.64	32.83	28.16
Assets	35.81	34.54	39.77	31.99	35.16
Cyclicals	33.22	31.66	37.26	30.48	34.13
Financials	28.97	28.28	31.58	28.18	30.72
Defensives	25.29	25.08	28.69	27.34	29.26
Non Cyclicals	31.25	30.31	35.95	31.07	33.24

Source: Citi Investment Research and Analysis

Cross Correlation	End of Last Month	End of Prior Month	3 Months Ago	6 Months Ago	12 Months Ago
PanAsia	0.12	0.09	0.28	0.06	0.24
Japan	0.24	0.32	0.71	0.19	0.39
APACxJ	0.12	0.09	0.19	0.05	0.20
Australia	0.19	0.18	0.26	0.07	0.27
Hong Kong	0.13	0.09	0.26	0.12	0.21
Singapore	0.16	0.15	0.36	0.11	0.28
China	0.23	0.12	0.21	0.20	0.34
India	0.25	0.20	0.19	0.35	0.21
South Korea	0.21	0.10	0.21	0.12	0.16
Taiwan	0.18	0.19	0.41	0.08	0.41
Thailand	0.27	0.13	0.20	0.17	0.26
Malaysia	0.12	0.14	0.21	0.10	0.21
Indonesia	0.27	0.10	0.20	0.22	0.37
Philippines	0.14	0.16	0.16	0.21	0.21
Assets	0.16	0.11	0.18	0.07	0.25
Cyclicals	0.12	0.10	0.23	0.06	0.22
Financials	0.09	0.06	0.13	0.05	0.12
Defensives	0.15	0.12	0.24	0.08	0.26
Non Cyclicals	0.09	0.07	0.17	0.05	0.14
Cross Sectional Deviation(Monthly Average)					
PanAsia	31.76	31.25	43.26	30.18	32.07
Japan	27.38	26.95	40.69	23.09	27.68
APACxJ	33.59	32.03	35.51	32.80	33.52
Australia	35.86	31.89	40.27	34.94	41.65
Hong Kong	36.50	35.85	38.33	37.08	32.11
Singapore	26.82	27.27	28.90	25.07	42.89
China	31.91	30.59	33.55	30.82	29.15
India	29.46	31.45	28.94	32.74	27.53
South Korea	41.78	41.31	42.27	35.38	36.71
Taiwan	28.49	26.80	29.73	27.94	25.34
Thailand	27.08	24.49	25.46	26.59	29.66
Malaysia	22.28	24.28	25.72	24.78	22.45
Indonesia	29.38	27.38	29.90	34.25	33.65
Philippines	27.86	27.68	26.19	33.74	27.13
Assets	37.13	35.38	40.66	33.90	34.94
Cyclicals	34.96	33.25	36.19	31.93	34.68
Financials	31.06	30.59	33.27	32.20	34.48
Defensives	26.81	25.77	27.25	28.99	26.40
Non Cyclicals	33.19	31.03	36.23	33.02	34.18
Citi Abnormal Vol(Monthly Average)					
PanAsia	10.76	10.57	15.88	9.09	11.15
Japan	10.62	11.07	18.67	7.49	10.70
APACxJ	11.39	10.65	13.22	10.53	11.47
Australia	8.94	8.38	10.98	7.59	11.44
Hong Kong	10.95	10.40	13.57	11.74	11.13
Singapore	7.41	8.12	9.60	7.35	9.17
China	12.00	11.70	14.24	12.30	11.96
India	15.42	15.25	14.75	15.52	14.10
South Korea	17.36	16.81	17.80	13.89	14.02
Taiwan	11.05	10.35	13.16	10.16	11.05
Thailand	10.73	9.05	9.54	10.28	10.59
Malaysia	7.73	7.08	7.38	6.44	6.64
Indonesia	11.55	11.53	14.16	15.99	15.45
Philippines	7.61	8.31	8.57	9.84	10.60
Assets	11.85	11.37	13.73	10.18	12.15
Cyclicals	13.19	12.28	14.81	11.85	12.34
Financials	10.64	9.42	11.79	9.36	10.24
Defensives	9.42	8.92	11.65	9.51	10.26
Non Cyclicals	12.10	11.01	13.92	11.40	12.80

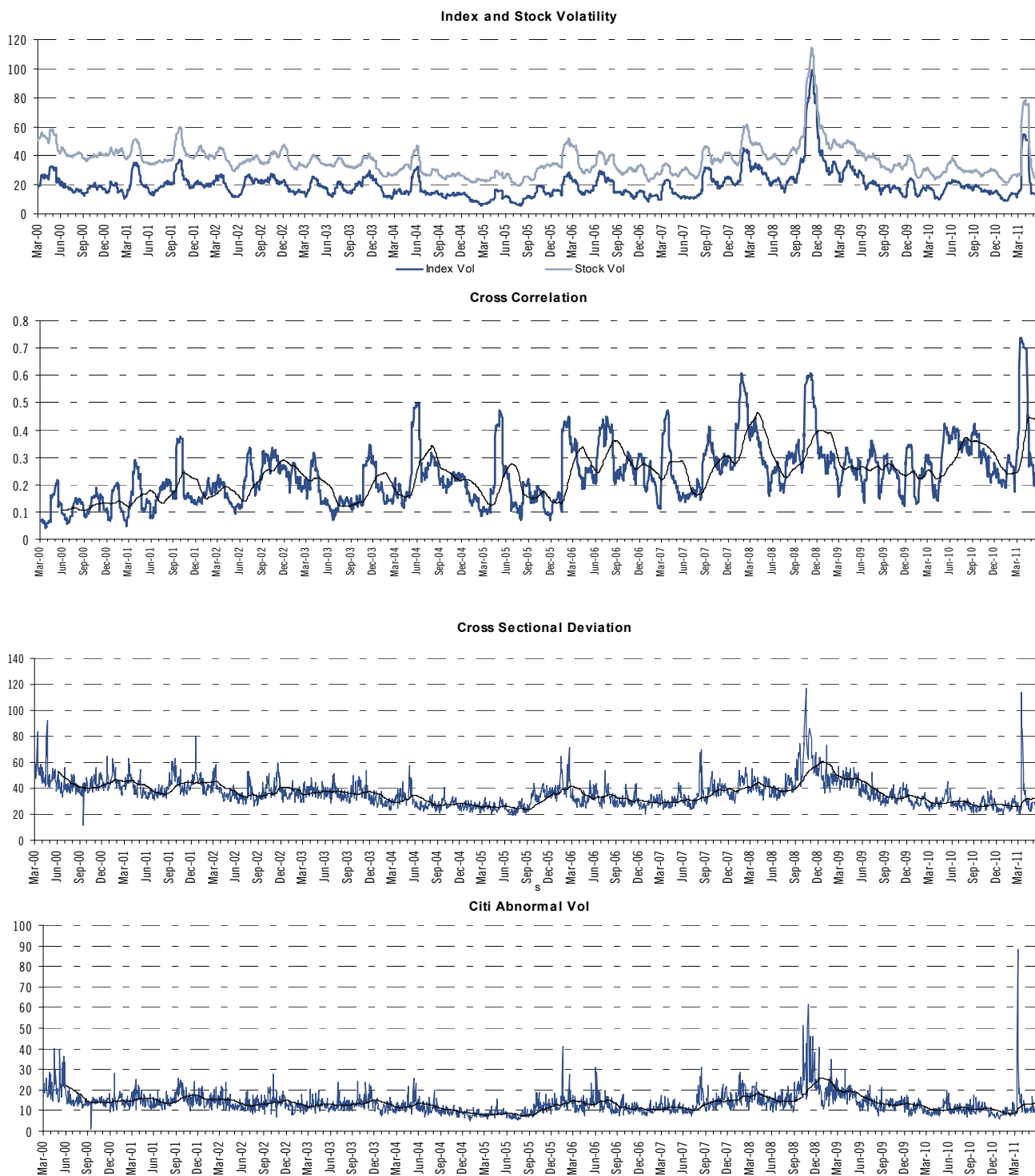
Source: Citi Investment Research and Analysis

Figure 1. Pan Asia Volatility Measures



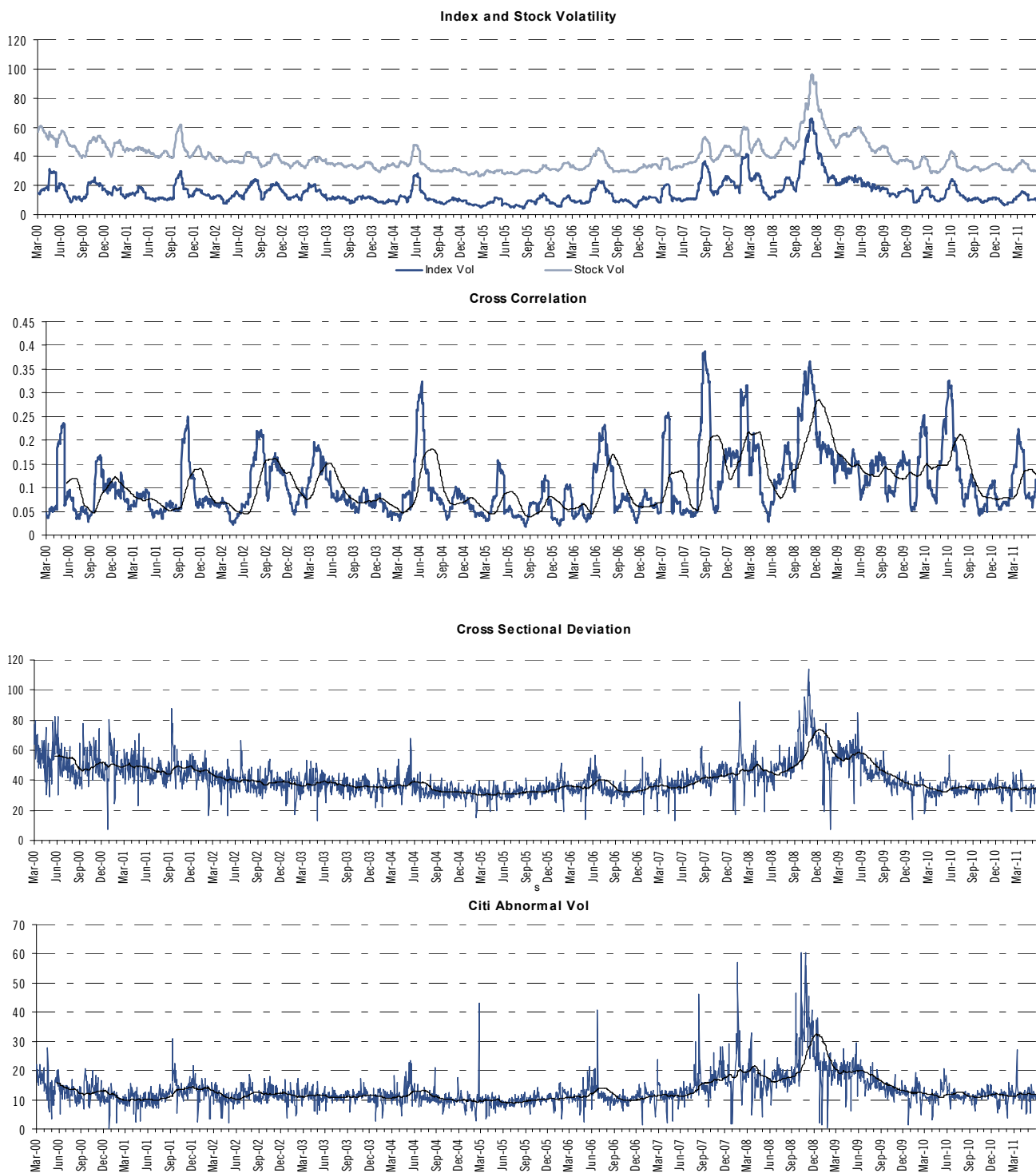
Source: Citi Investment Research and Analysis

Figure 2. Japan Volatility Measures



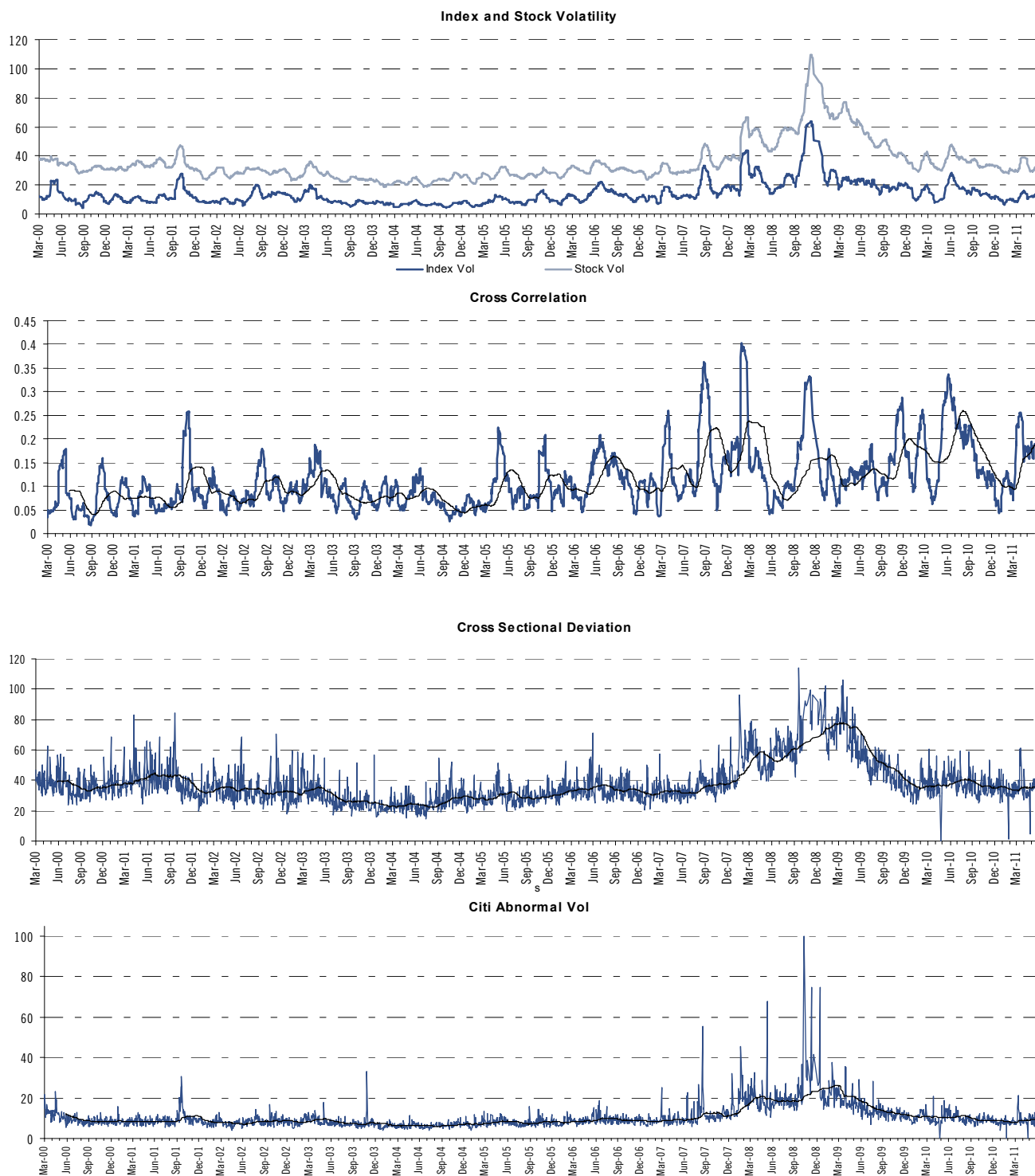
Source: Citi Investment Research and Analysis

Figure 3. APACxJ Volatility Measures



Source: Citi Investment Research and Analysis

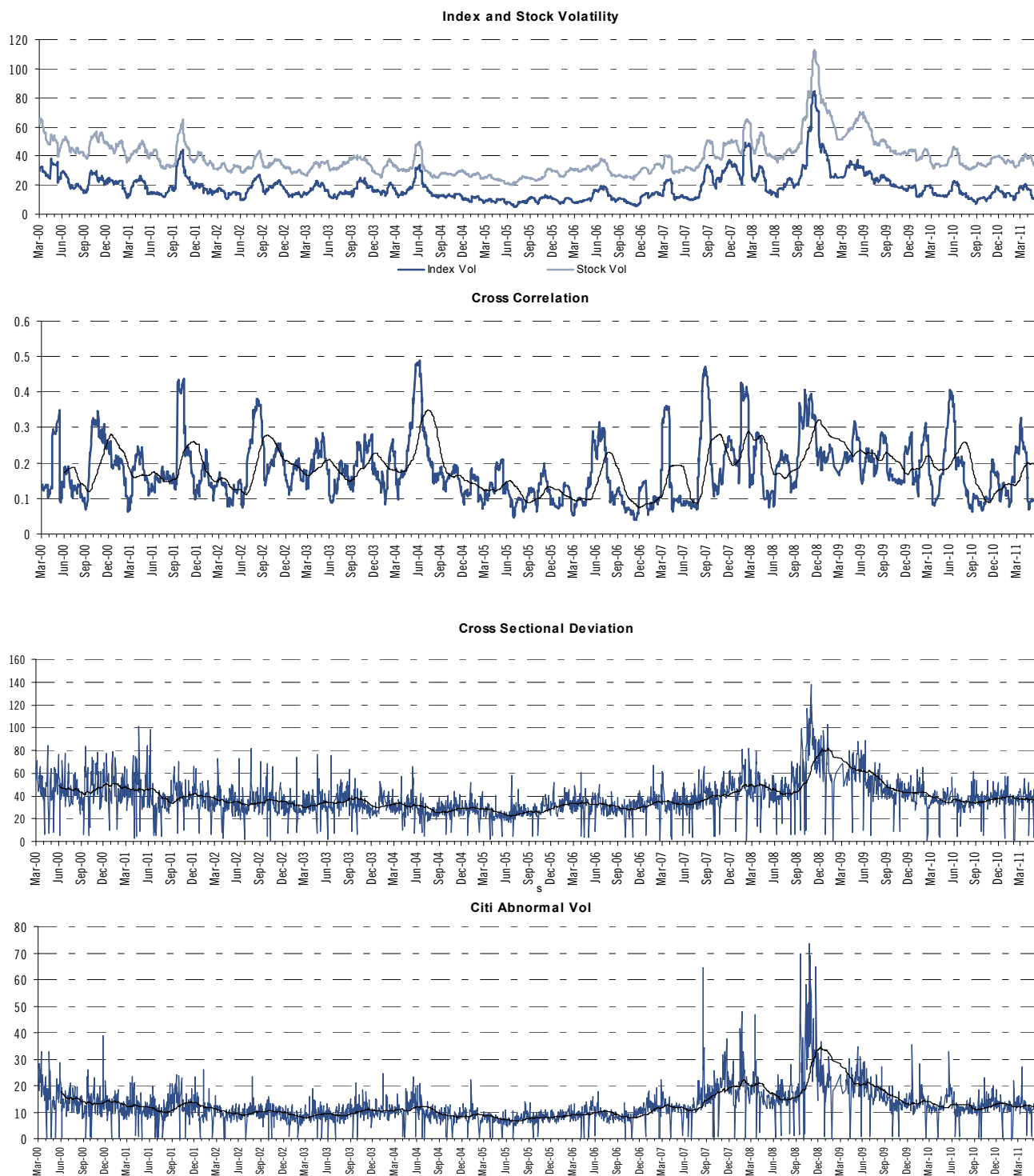
Figure 4. Australia Volatility Measures



Source: Citi Investment Research and Analysis

Hong Kong

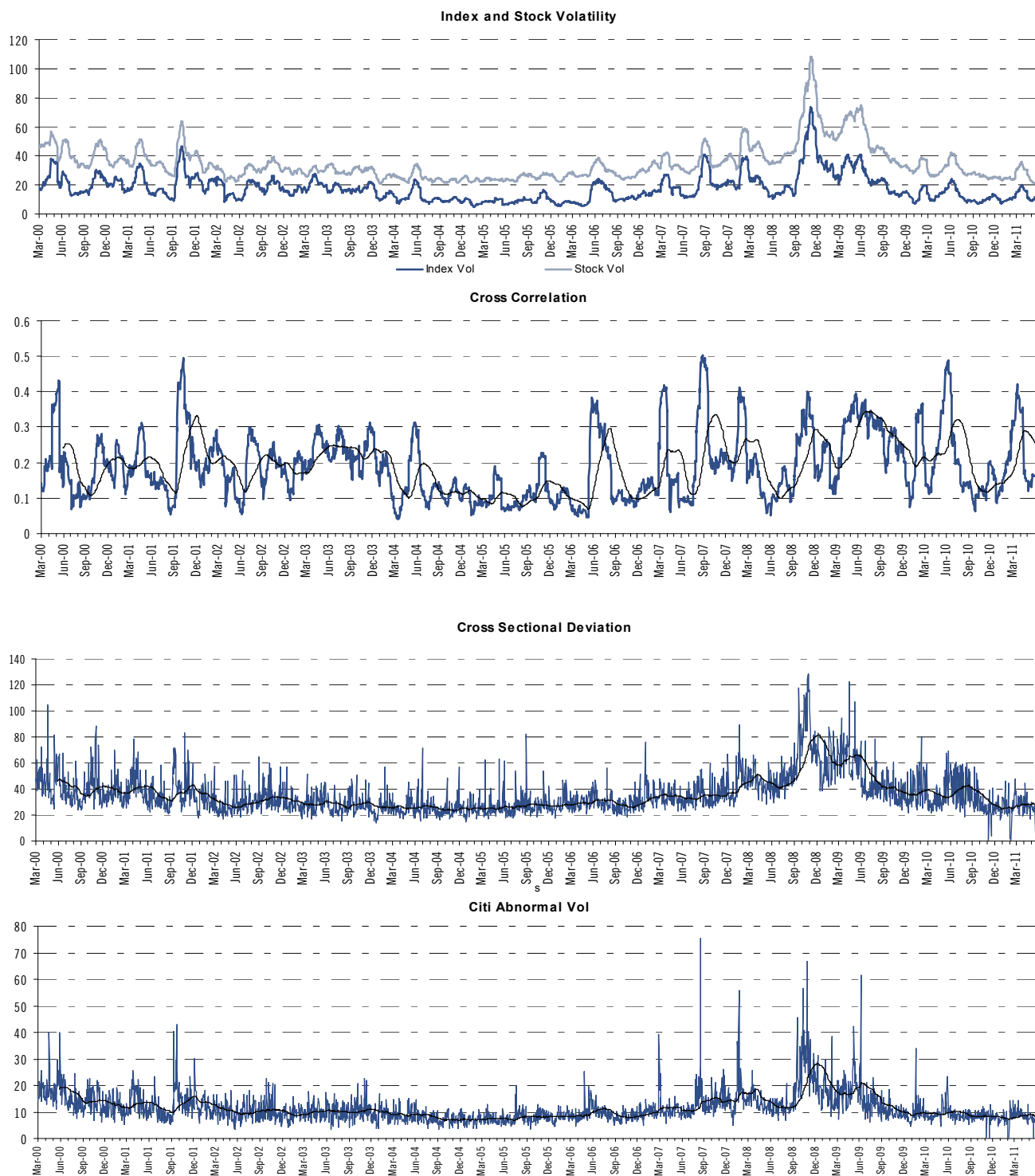
Figure 5. Hong Kong Volatility Measures



Source: Citi Investment Research and Analysis

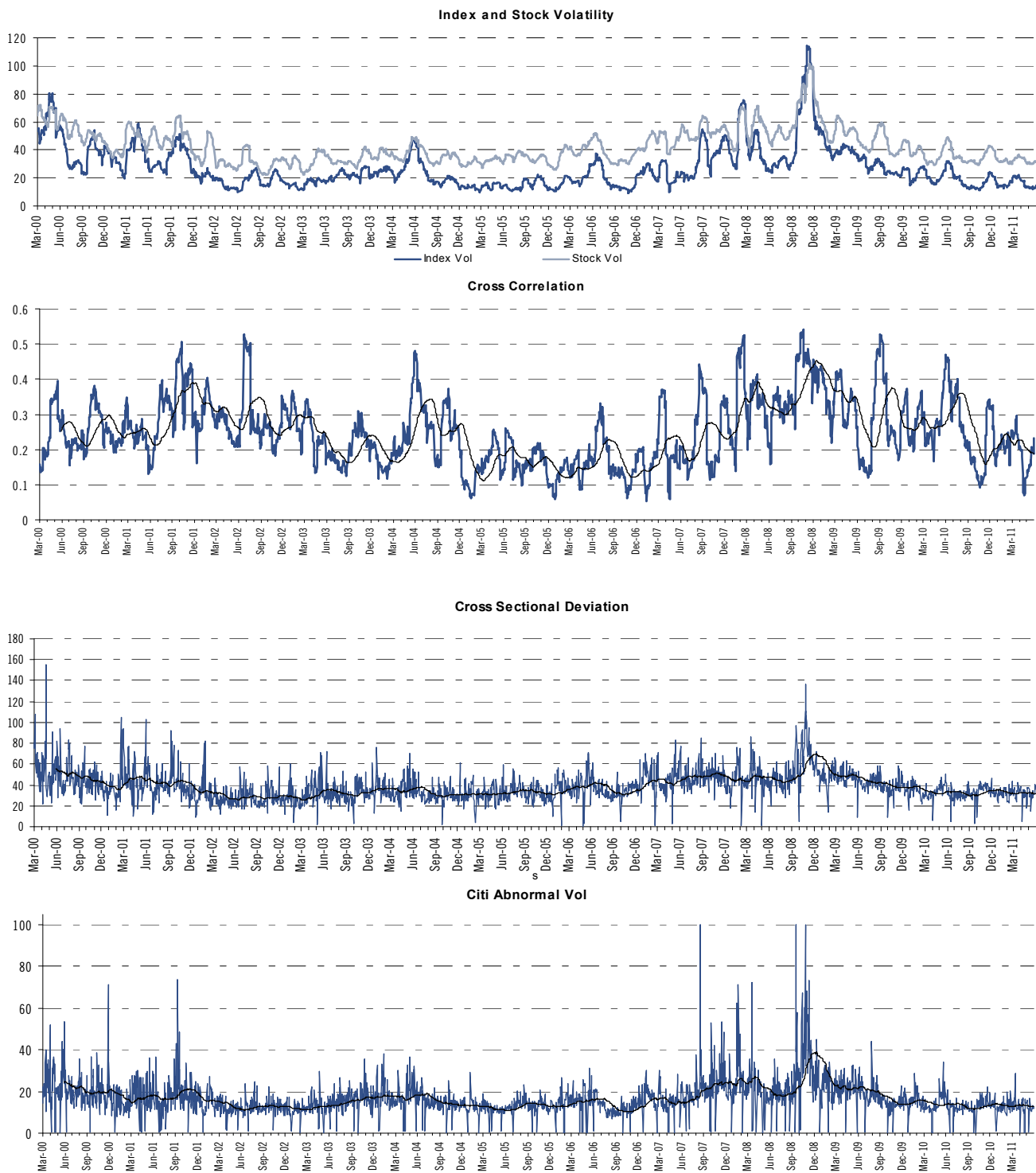
Singapore

Figure 6. Singapore Volatility Measures



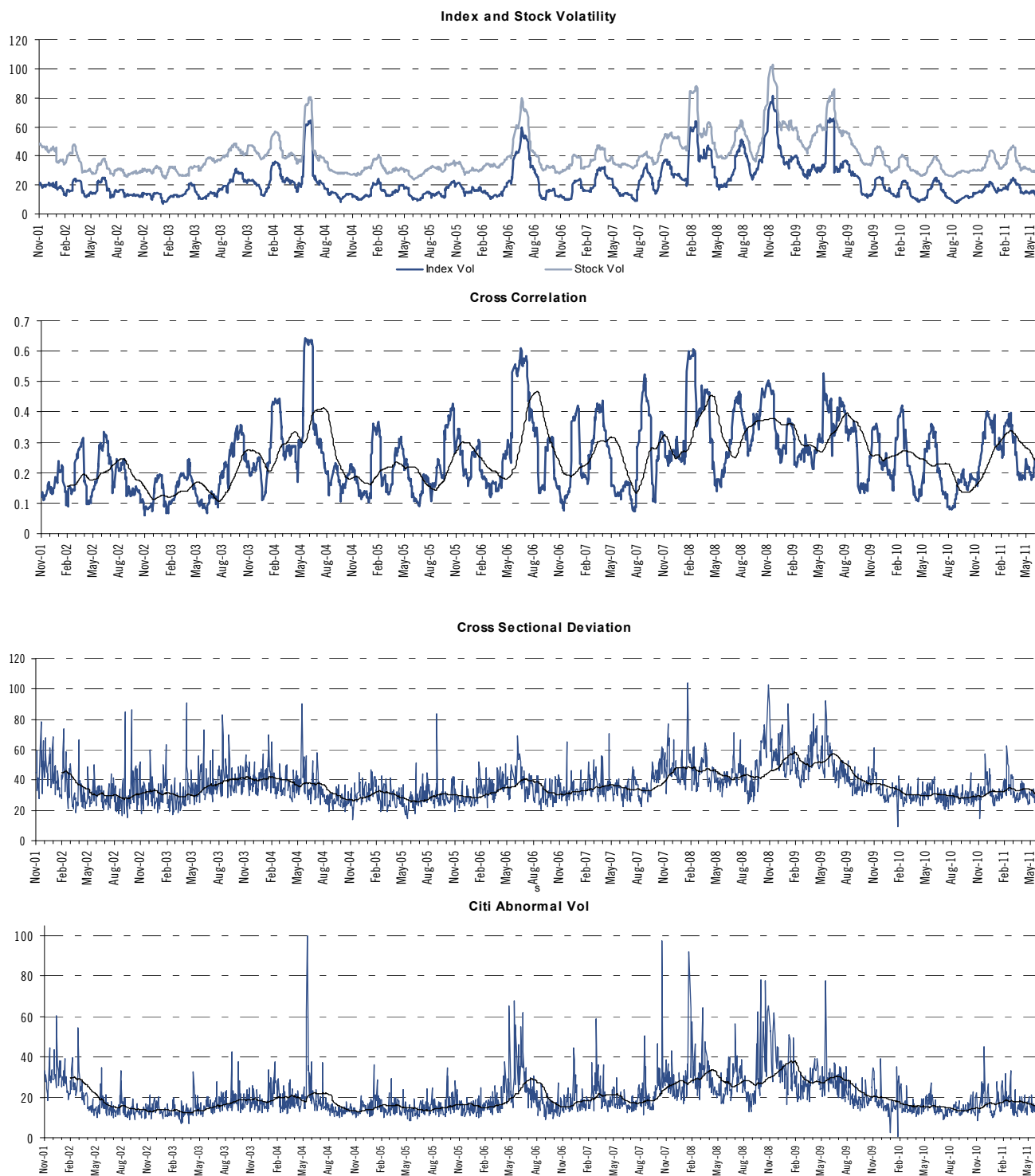
Source: Citi Investment Research and Analysis

Figure 7. China Volatility Measures



Source: Citi Investment Research and Analysis

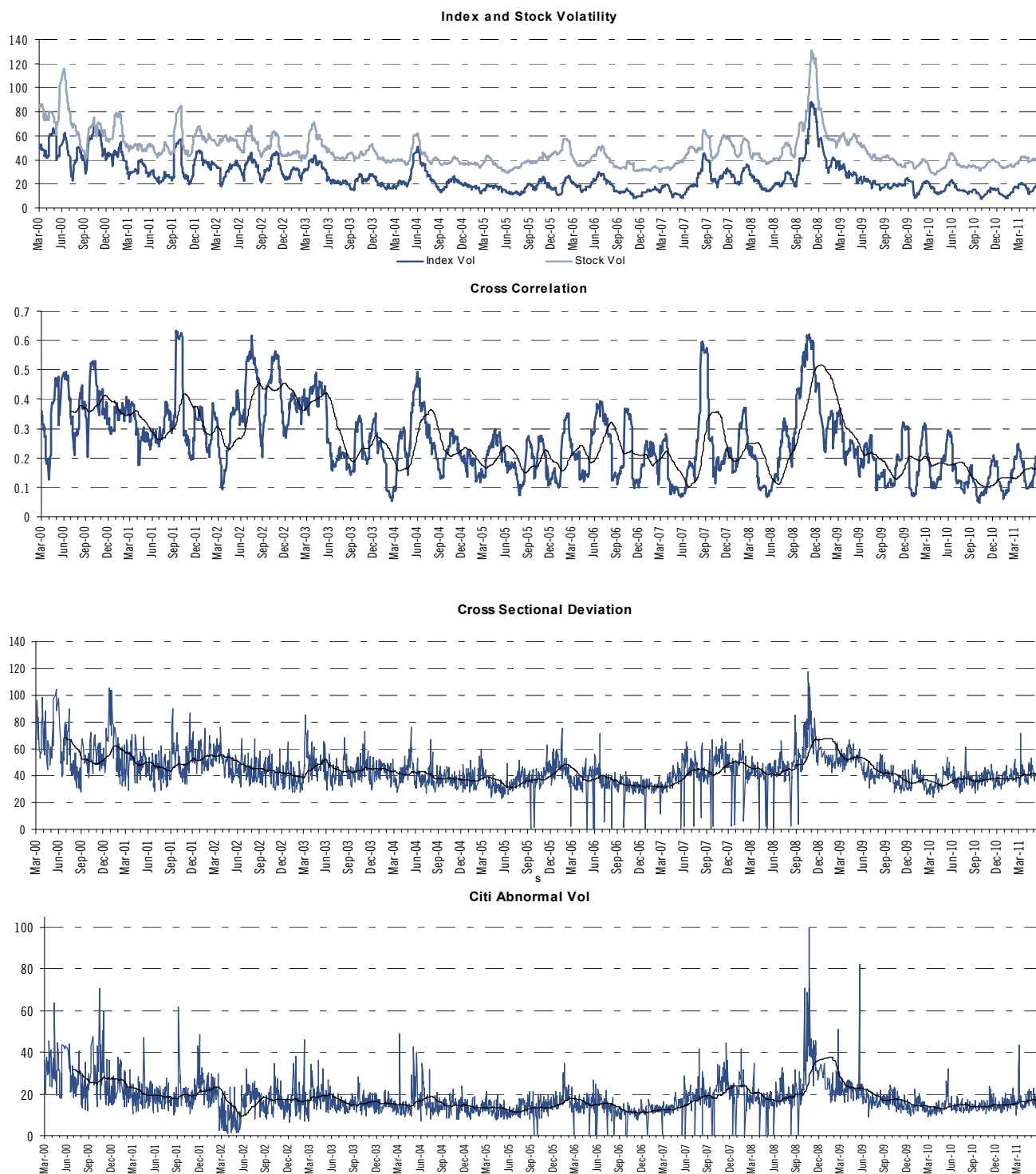
Figure 8. India Volatility Measures



Source: Citi Investment Research and Analysis

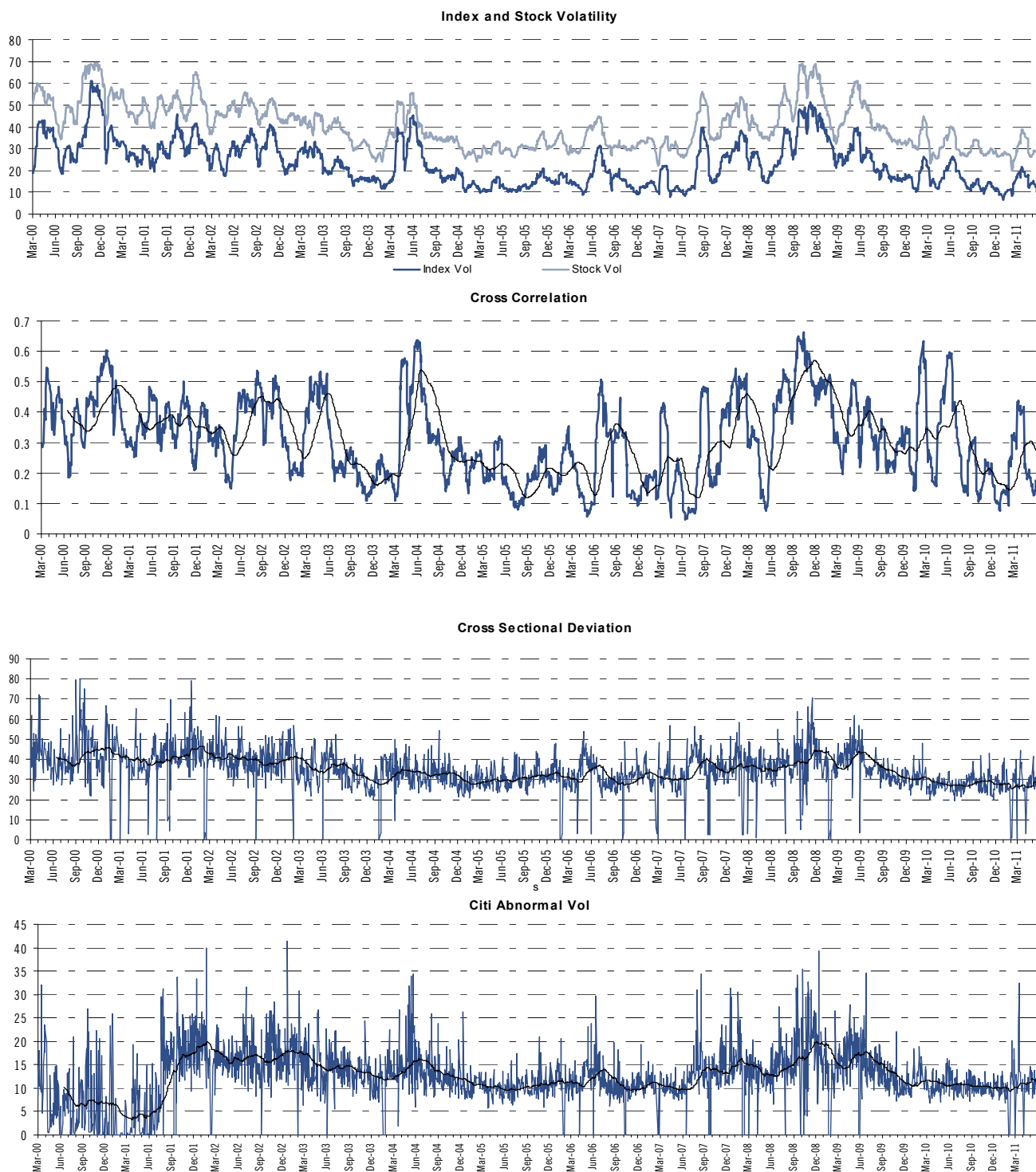
South Korea

Figure 9. South Korea Volatility Measures



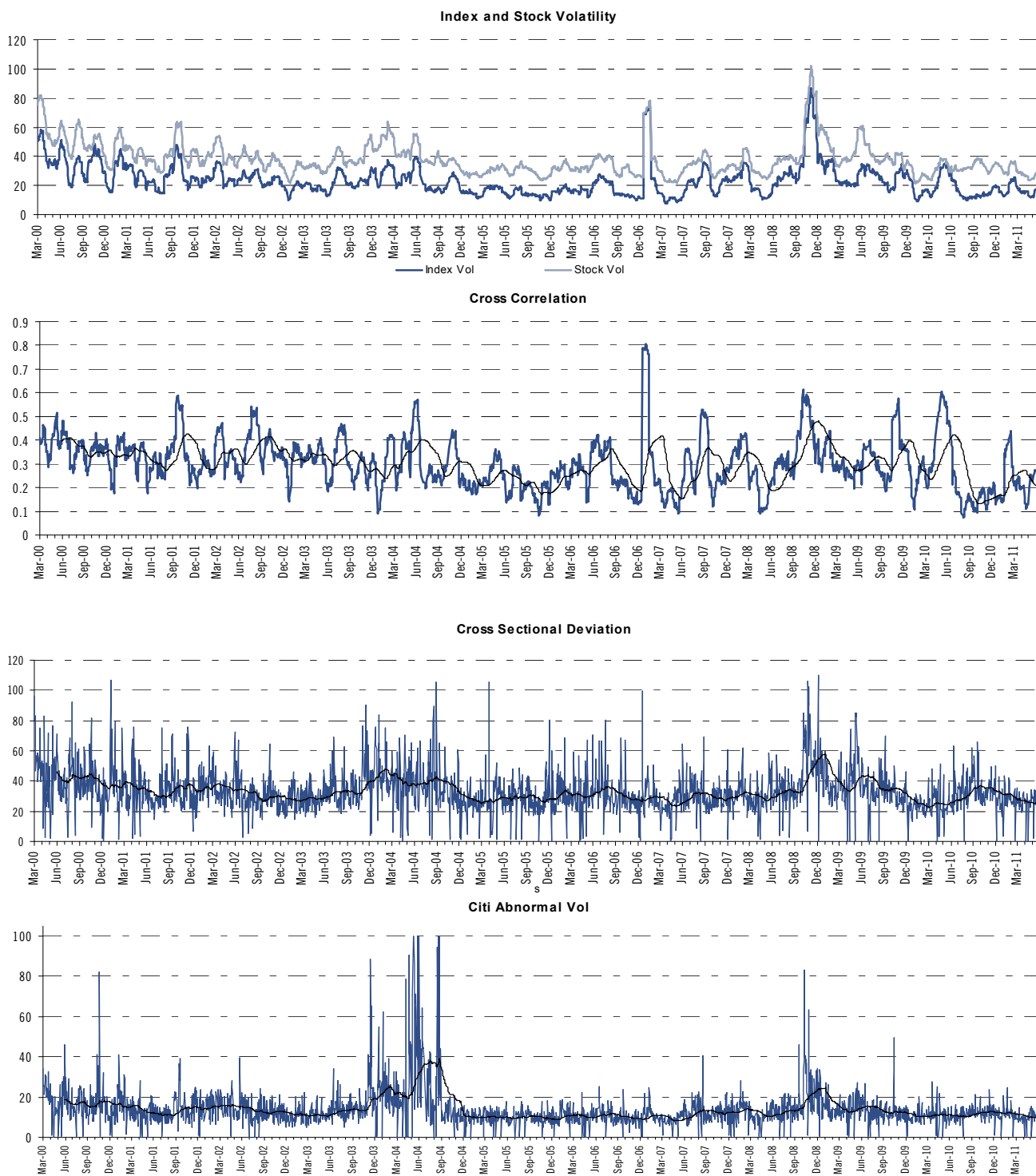
Source: Citi Investment Research and Analysis

Figure 10. Taiwan Volatility Measures



Source: Citi Investment Research and Analysis

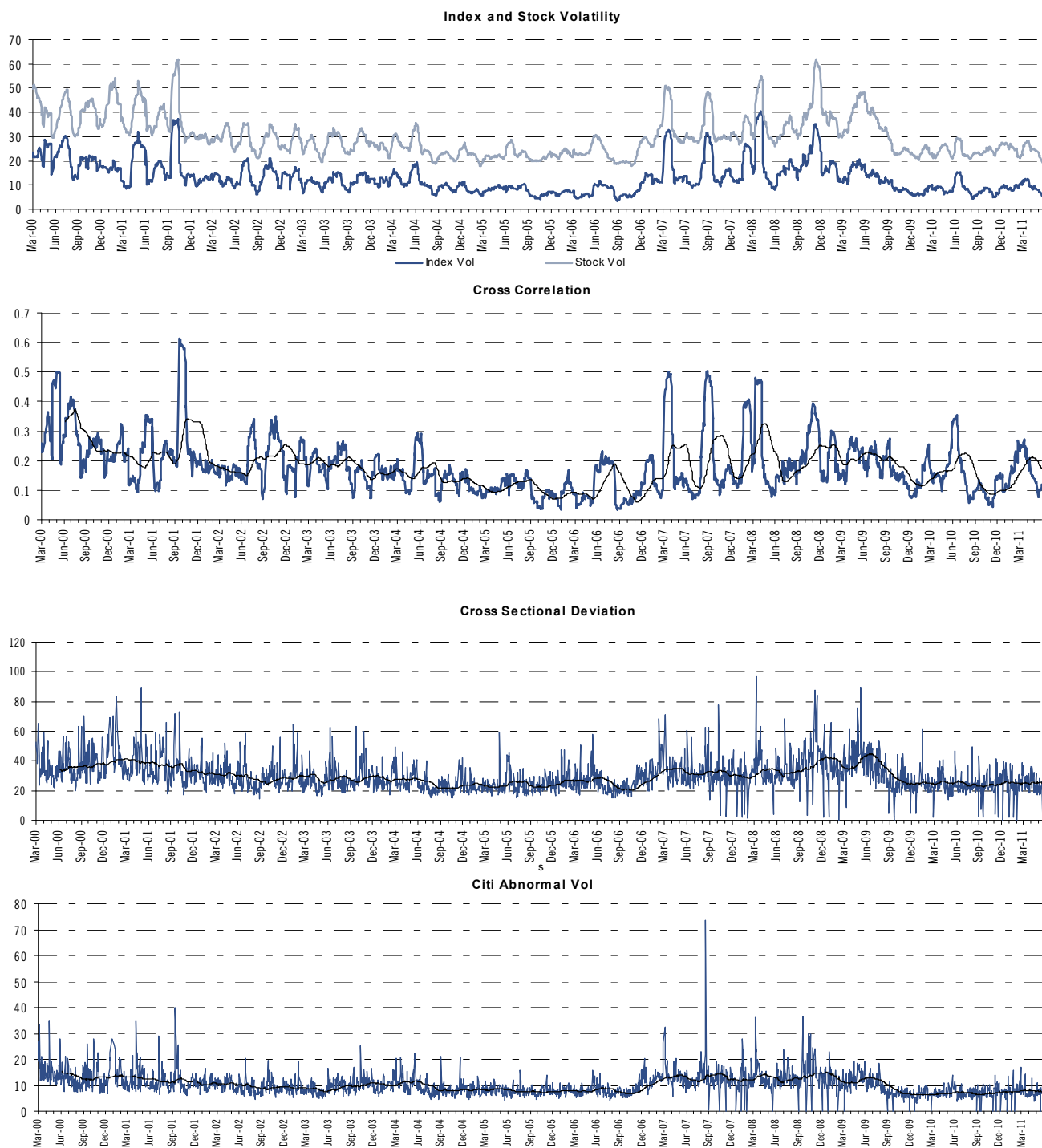
Figure 11. Thailand Volatility Measures



Source: Citi Investment Research and Analysis

Malaysia

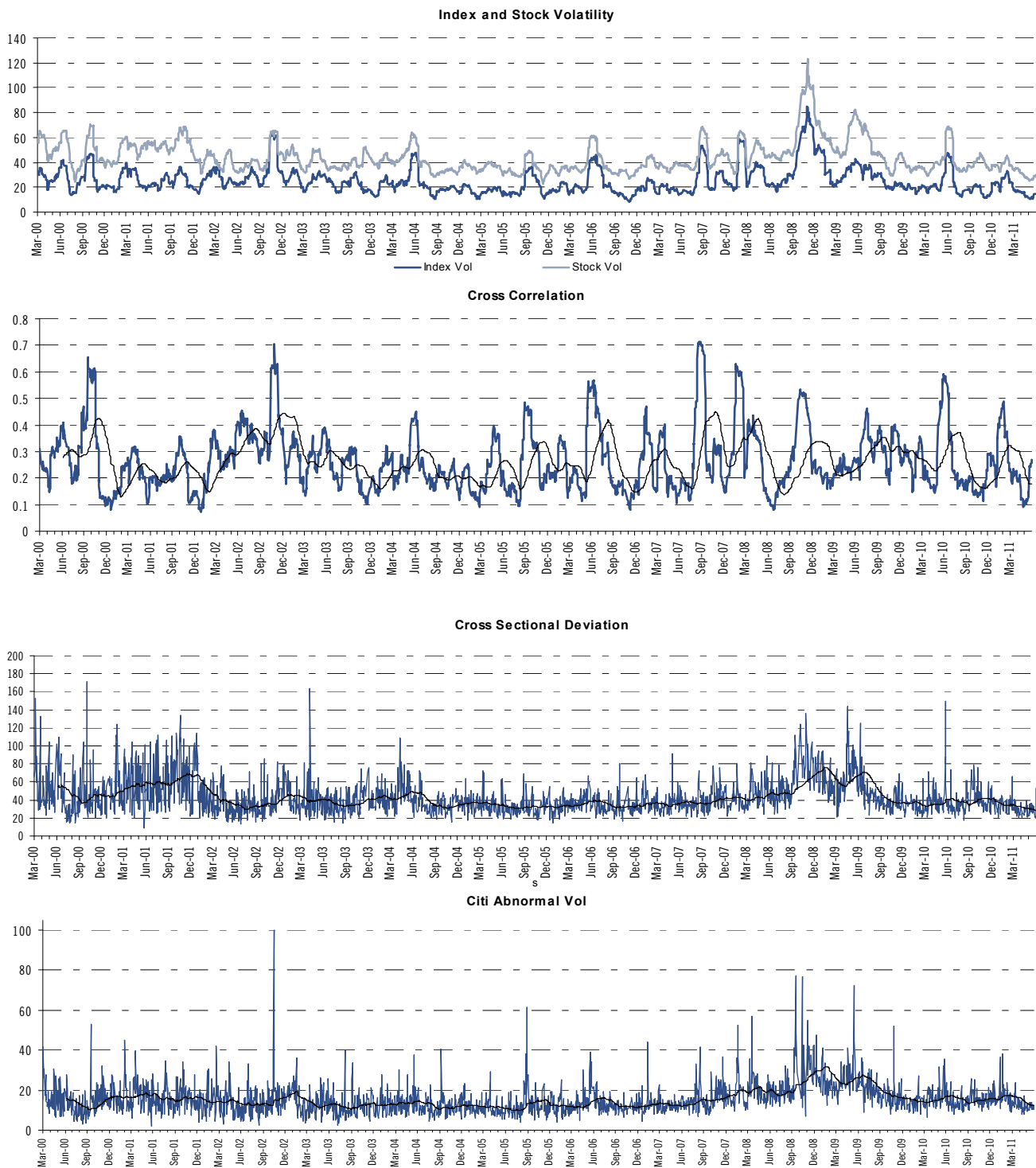
Figure 12. Malaysia Volatility Measures



Source: Citi Investment Research and Analysis

Indonesia

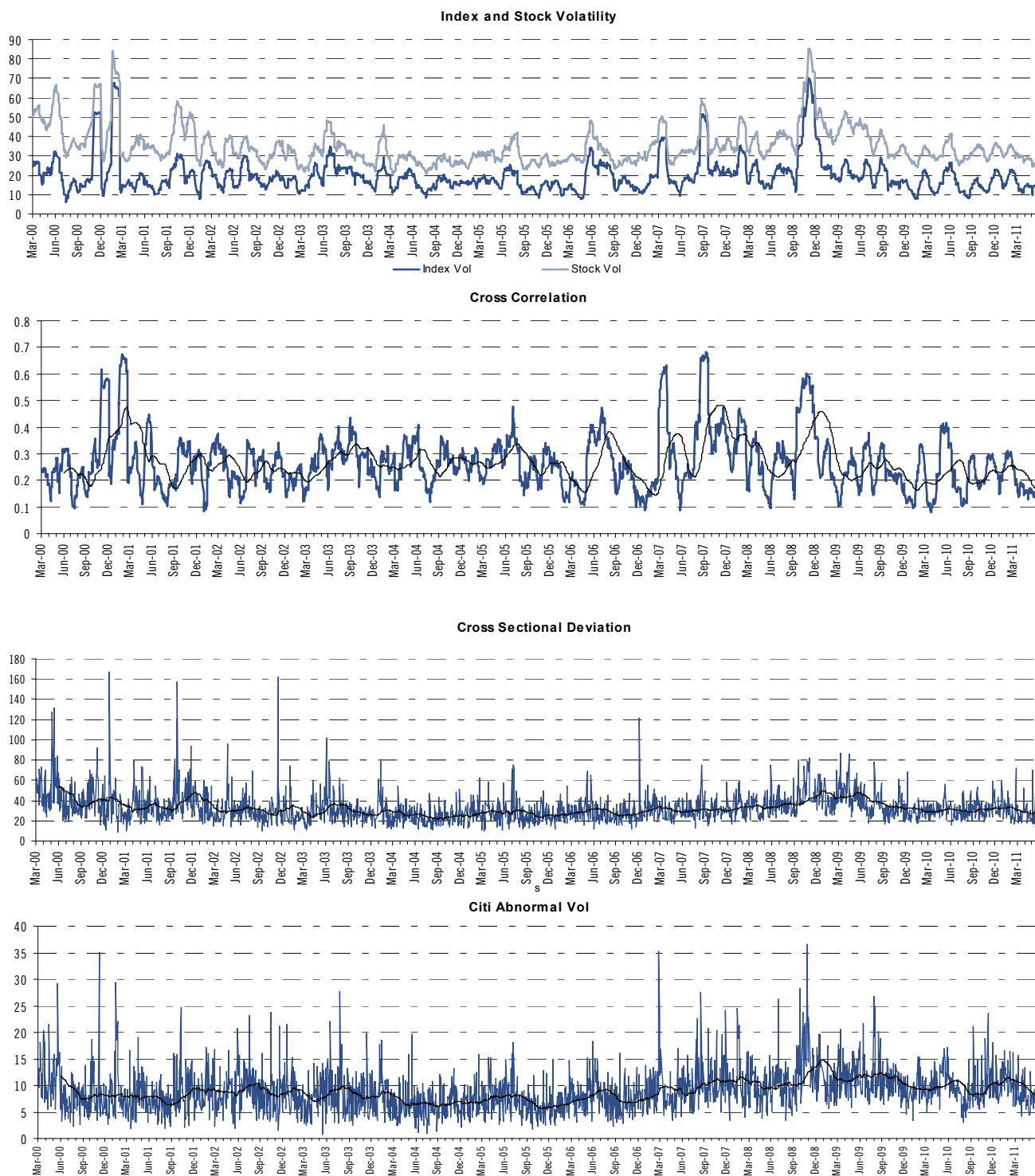
Figure 13. Indonesia Volatility Measures



Source: Citi Investment Research and Analysis

Philippines

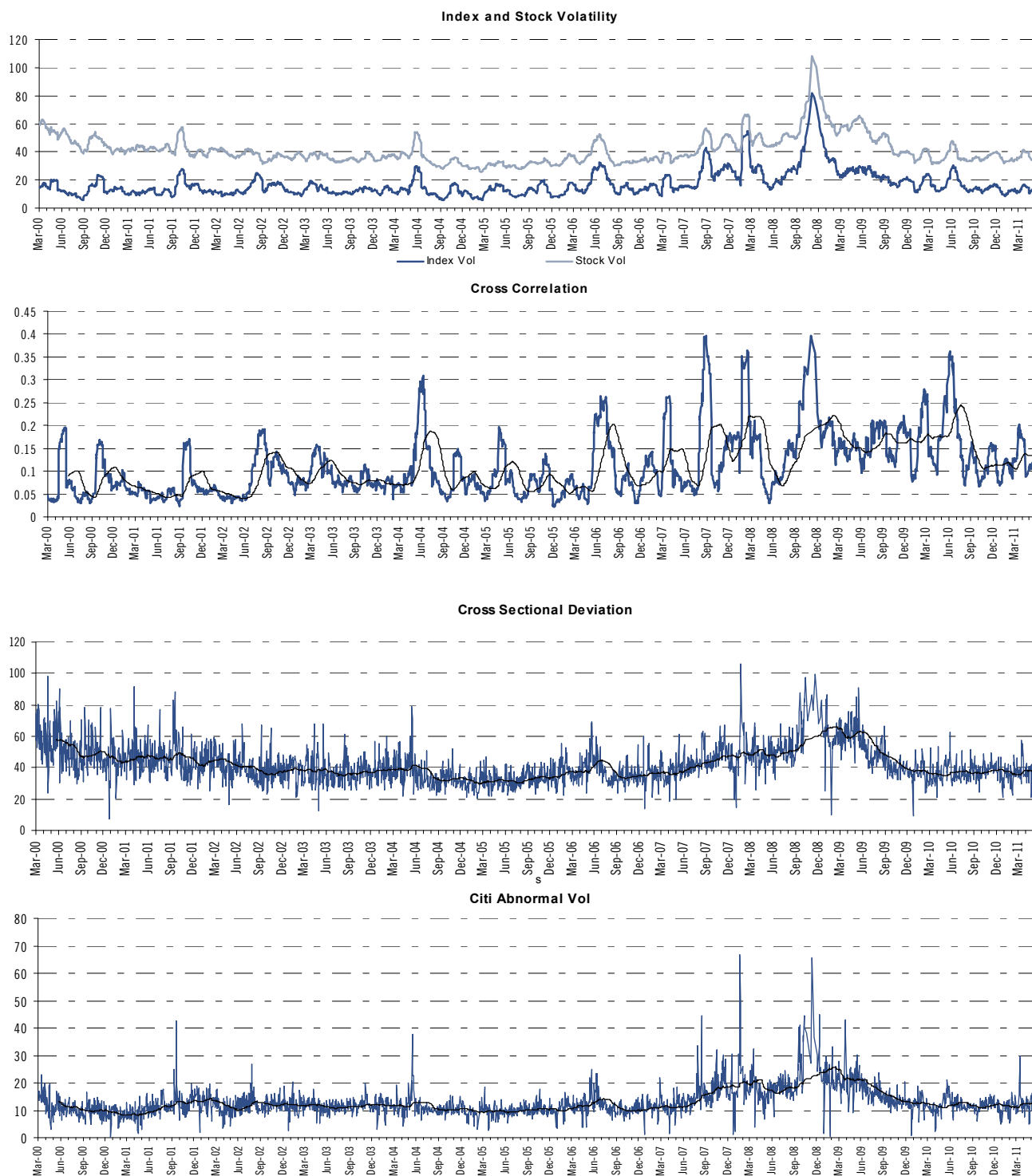
Figure 14. Philippines Volatility Measures



Source: Citi Investment Research and Analysis

Assets

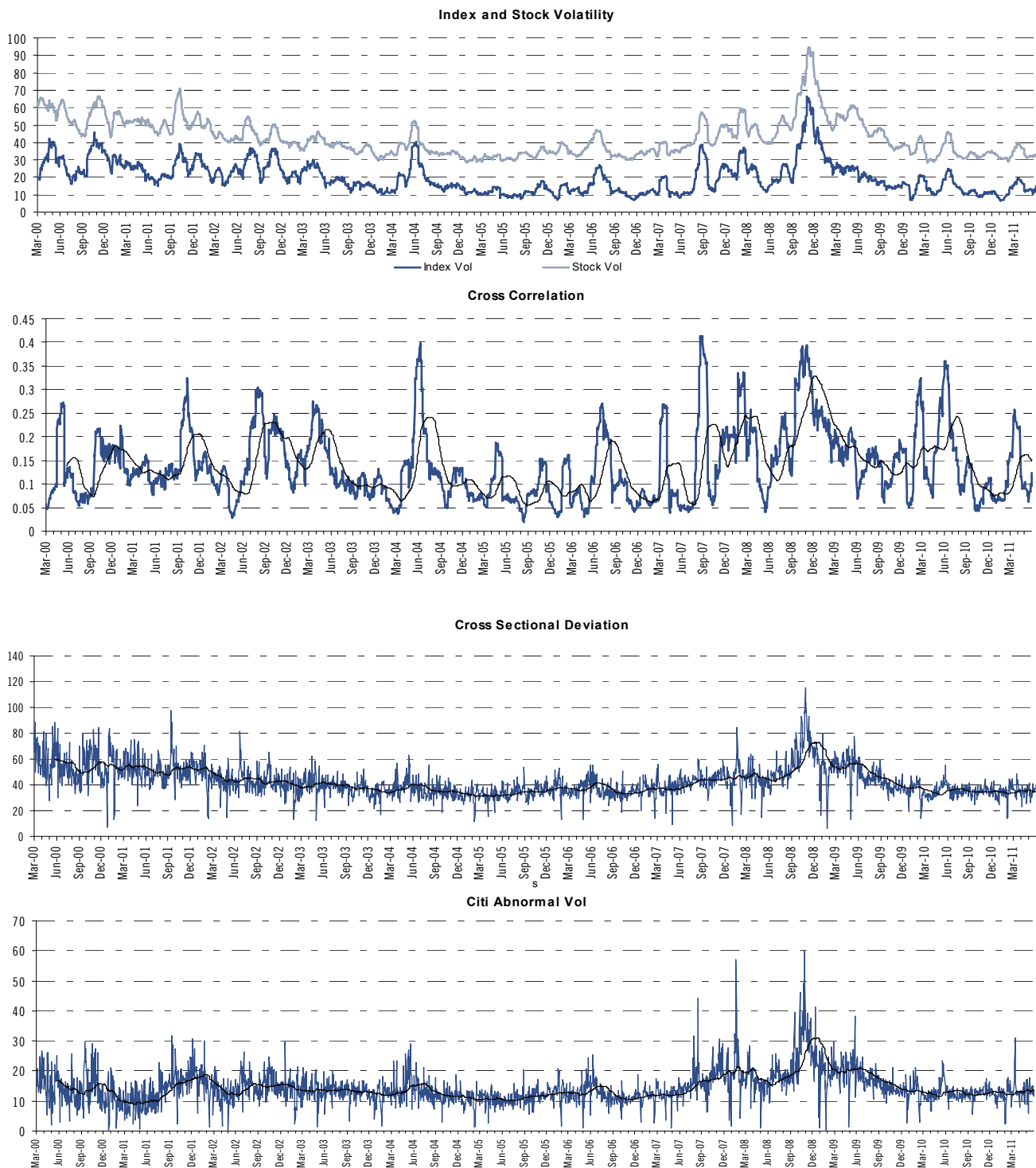
Figure 15. Assets Volatility Measures



Source: Citi Investment Research and Analysis

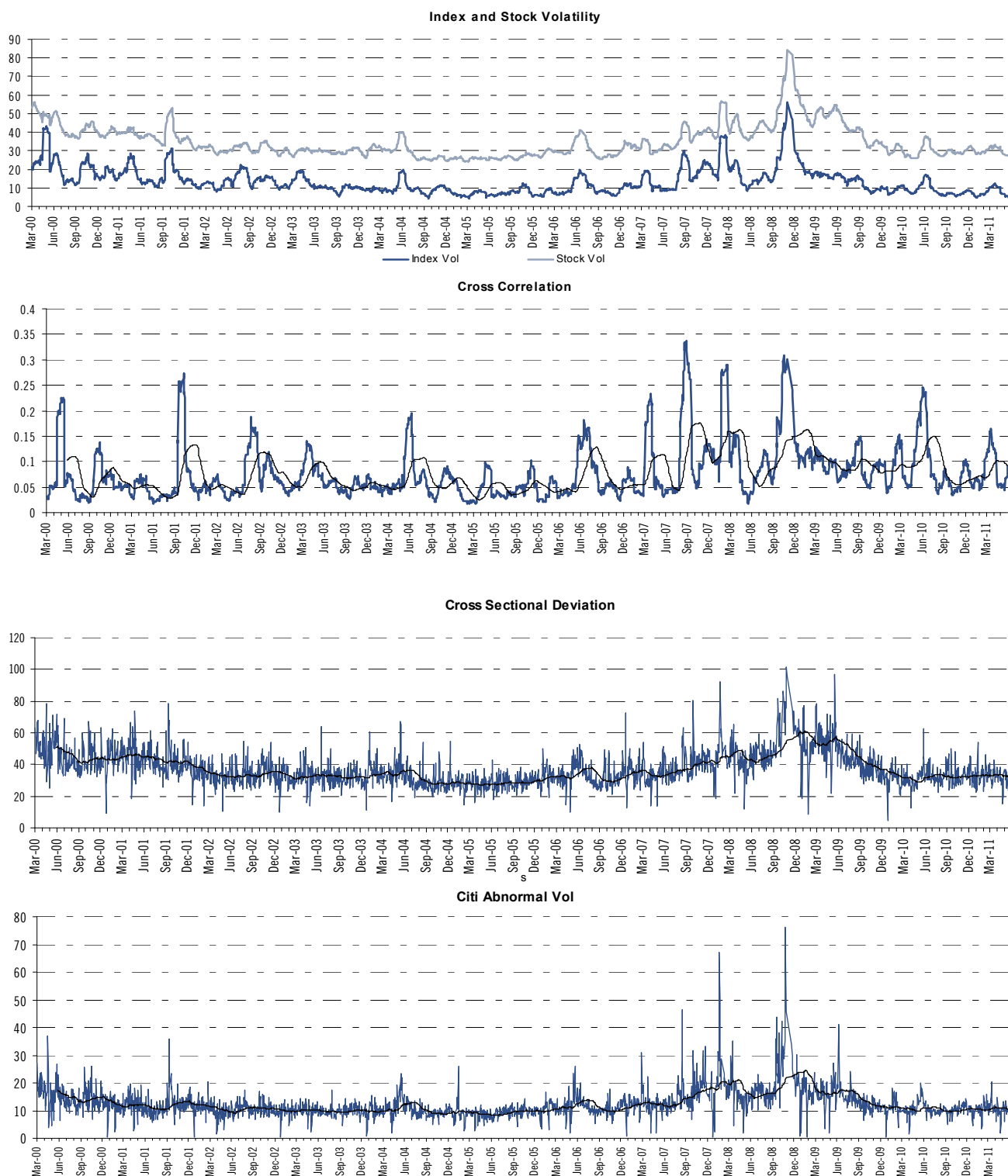
Cyclicals

Figure 16. Cyclicals Volatility Measures



Source: Citi Investment Research and Analysis

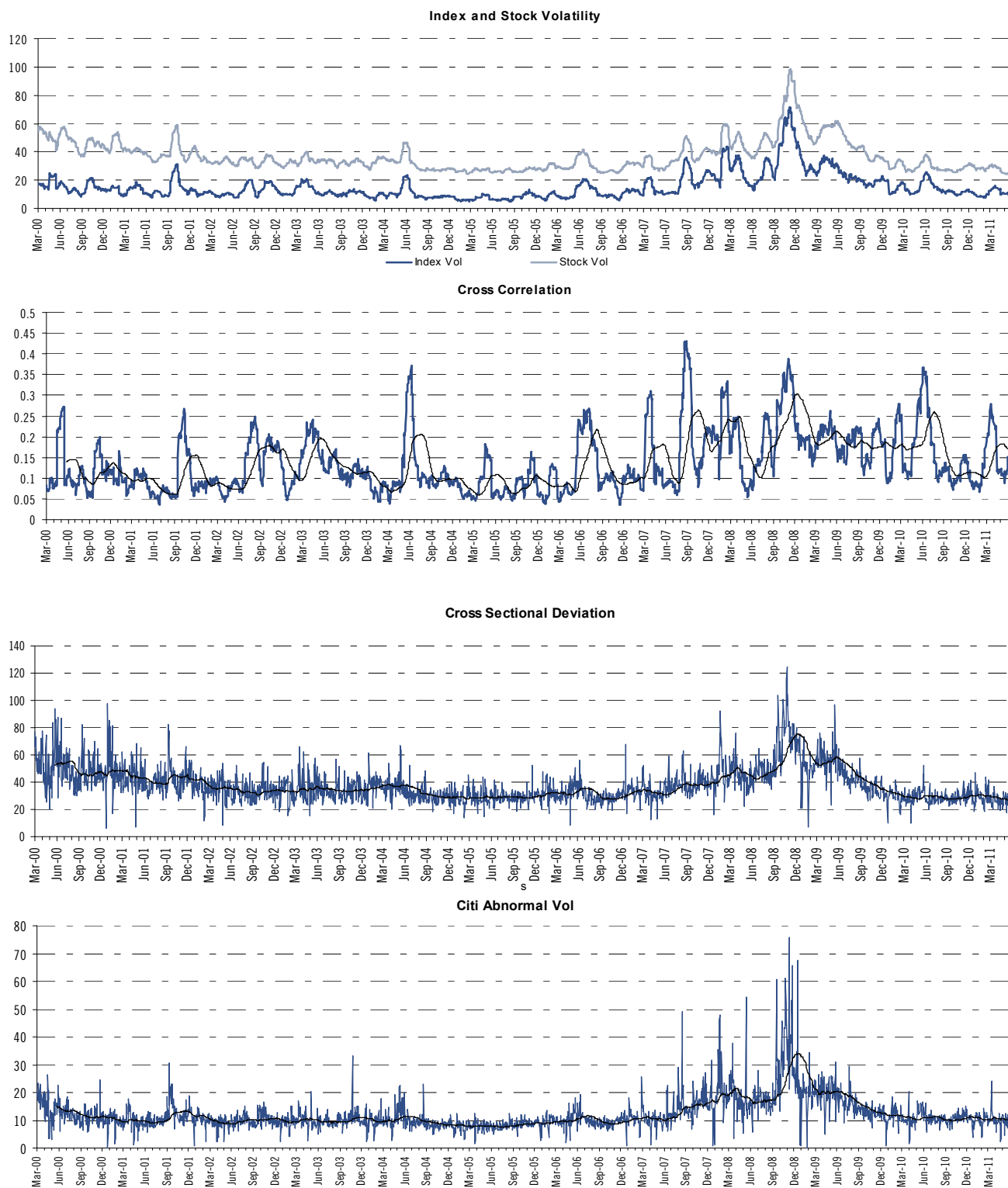
Figure 17. Financials Volatility Measures



Source: Citi Investment Research and Analysis

Defensives

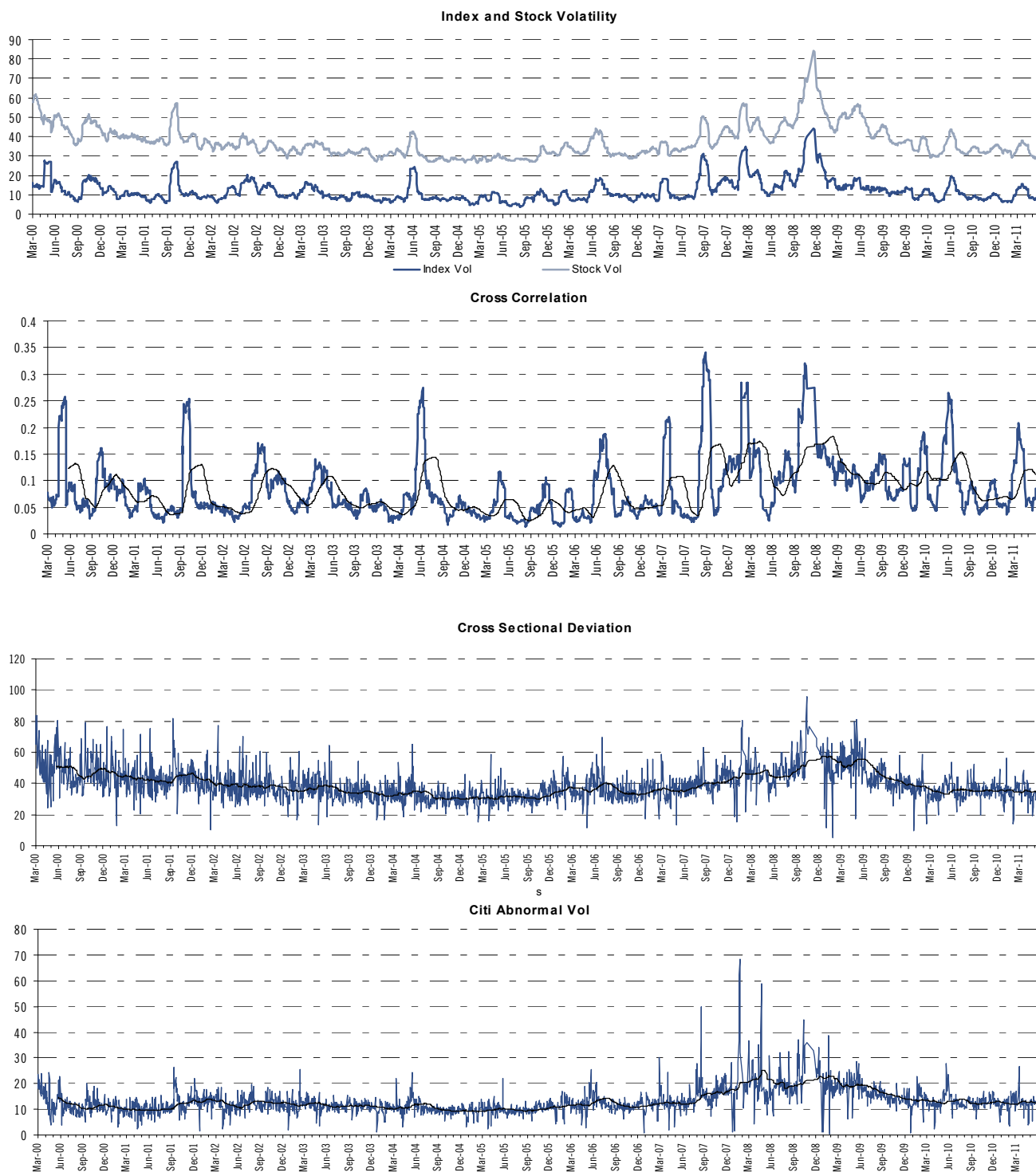
Figure 18. Defensives Volatility Measures



Source: Citi Investment Research and Analysis

Non Cyclicals

Figure 19. Non Cyclicals Volatility Measures



Source: Citi Investment Research and Analysis

Methodology

The report uses various S&P Regional, Country and Sector level BMI (Broad Market Index) indices which have 80% of weight in Large and Mid Cap and 20% in Small Cap for calculating various volatility measures:

1. Index Volatility

Index Volatility is historical one month rolling annualized volatility of various regional, country and sector level indices.

2. Stock Volatility

Stock Volatility is computed as the mean one month rolling annualized volatility of the index constituents.

3. Cross Correlation

Cross correlation is the mean pairwise correlation between rolling one month returns of all the possible pairs of index constituents

4. Cross Sectional Deviation

Cross Sectional Deviation is the annualized standard deviation of the daily returns of the constituent stocks in an index.

5. Citi Abnormal Vol

Citi Abnormal Vol is Citi's proprietary volatility indicator which whose daily reading is defined as

$$V_x = H/L - \max(O, C) / \min(O, C)$$

Where:

O: Open price on the given day

C: Closing price

H: High price

L: Low price

(For more details refer to our August 2010 report on [Citi Abnormal Vol](#))

Appendix A-1

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Citi Investment Research & Analysis Quantitative Decision Tree Model Coverage	47%	0%	53%			
<i>% of companies in each rating category that are investment banking clients</i>	56%	0%	44%			
Citi Investment Research & Analysis Asia Quantitative Radar Screen Model Coverage	20%	60%	20%			
<i>% of companies in each rating category that are investment banking clients</i>	24%	22%	20%			
Citi Investment Research & Analysis Australia Radar Model Coverage	51%	0%	49%			
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CIRA Quantitative Research World Radar Screen recommendations are based on a globally consistent framework to measure relative value and momentum for a large number of stocks across global developed and emerging markets. Relative value and momentum rankings are equally weighted to produce a global attractiveness score for each stock. The scores are then ranked and put into deciles. A stock with a decile rating of 1 denotes an attractiveness score in the top 10% of the universe (most attractive). A stock with a decile rating of 10 denotes an attractiveness score in the bottom 10% of the universe (least attractive).

CIRA Asia Quantitative Radar Screen model recommendations are based on a regionally consistent framework to measure relative value and momentum for a large number of stocks across regional developed and emerging markets. Relative value and momentum rankings are equally weighted to produce a global attractiveness score for each stock. The scores are then ranked and put into quintiles. A stock with a quintile rating of 1 denotes an attractiveness score in the top 20% of the universe (most attractive). A stock with a quintile rating of 5 denotes an attractiveness score in the bottom 20% of the universe (least attractive).

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