

Equities

4 October 2011 | 24 pages

GEM Volatility Outlook and Review

Correlation and Volatility Environment Deteriorate in September

■ Quantitative Analysis
■ Monthly

- **Difficult times** — 3Q11 was a terrible quarter globally. With the European debt crisis deepening and the global economic outlook also deteriorating, equity markets tumbled and markets remained extremely volatile. The MSCI GEM benchmark index closed down almost 15% on the month – and the peak-to-trough fall over 3Q was more than 27%.
- **Risk Aversion Rises** — All measures of risk increased and headline volatility spiked as markets tumbled. Most worryingly, our measure of risk generated using individual intra-day stock pricing also ticked up. This suggests a more general backing away from risk and less efficiency in stock pricing.
- **Cross Correlations Rise** — The increase in market-level volatility helps explain the dramatic increase in pair-wise cross correlations, which reached levels not seen since the GFC. However while excess-return correlation rose (See figure 1), the picture is different and suggests markets remain more rational than during the GFC.

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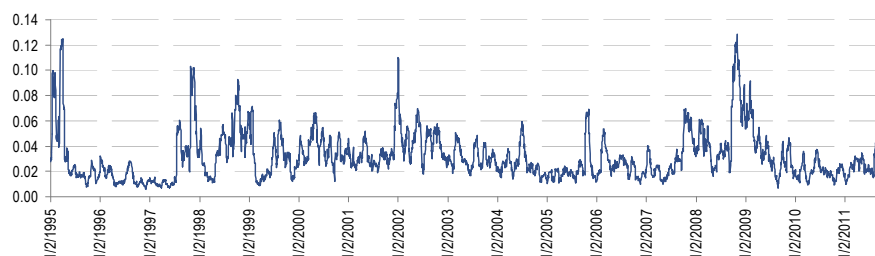
Nick Morton

Tushar Subhra Mandal

Si An Tan

Zee Yusuf

Figure 1. Pair-wise Excess Return Correlations across Global Emerging Markets



Source: Citi Investment Research and Analysis

See Appendix A-1 for Analyst Certification, Important Disclosures and non-US research analyst disclosures.

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Summary

Figure 2. Index and Stock Volatility

Index Volatility	End of Last Month	End of Prior Month	3 Months Ago	6 Months Ago	12 Months Ago
GEM	26.52	28.11	10.57	10.56	7.66
LatAm	25.77	41.20	11.52	11.51	11.63
EmergingAsia	28.47	29.11	13.43	10.99	10.10
CCEMA	27.84	30.32	10.58	16.45	9.99
Brazil	26.83	44.59	14.64	13.09	14.10
Chile	28.21	40.41	12.42	11.52	11.88
Mexico	29.05	35.88	9.26	10.55	9.10
China	39.13	37.85	20.66	13.95	15.52
India	21.68	23.34	13.89	14.12	14.88
South Korea	43.61	45.25	15.36	13.71	12.91
Taiwan	32.37	36.78	16.63	14.30	13.48
Russia	41.39	42.63	14.89	23.51	14.09
South Africa	23.45	22.07	9.70	15.98	10.27
Turkey	32.29	42.95	15.86	18.49	18.58
Poland	41.72	44.55	15.19	11.23	12.26
Stock Volatility	End of Last Month	End of Prior Month	3 Months Ago	6 Months Ago	12 Months Ago
GEM	44.64	50.21	30.58	29.53	30.49
LatAm	38.52	50.64	27.41	25.12	25.96
EmergingAsia	43.40	46.96	31.09	28.71	31.13
CCEMA	39.05	47.37	24.94	26.31	24.36
Brazil	39.67	53.18	30.26	25.44	28.69
Chile	35.31	46.92	20.31	21.33	19.11
Mexico	38.18	46.72	22.87	20.04	21.93
China	47.83	48.57	34.19	31.22	35.93
India	35.97	40.96	28.98	30.97	30.76
South Korea	61.15	67.66	36.52	40.29	37.44
Taiwan	43.45	55.76	32.59	27.14	27.79
Russia	57.80	61.84	24.20	29.52	26.83
South Africa	29.25	30.44	20.37	22.50	20.79
Turkey	37.70	57.70	26.71	27.88	30.42
Poland	52.99	68.76	28.96	21.62	25.40

Source: Citi Investment Research and Analysis

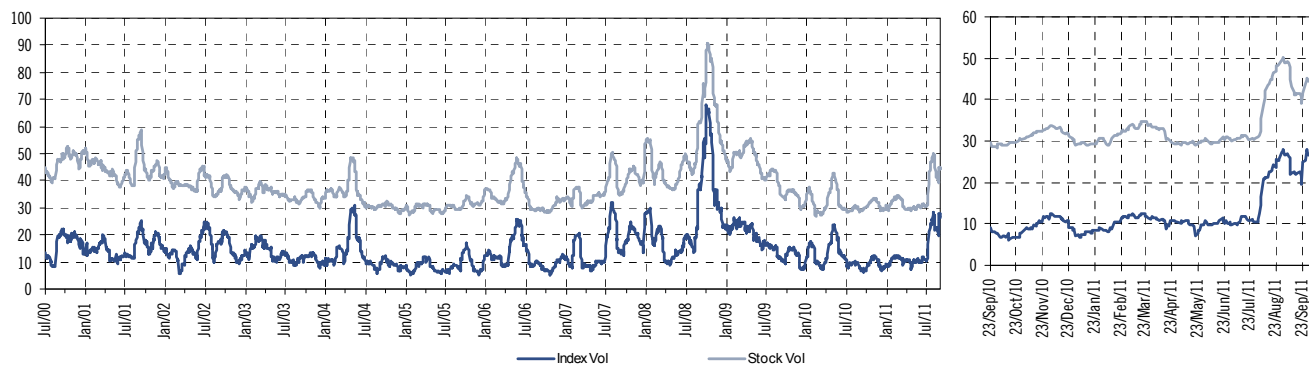
Figure 3. Correlations, Standard Deviation and Abnormal Vol

Cross Correlation	End of Last Month	End of Prior Month	3 Months Ago	6 Months Ago	12 Months Ago
GEM	0.27	0.29	0.10	0.08	0.05
LatAm	0.33	0.50	0.13	0.14	0.10
EmergingAsia	0.32	0.35	0.15	0.09	0.06
CCEMA	0.23	0.30	0.10	0.16	0.08
Brazil	0.35	0.51	0.18	0.16	0.13
Chile	0.50	0.59	0.29	0.22	0.19
Mexico	0.39	0.49	0.13	0.22	0.13
China	0.39	0.38	0.29	0.12	0.10
India	0.28	0.32	0.20	0.20	0.18
South Korea	0.50	0.46	0.11	0.10	0.09
Taiwan	0.54	0.59	0.27	0.19	0.18
Russia	0.62	0.62	0.24	0.52	0.20
South Africa	0.23	0.26	0.12	0.17	0.10
Turkey	0.53	0.59	0.31	0.29	0.31
Poland	0.41	0.52	0.18	0.11	0.12
Cross Sectional Deviation	End of Last Month	End of Prior Month	3 Months Ago	6 Months Ago	12 Months Ago
GEM	42.30	45.66	32.51	30.77	32.97
LatAm	33.13	35.66	27.72	24.69	25.80
EmergingAsia	40.26	40.79	32.28	29.18	33.30
CCEMA	38.00	42.98	25.83	24.29	25.18
Brazil	34.19	37.34	29.22	24.29	29.07
Chile	28.39	28.48	18.26	19.29	18.09
Mexico	32.08	33.50	23.47	18.38	20.90
China	40.38	42.09	31.18	31.99	36.43
India	34.67	37.28	27.86	31.43	30.47
South Korea	48.75	53.21	37.99	41.31	39.31
Taiwan	32.97	37.14	31.65	28.12	27.31
Russia	39.14	40.51	22.13	21.30	26.08
South Africa	27.64	26.72	20.38	24.06	20.52
Turkey	28.12	39.60	25.46	23.21	26.47
Poland	42.96	51.62	27.76	23.95	25.23
Citi Abnormal Vol	End of Last Month	End of Prior Month	3 Months Ago	6 Months Ago	12 Months Ago
GEM	19.05	21.17	12.36	11.46	12.62
LatAm	17.02	20.62	11.71	9.90	11.56
EmergingAsia	17.62	19.81	12.25	10.83	12.94
CCEMA	23.04	23.94	11.93	10.36	11.75
Brazil	17.85	21.67	12.11	10.87	13.45
Chile	19.70	20.75	11.68	10.63	9.00
Mexico	19.28	19.88	11.47	9.32	10.37
China	19.78	24.32	12.50	12.39	13.79
India	18.19	20.80	13.40	15.26	15.75
South Korea	24.07	27.07	14.04	16.81	14.26
Taiwan	14.87	17.96	11.99	10.82	10.00
Russia	26.49	30.92	11.80	11.82	10.94
South Africa	18.58	15.57	12.49	12.32	11.50
Turkey	18.25	28.48	14.14	11.45	16.93
Poland	20.85	33.19	11.00	9.82	10.91

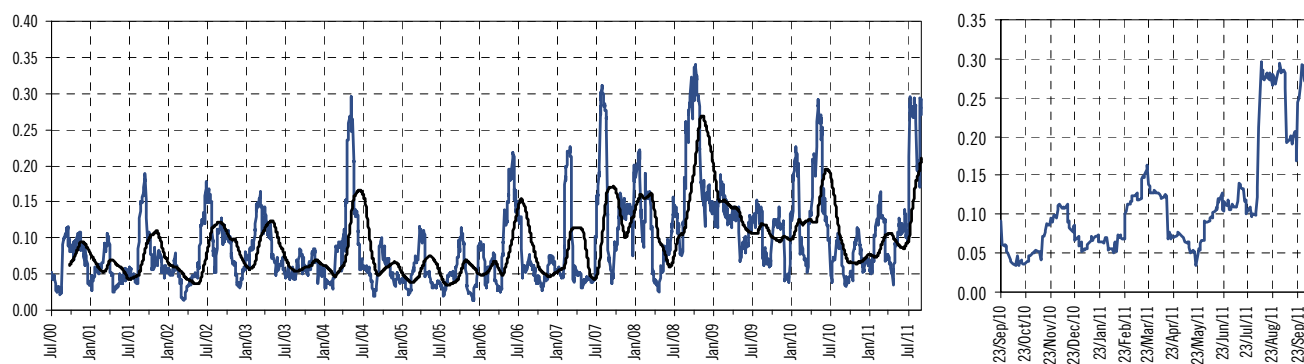
Source: Citi Investment Research and Analysis

Global Emerging Markets

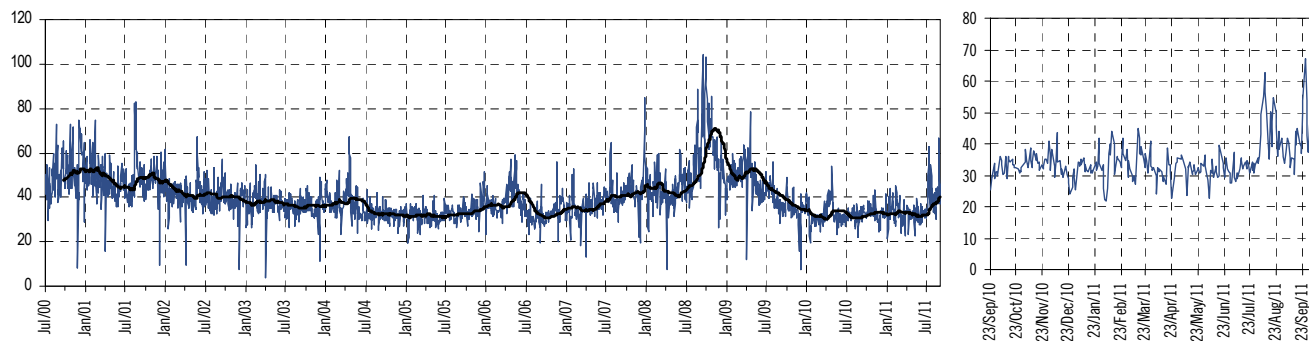
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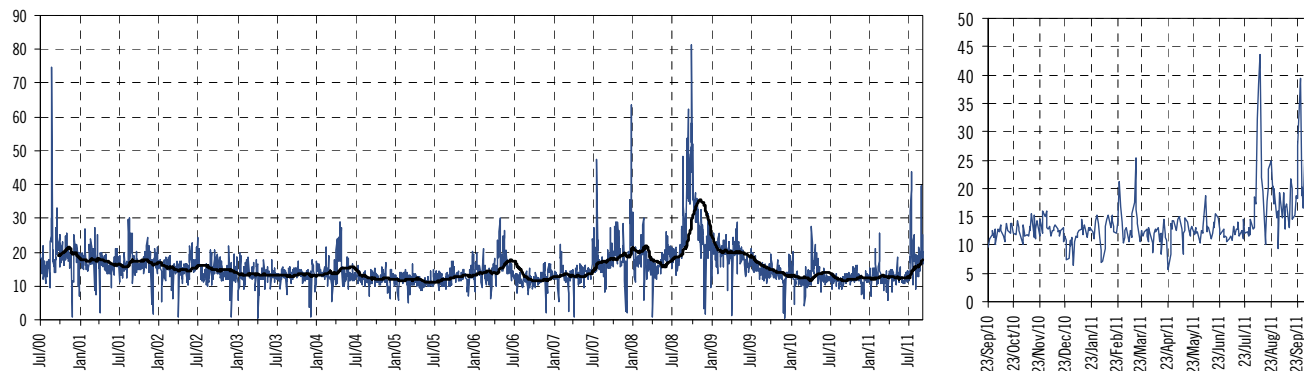
Cross Correlation



Cross Sectional Deviation



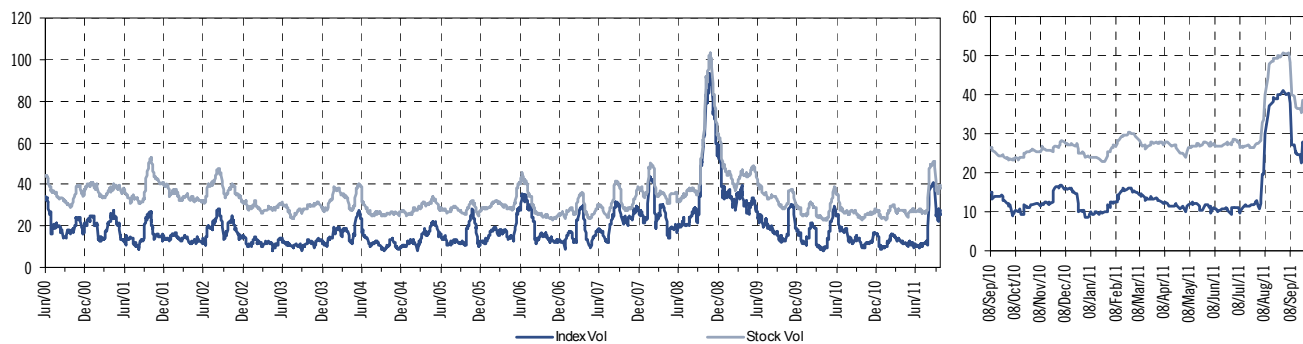
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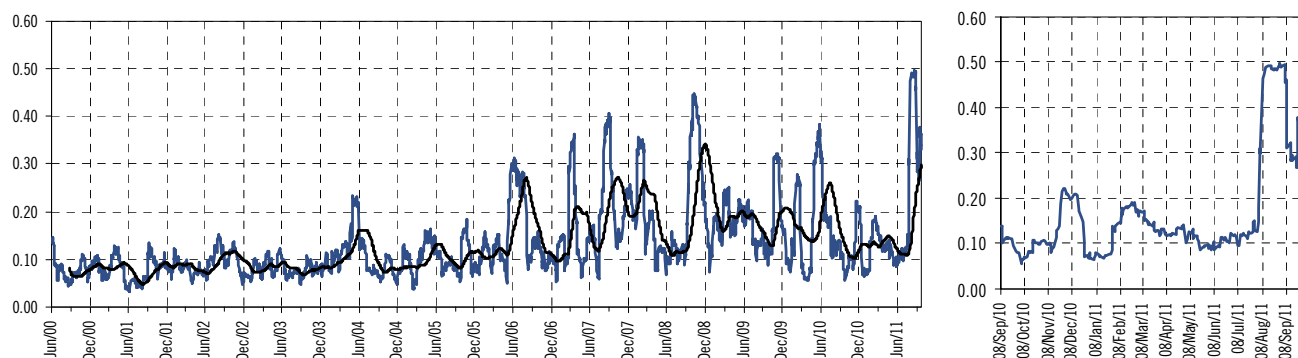
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Latin America

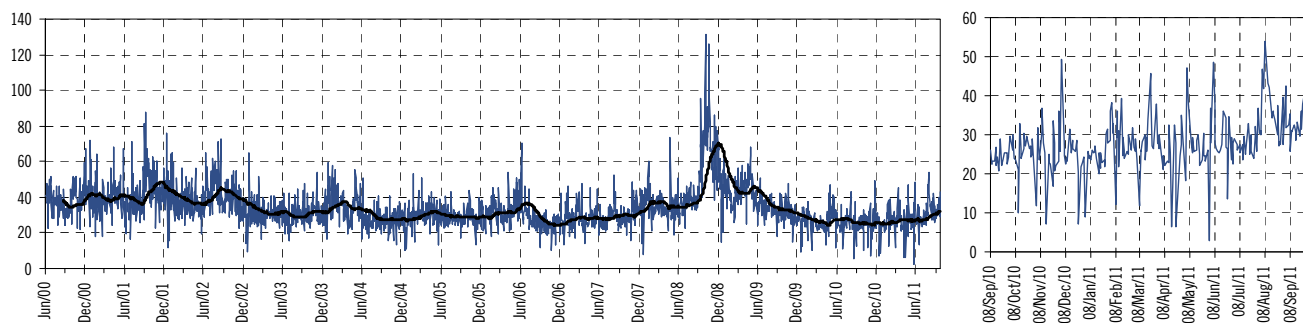
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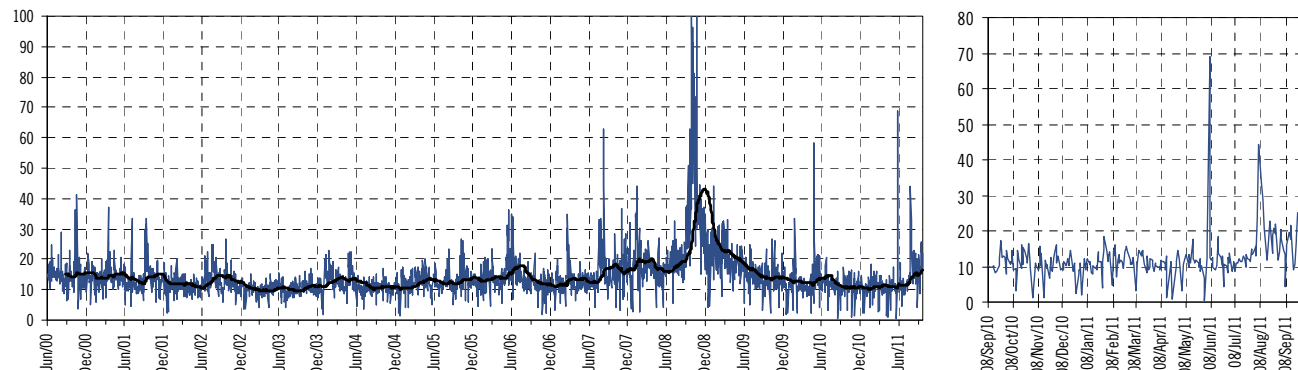
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Cross Sectional Deviation



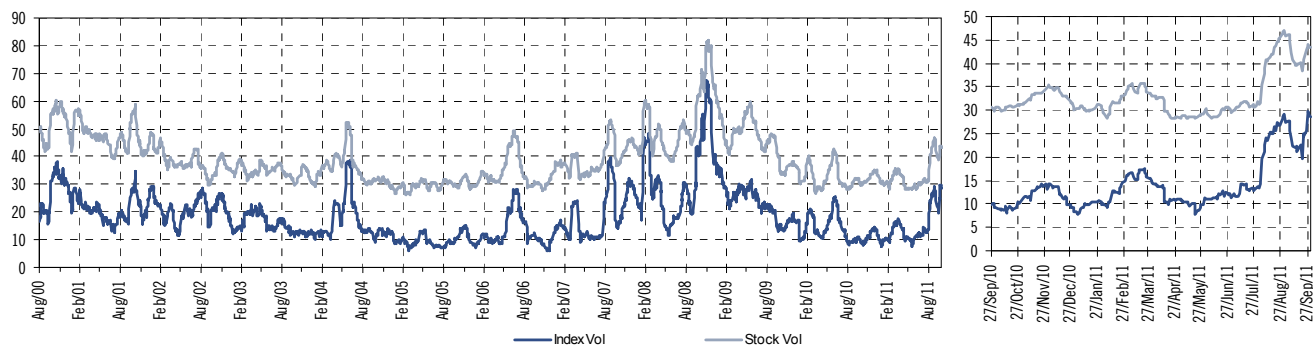
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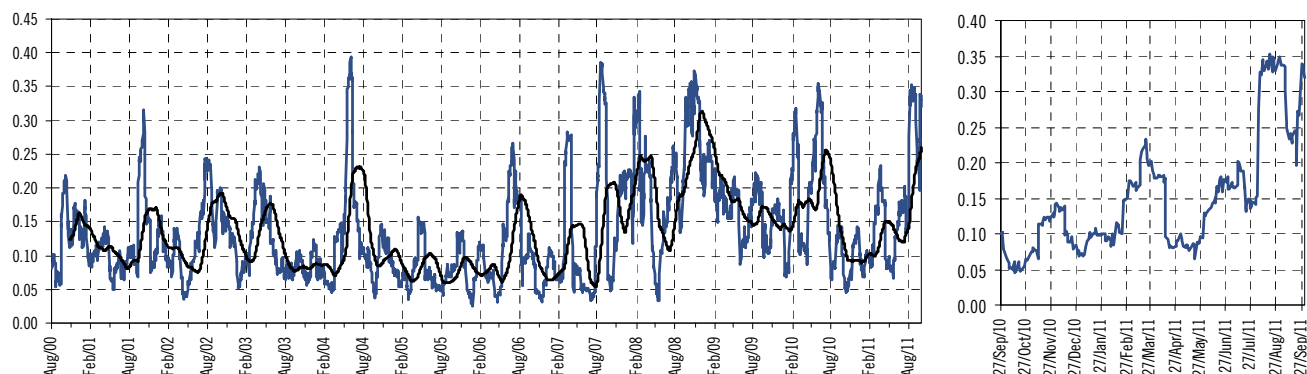
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Emerging Asia

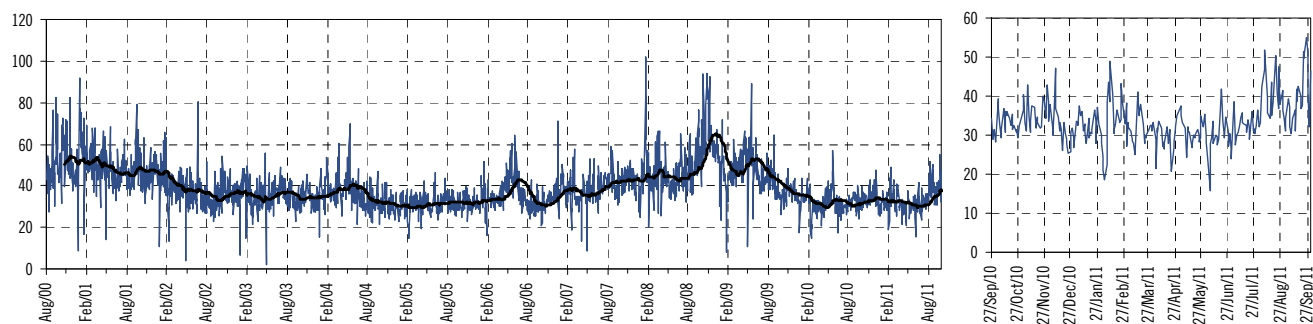
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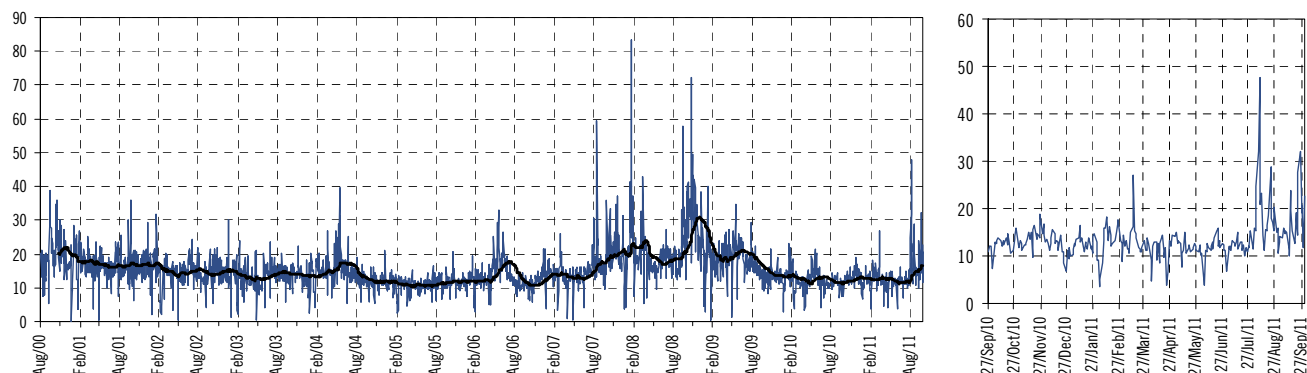
Cross Correlation



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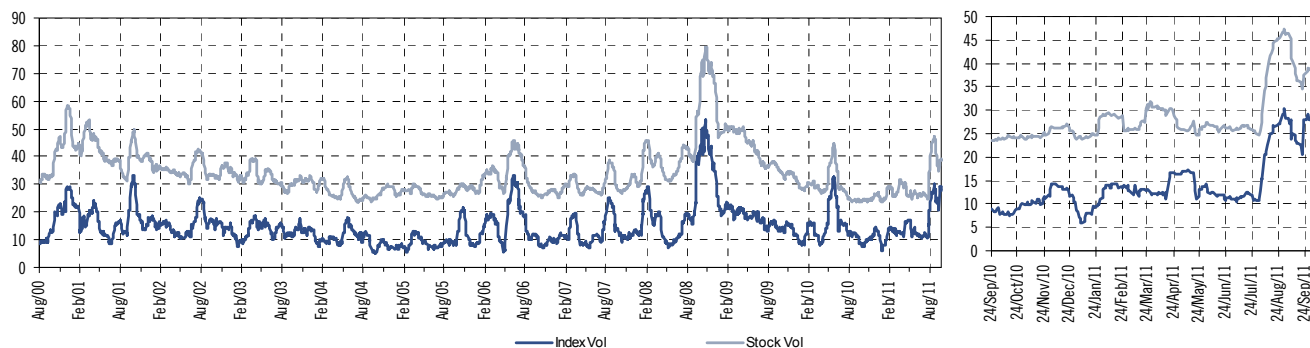


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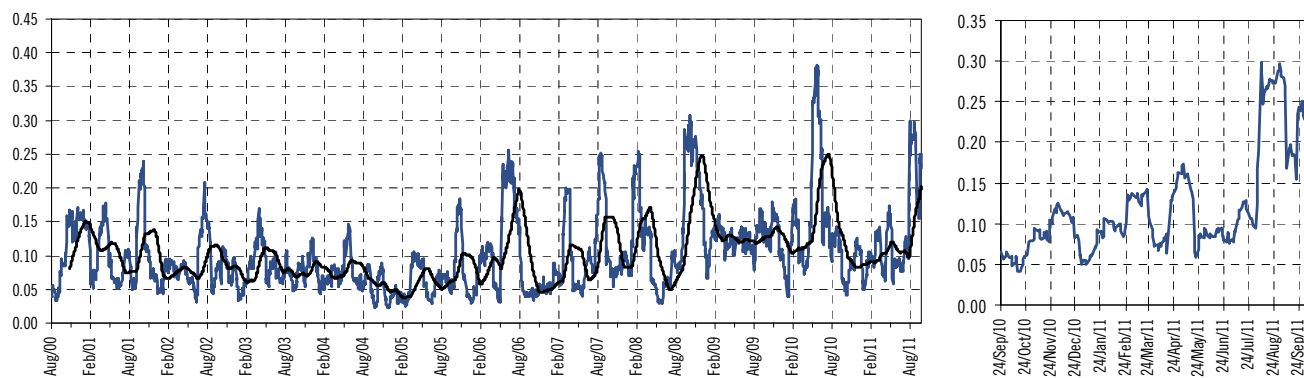


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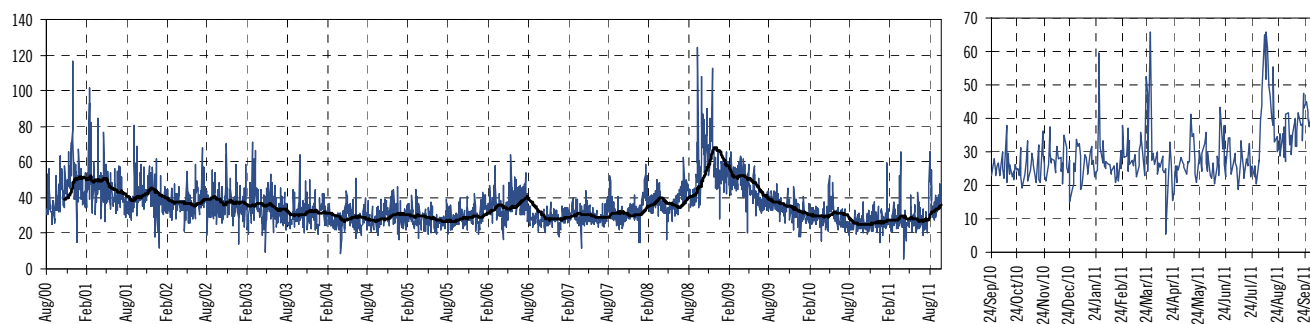
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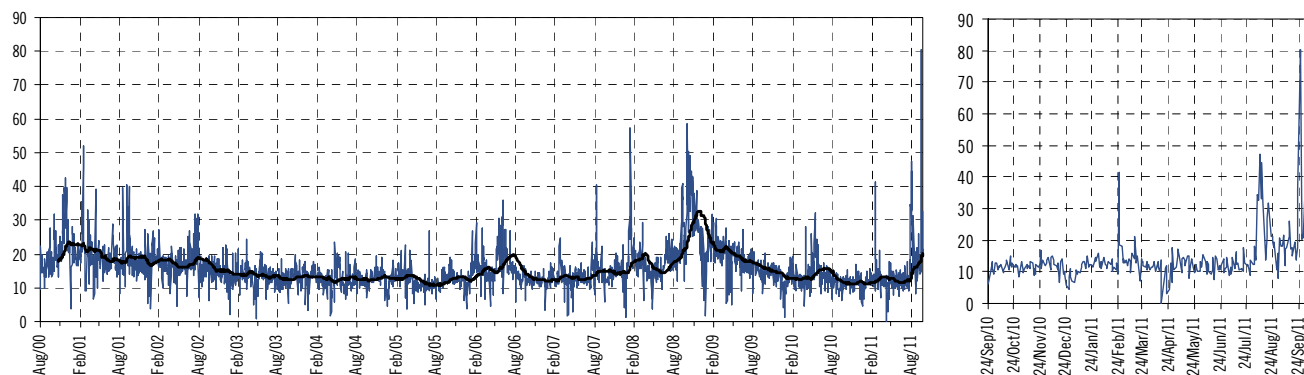
Cross Correlation



Cross Sectional Deviation



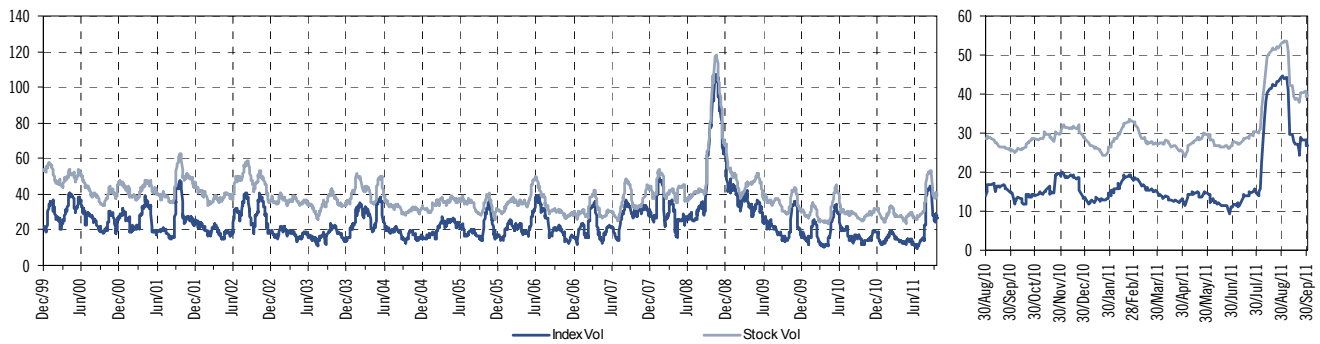
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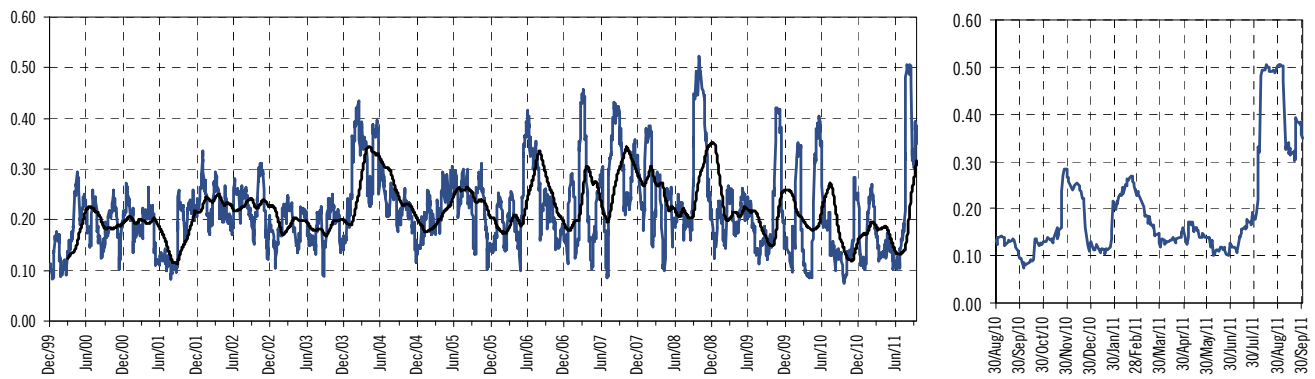
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Brazil

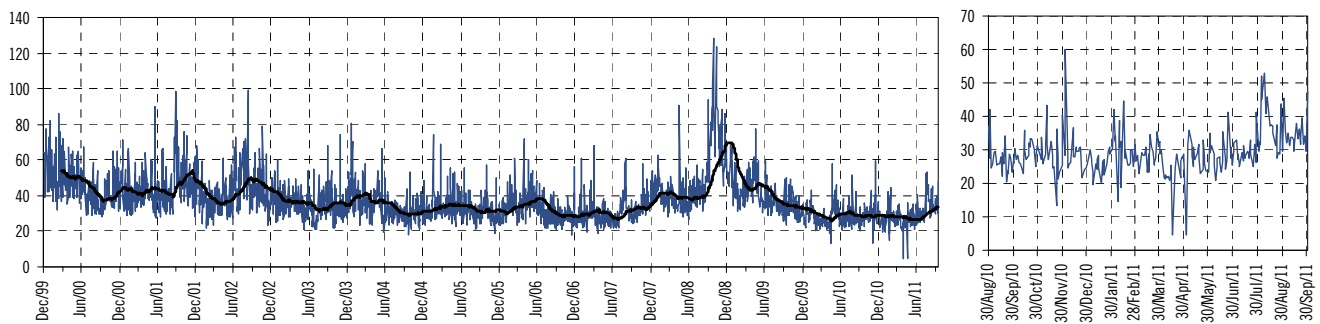
Index and Stock Volatility



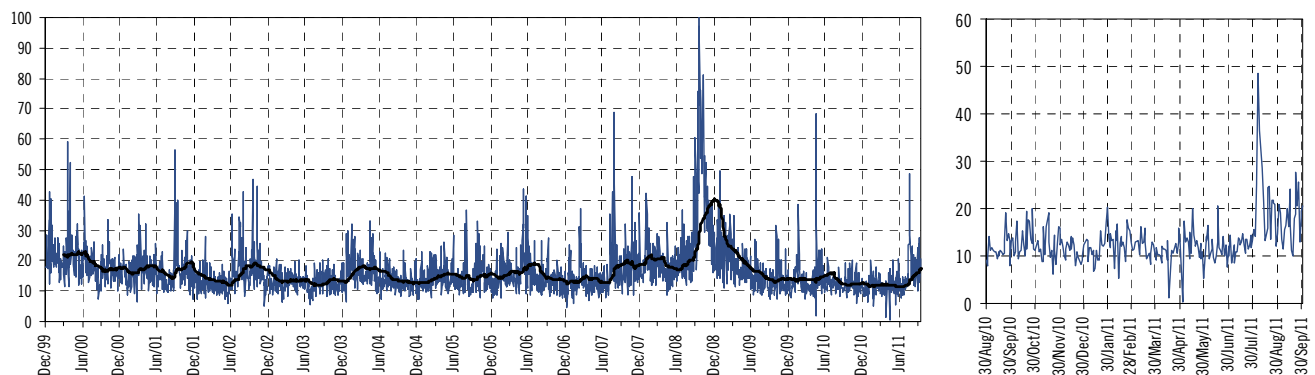
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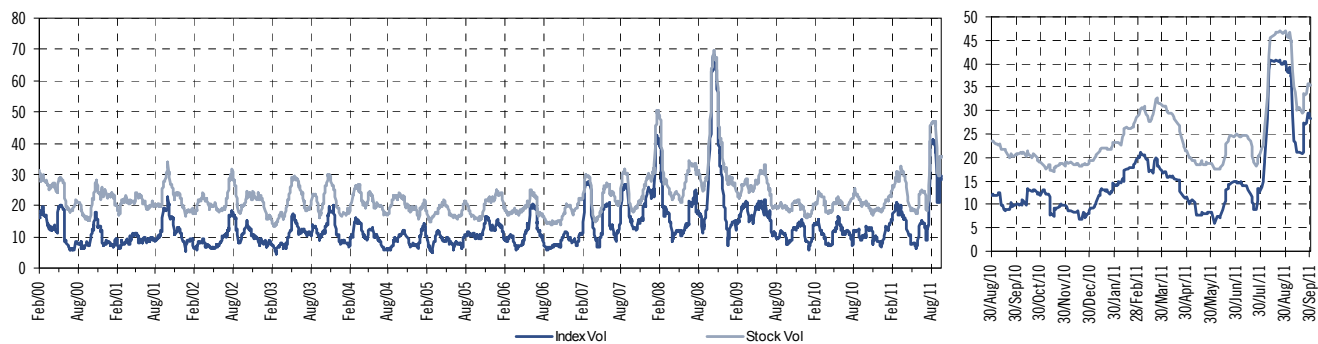


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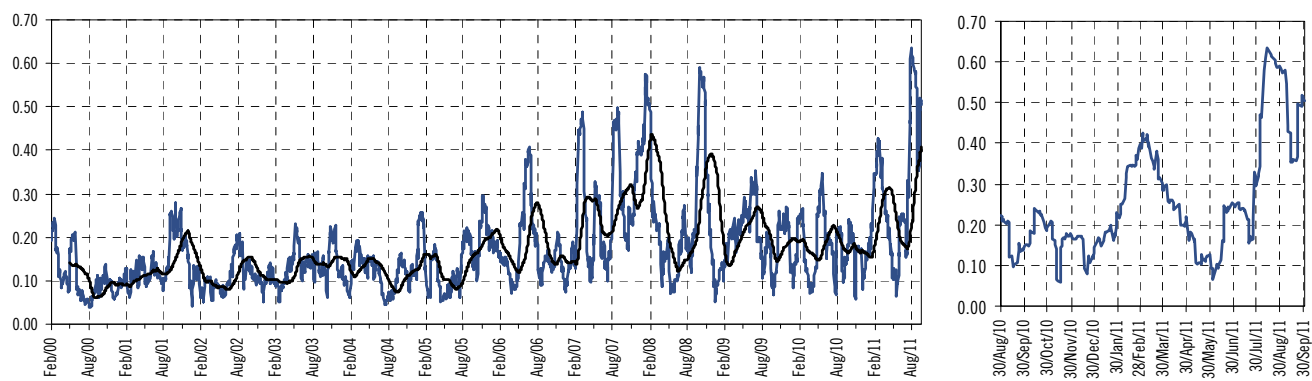


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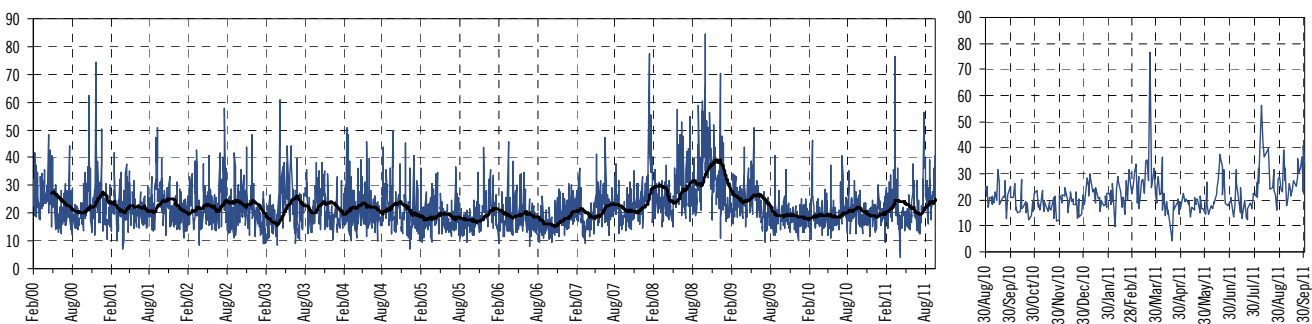
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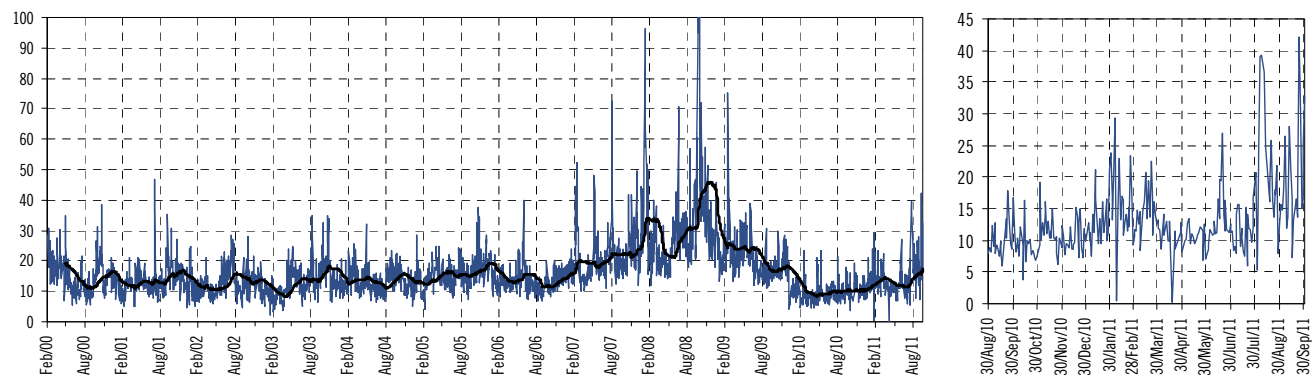
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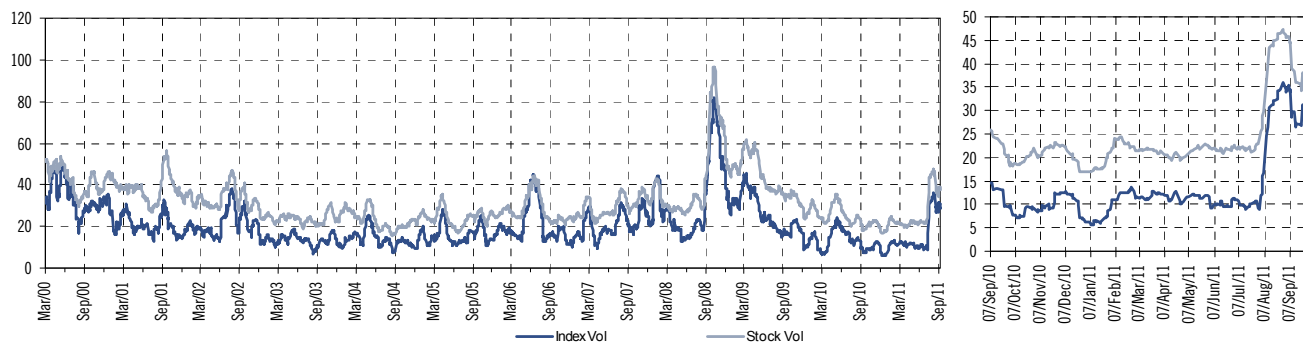


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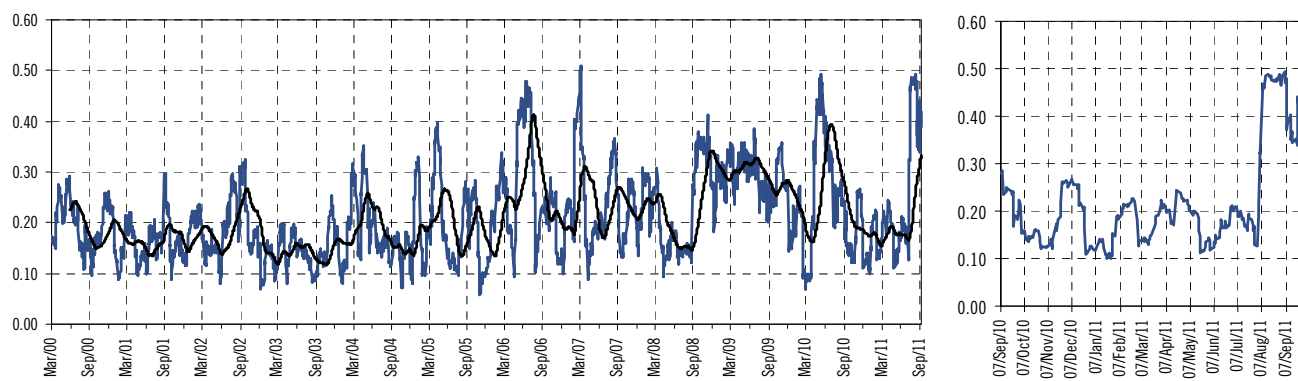


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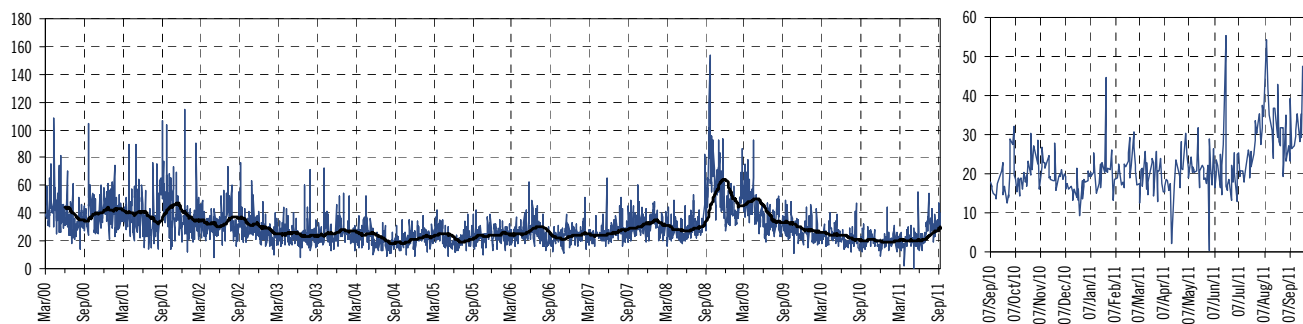
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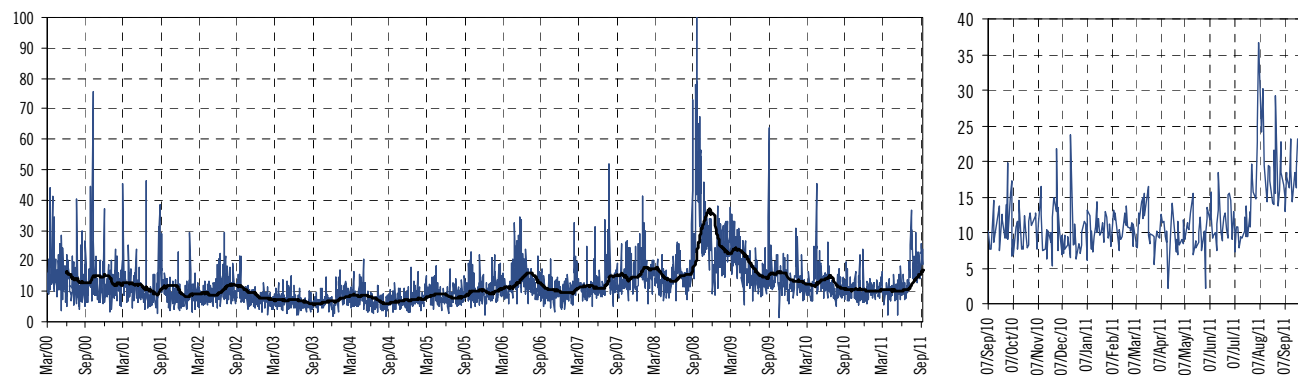
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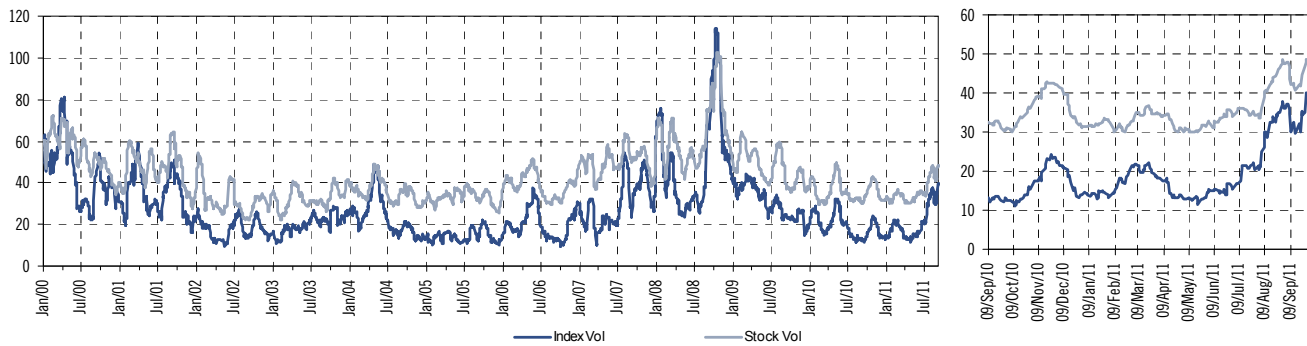


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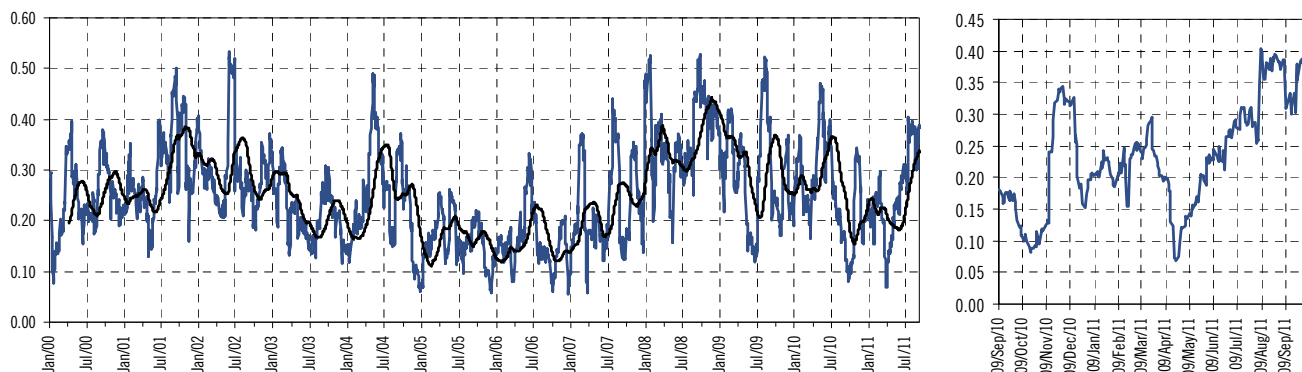


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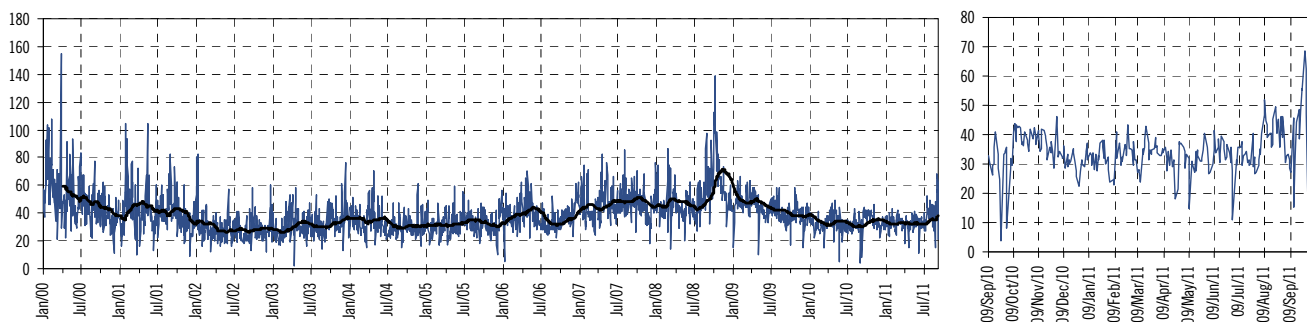
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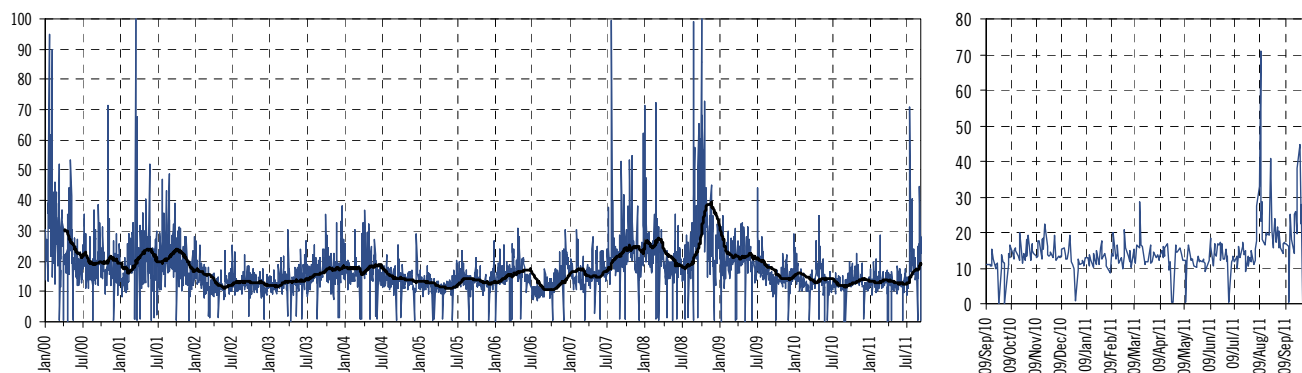
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Cross Sectional Deviation

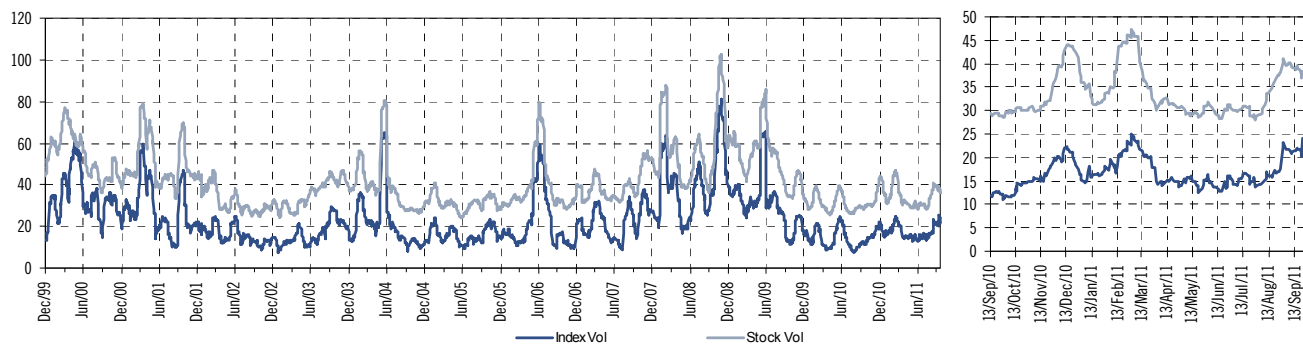


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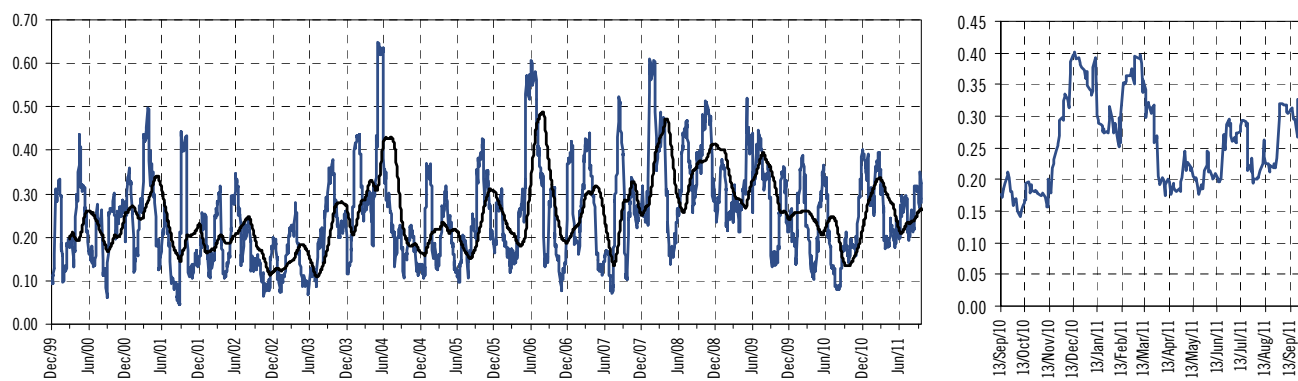


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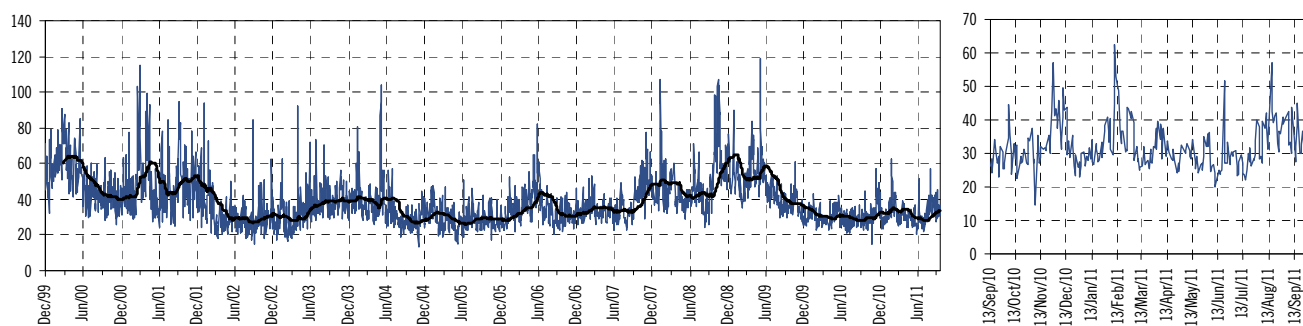
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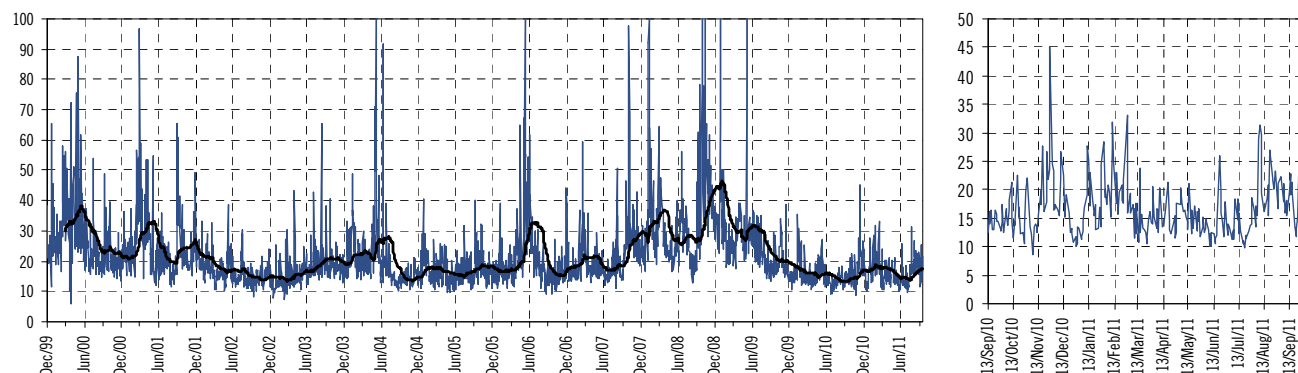
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Cross Sectional Deviation



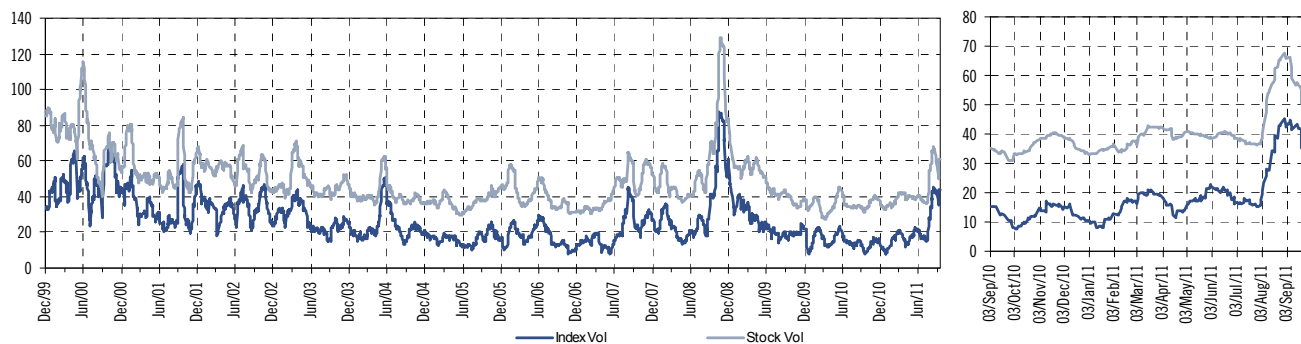
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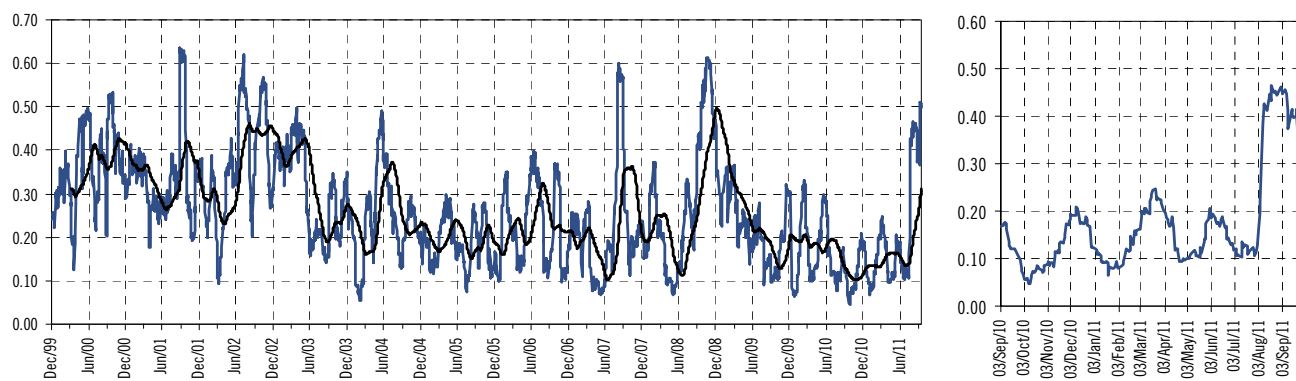
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South Korea

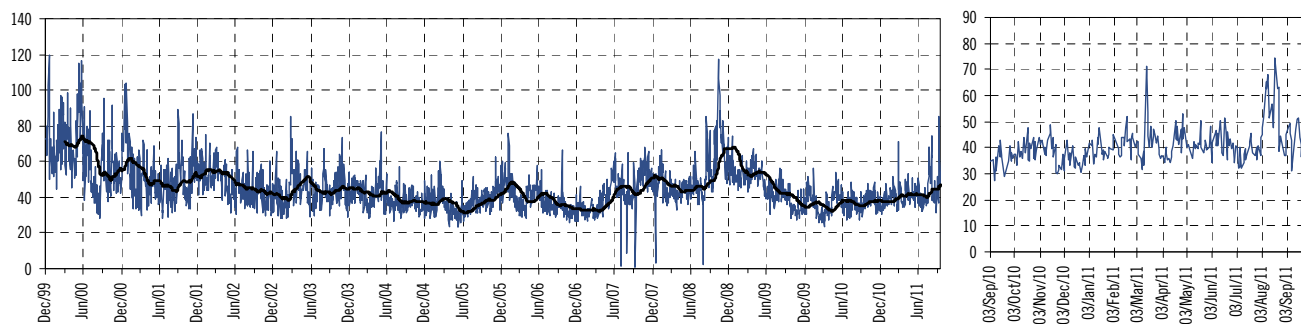
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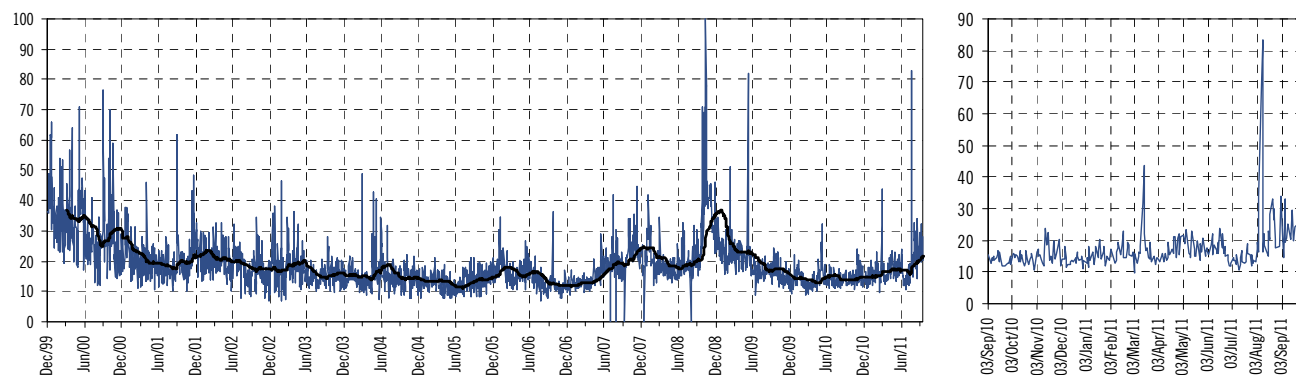
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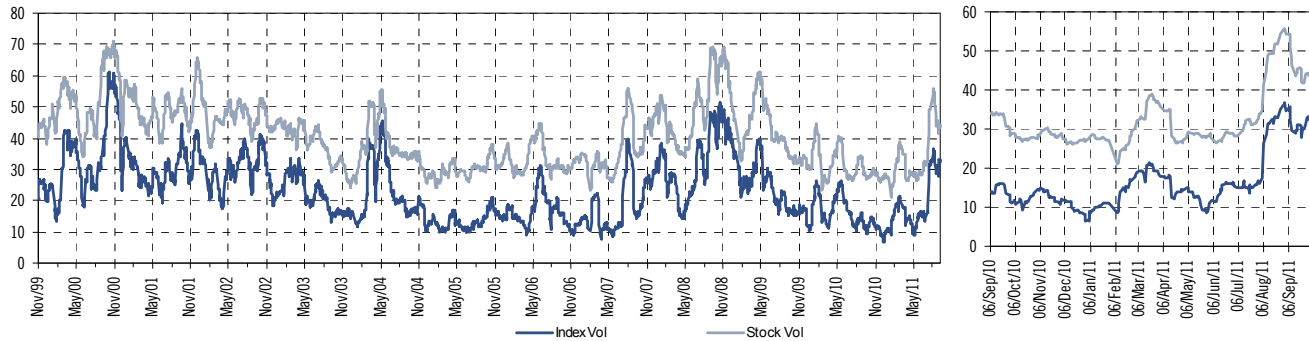
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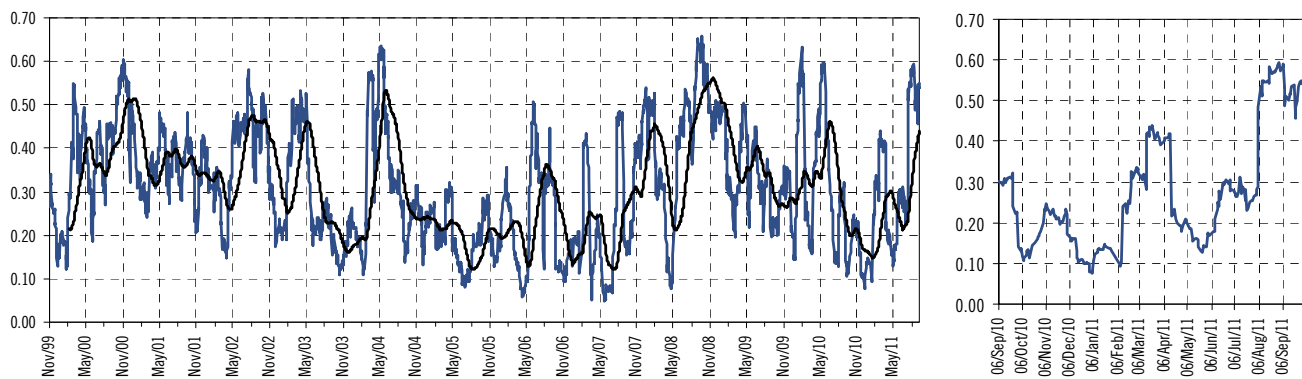
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Taiwan

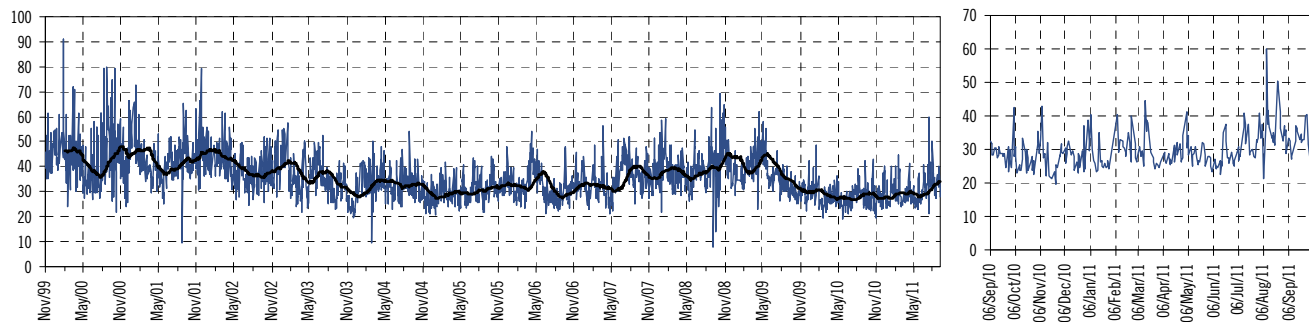
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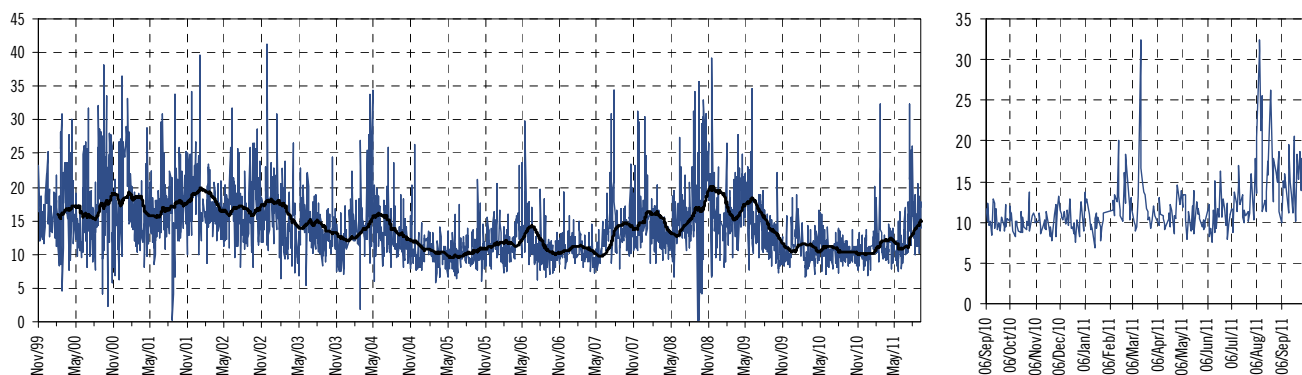
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Cross Sectional Deviation

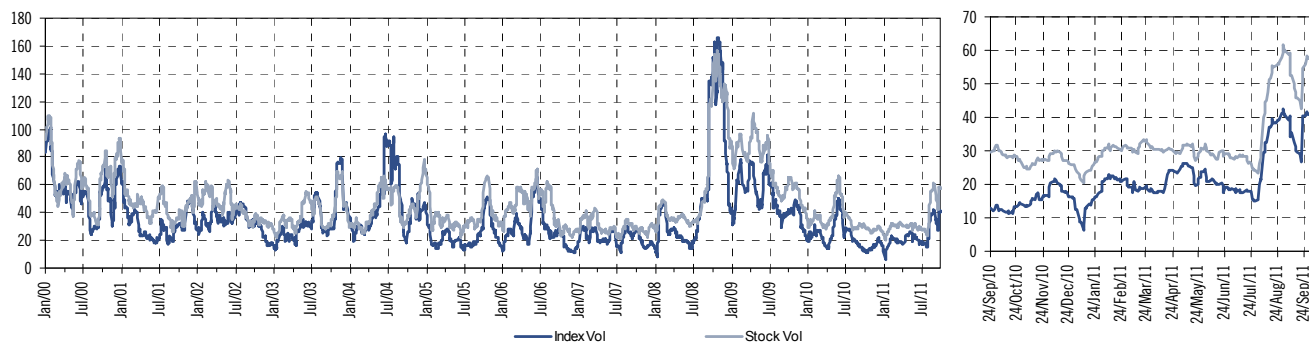


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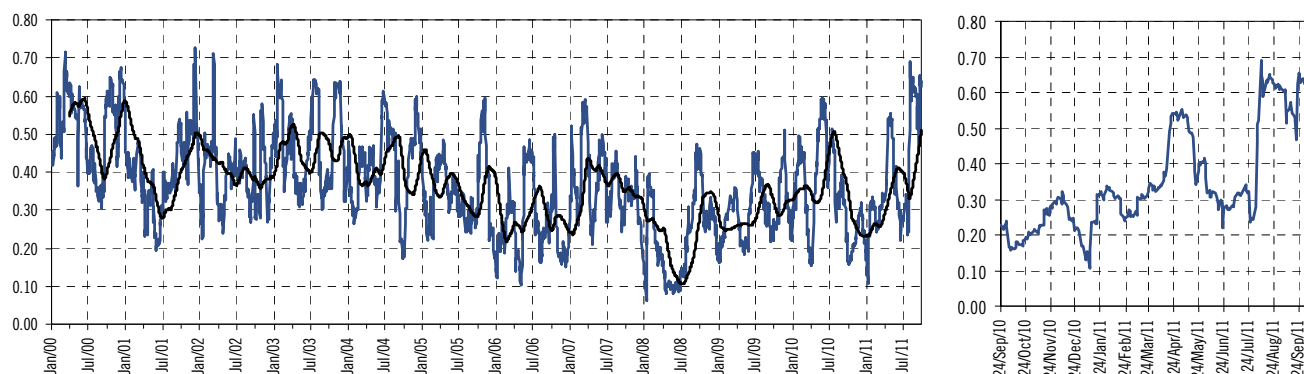


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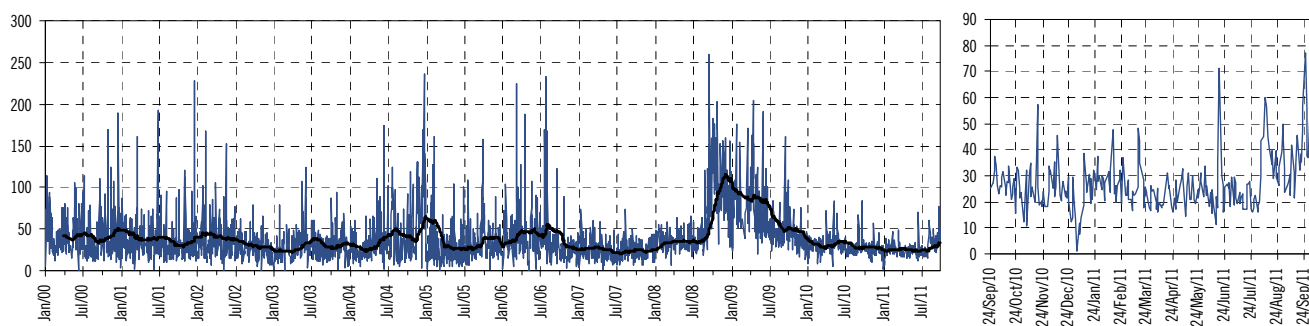
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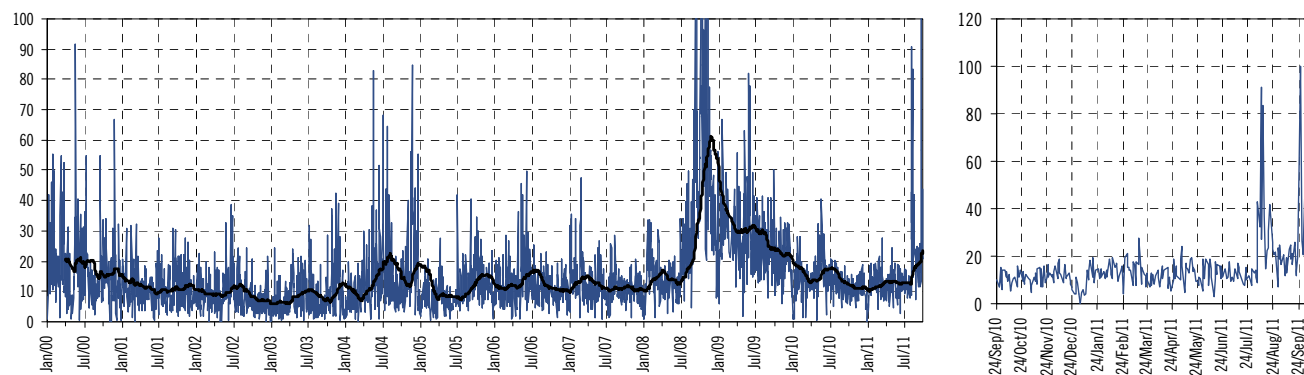
Cross Correlation



Cross Sectional Deviation



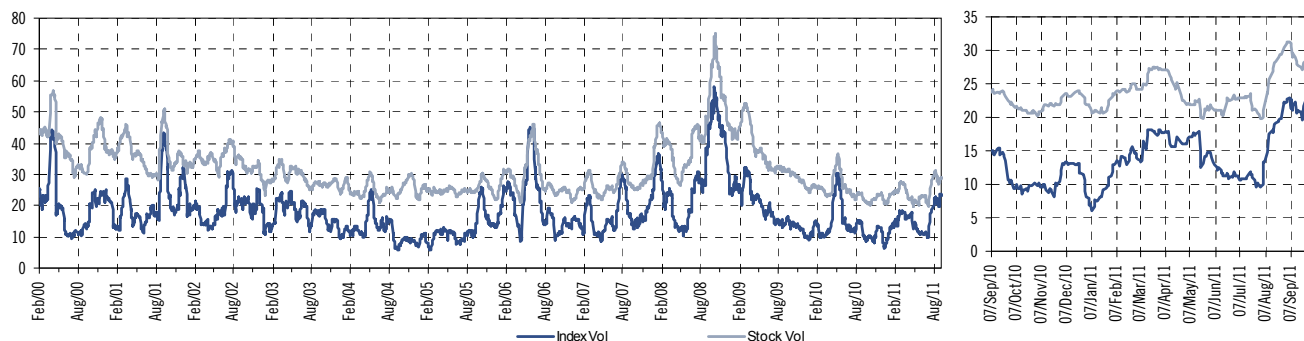
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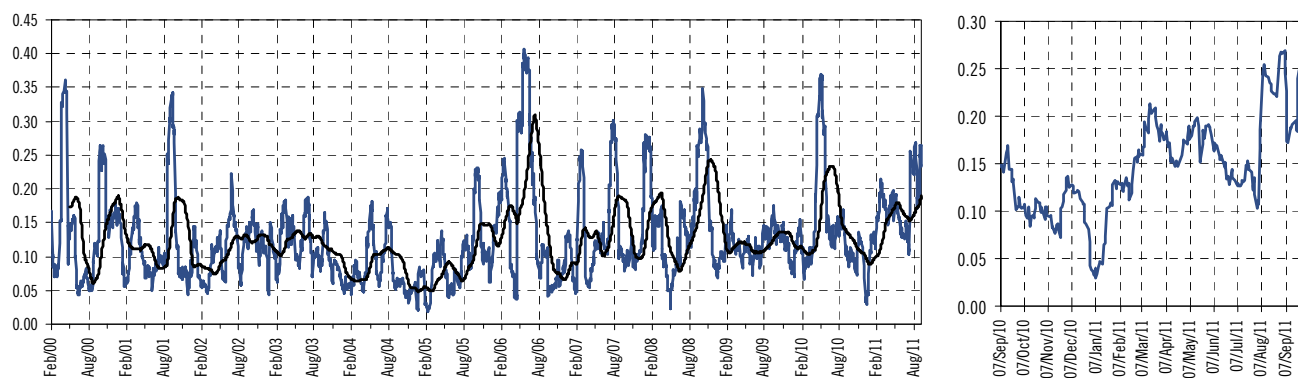
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South Africa

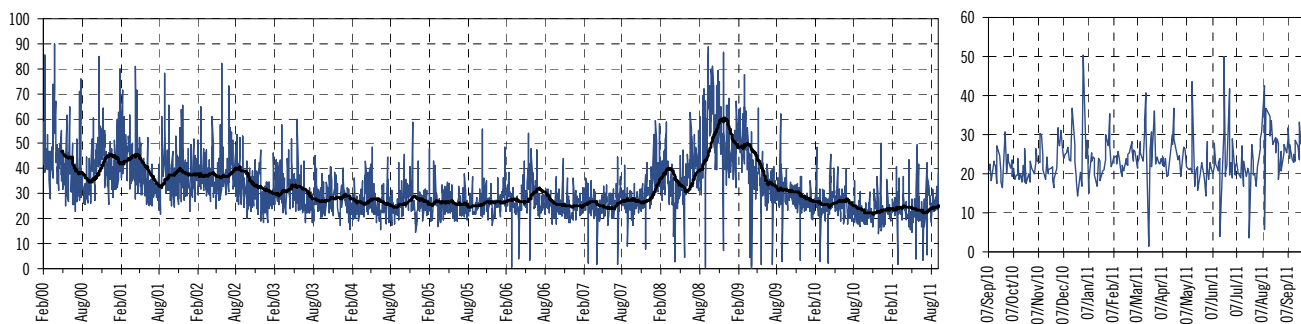
Index and Stock Volatility



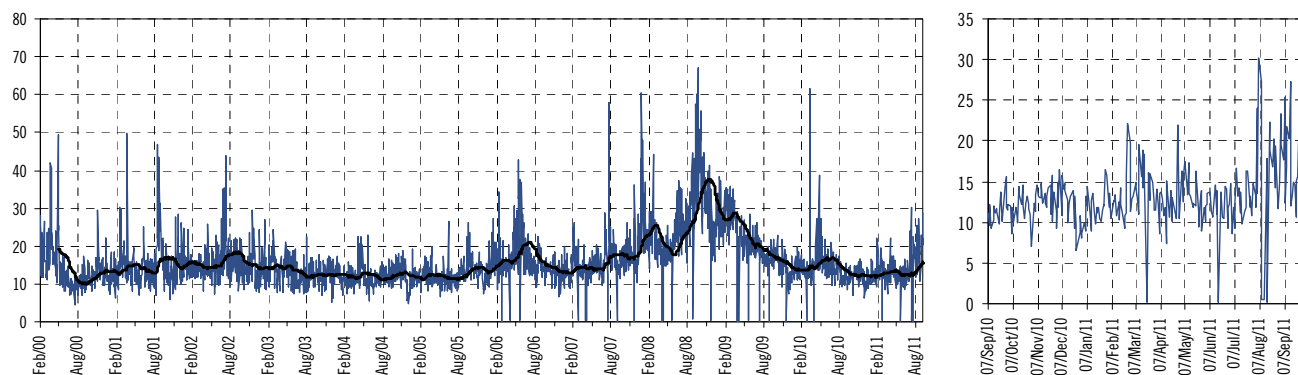
Cross Correlation



Cross Sectional Deviation



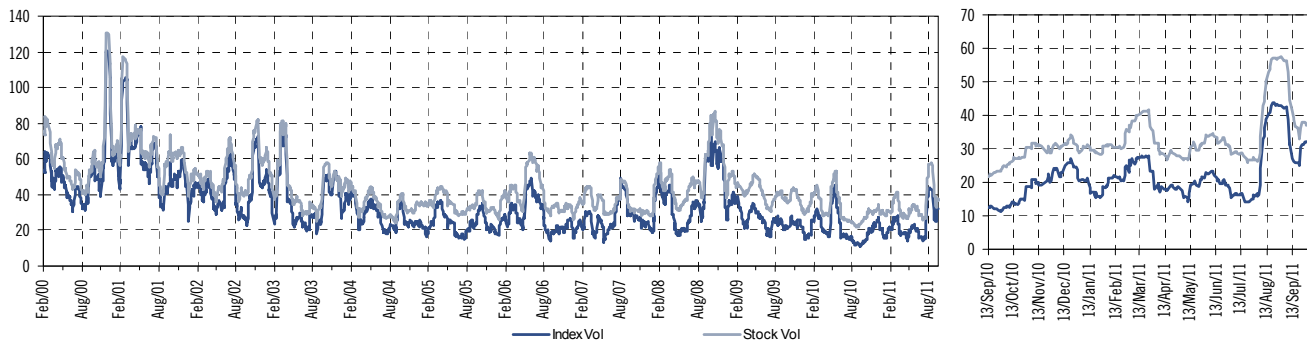
Citi Abnormal Vol



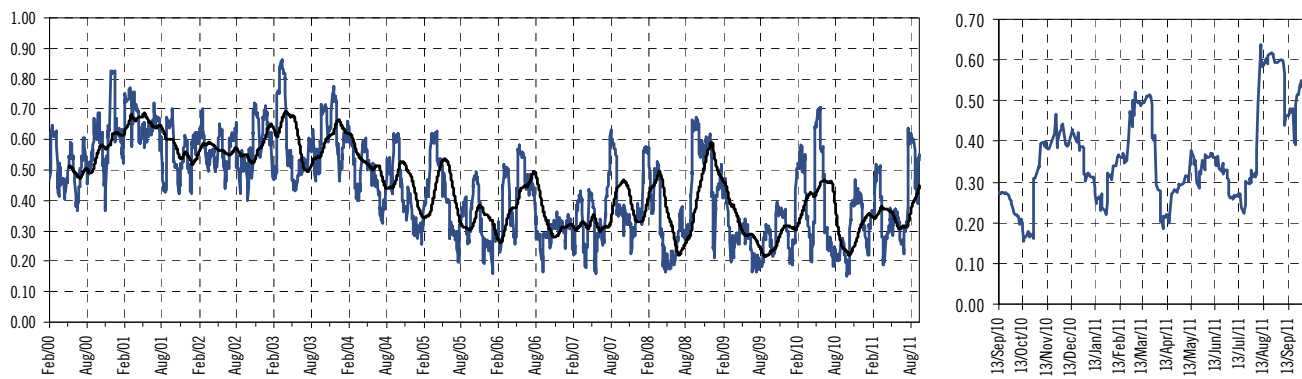
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Turkey

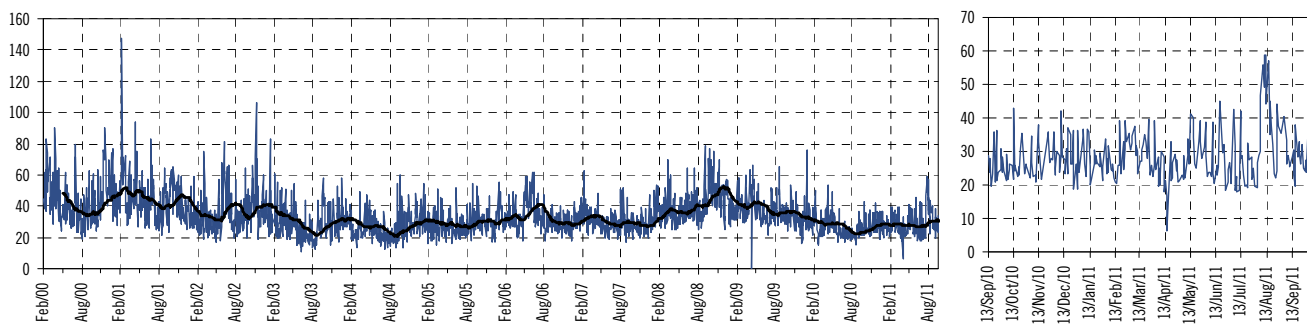
Index and Stock Volatility



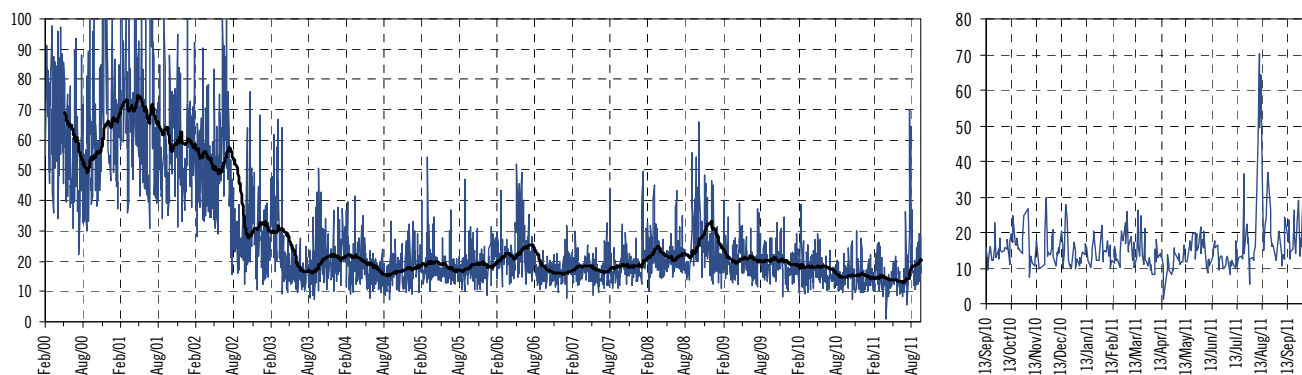
Cross Correlation



Cross Sectional Deviation

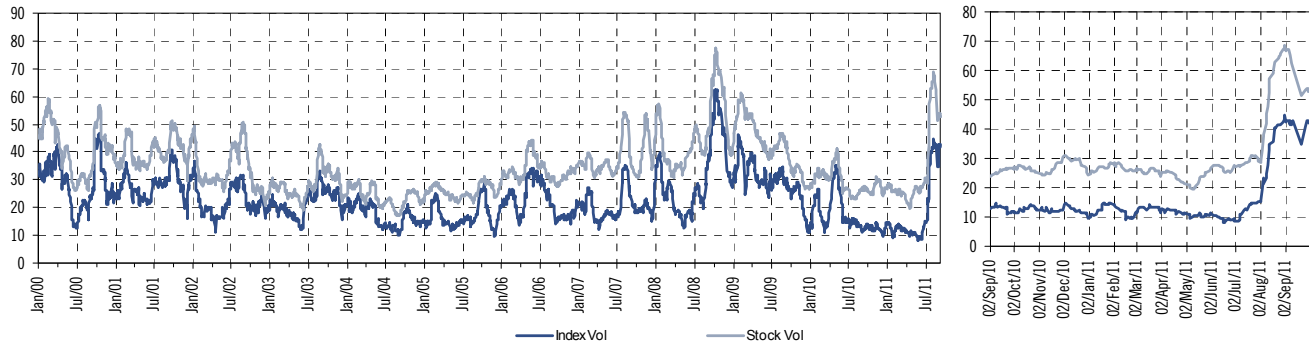


Citi Abnormal Vol

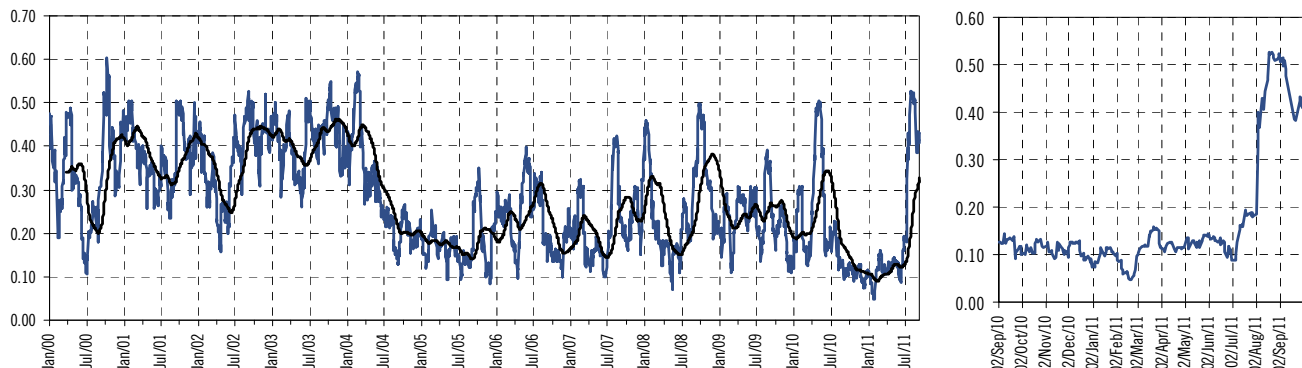


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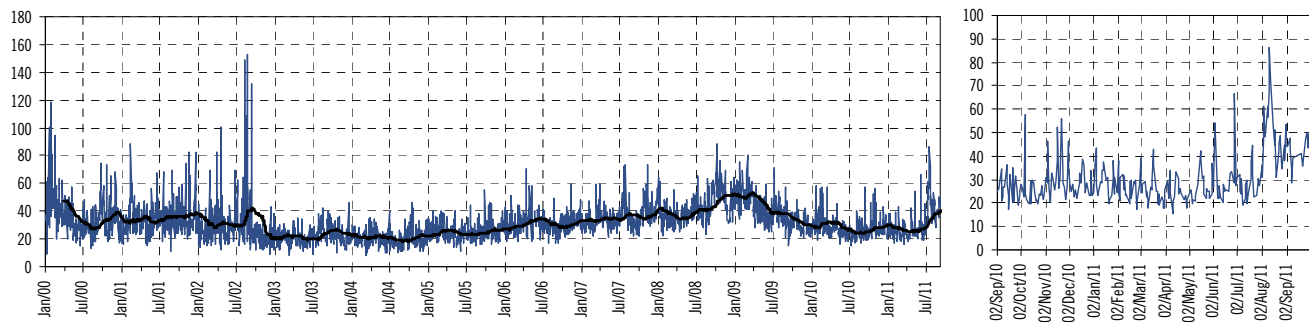
Index and Stock Volatility



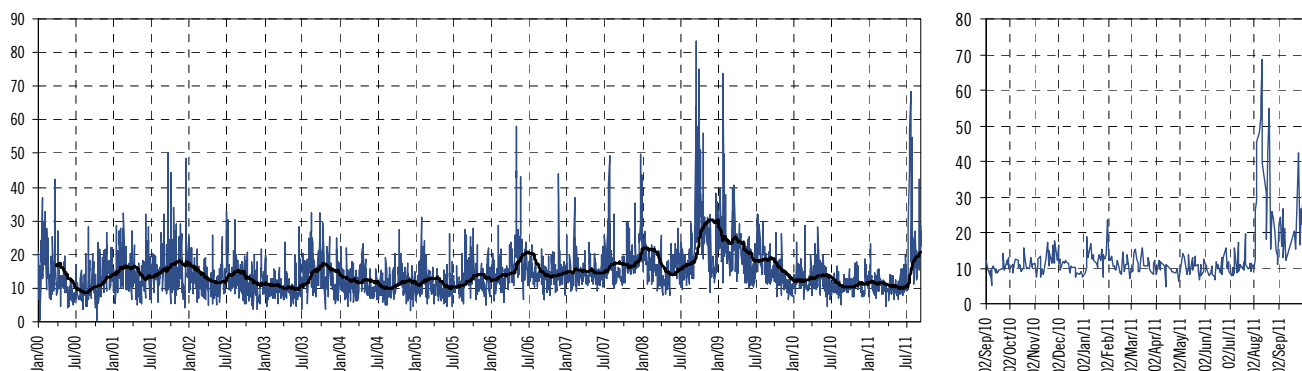
Cross Correlation



Cross Sectional Deviation



Citi Abnormal Vol



Source: Citi Investment Research and Analysis

Appendix A-1

Analyst Certification

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