

Internet Appendix for

## “Emerging Equity Market Comovements: Trends and Macro-Economic Fundamentals”\*

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### Abstract

This appendix contains unreported results discussed in the paper “Emerging Equity Market Comovements: Trends and Macro-Economic Fundamentals.” The paper includes references to the corresponding tables and figures in this appendix. Table A.I reports summary statistics of daily returns for all 56 equity markets in the sample. Table A.II shows summary statistics of quarterly comovement measures for three developed market regions. Table A.III shows the results of an alternative test for time trends in emerging market cross-country correlations and integration measures, based on Vogelsang (1998). Table A.IV reports a comparison of our results for the Asia Pacific region and the trend results presented in Bekaert, Hodrick and Zhang (2009). Table A.V shows summary statistics of the macro-economic variables for emerging and developed regions. Table A.VI shows pooled cross-sectional time-series regression results that link our comovement measures to various macro-economic variables. Table A.VII shows trend tests and regression results for the sample period when all countries in an emerging region have available returns data. Table A.VIII shows trend tests for emerging market comovement measures where the country composition does not change (i.e., 50% of the countries in a region are available). Table A.IX reports results of a simulation exercise that shows the impact of the number of countries in a region on trends in comovement measures. Table A.X reports time series regression results when currency comovements are included as additional explanatory variables for emerging and developed equity market comovements. Table A.XI reports trend test results for emerging market integration measures based on alternative specifications of the global factor; constant weights and industry-adjusted. Finally, Table A.XII reports trend tests for alternative correlation and integration measures of emerging markets that allow for country-specific factor exposures and idiosyncratic variances as well as multiple global factors. Figure A.1 shows annual governance indicators for emerging and developed regions.

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Table A.I. Summary Statistics of Daily Excess Returns in Emerging and Developed Equity Markets

The column 'w<sub>av</sub>' reports the average market value as a percentage of the total G51 market capitalization. The last two columns give the weights in the global market index at the beginning and at the end of the sample period.

	starting date	mean (% p.a.)	stdev (% p.a.)	min (% p.d.)	max (% p.d.)	w <sub>av</sub> (%)	w <sub>start</sub> (%)	w <sub>end</sub> (%)
<u>Eastern Europe</u>								
Bulgaria	01-Nov-00	34.94	32.98	-26.78	11.22	0.00	0.00	0.00
Cyprus	01-Apr-96	10.16	31.61	-11.40	37.49	0.03	0.02	0.03
Czech Republic	01-Aug-94	13.66	26.16	-14.48	22.53	0.08	0.06	0.15
Hungary	01-Jul-91	11.40	30.66	-17.34	20.17	0.05	0.00	0.08
Malta	01-Feb-00	2.82	15.87	-5.26	6.17	0.01	0.01	0.01
Poland	01-Aug-94	7.62	31.72	-11.67	14.26	0.14	0.03	0.29
Romania	01-May-97	5.80	38.63	-18.79	19.47	0.03	0.00	0.03
Russia	01-Jul-94	28.07	44.26	-26.40	35.20	0.74	0.04	1.53
Slovenia	01-Jan-99	9.86	19.66	-8.50	8.87	0.02	0.01	0.03
Turkey	03-Jul-89	22.55	51.29	-23.63	24.80	0.21	0.04	0.52
<u>Middle East/Africa</u>								
Israel	01-Feb-93	7.74	23.10	-9.89	8.05	0.19	0.17	0.40
Kenya	03-Jun-02	29.08	25.23	-10.44	10.41	n.a.	n.a.	n.a.
Kuwait	03-Sep-07	-24.78	34.20	-10.96	9.10	n.a.	n.a.	n.a.
Morocco	01-Feb-01	15.22	17.71	-7.41	5.65	n.a.	n.a.	n.a.
Nigeria	03-Jun-02	15.79	26.20	-9.71	12.13	n.a.	n.a.	n.a.
South Africa	03-Jan-73	9.26	26.39	-15.01	12.88	0.83	0.73	0.93
Tunisia	01-Jun-04	15.60	16.68	-6.92	9.46	n.a.	n.a.	n.a.
<u>Emerging markets Asia</u>								
China	02-Aug-93	16.05	33.85	-13.31	17.02	0.29	0.01	1.64
India	01-Feb-90	12.84	29.42	-15.92	22.70	0.77	0.24	2.55
Indonesia	01-May-90	4.31	41.39	-31.54	46.39	0.20	0.13	0.48
Korea	01-Oct-87	9.18	36.77	-19.49	27.97	0.89	0.24	1.69
Malaysia	03-Feb-86	9.59	26.42	-30.77	20.68	0.52	0.25	0.62
Philippines	01-Dec-88	7.03	26.40	-11.32	15.36	0.16	0.03	0.20
Taiwan	01-Jun-88	4.87	32.26	-11.58	14.70	1.05	0.86	1.20
Thailand	02-Feb-87	10.76	32.39	-16.31	17.77	0.25	0.04	0.37
<u>Latin America</u>								
Argentina	01-Sep-93	2.75	30.56	-28.56	15.43	0.16	0.27	0.10
Brazil	01-Aug-94	15.34	34.65	-14.96	15.80	1.01	0.46	2.68
Chile	01-Aug-89	14.52	19.61	-10.01	12.78	0.28	0.06	0.52
Colombia	01-Apr-92	9.65	21.98	-21.85	12.13	0.10	0.07	0.38
Mexico	01-Jun-89	14.86	28.48	-18.69	14.71	0.56	0.08	0.79
Peru	01-Feb-94	9.37	19.42	-10.03	10.34	0.06	0.04	0.18
Venezuela	01-Feb-90	17.28	38.79	-18.27	22.59	0.02	0.01	0.03

Table A.I - continued

	starting date	mean (% p.a.)	stdev (% p.a.)	min (% p.d.)	max (% p.d.)	$w_{av}$ (%)	$w_{start}$ (%)	$w_{end}$ (%)
<u>Developed markets Europe</u>								
Austria	01-Jan-82	9.32	19.50	-11.63	10.82	0.17	0.03	0.30
Belgium	03-Jan-73	6.09	17.89	-11.16	9.32	0.57	0.50	0.62
Denmark	01-Sep-80	9.27	19.49	-12.89	11.82	0.31	0.17	0.45
Finland	01-Apr-88	9.48	29.62	-16.97	15.45	0.44	0.12	0.49
France	03-Jan-73	8.03	20.64	-10.13	11.26	2.76	1.05	4.75
Germany	03-Jan-73	5.89	18.99	-11.75	17.67	3.94	3.27	3.60
Greece	01-Feb-90	10.47	28.84	-11.06	16.63	0.23	0.05	0.32
Ireland	03-Jan-73	6.93	20.70	-15.51	15.90	0.16	0.08	0.18
Italy	03-Jan-73	5.22	23.59	-10.31	11.94	1.47	0.73	1.85
Luxembourg	03-Feb-92	8.73	18.73	-7.66	10.60	0.08	0.02	0.11
Netherlands	03-Jan-73	7.81	18.75	-10.84	10.76	1.92	1.73	1.14
Norway	01-Feb-80	8.58	26.18	-20.19	14.91	0.26	0.21	0.54
Portugal	01-Feb-90	3.83	18.44	-12.02	10.64	0.20	0.07	0.24
Spain	01-Apr-87	8.43	21.00	-10.23	10.94	1.39	0.70	2.20
Sweden	01-Feb-82	11.34	25.28	-15.42	14.28	0.72	0.29	1.06
Switzerland	03-Jan-73	6.87	17.10	-10.52	9.47	1.69	0.93	2.80
UK	03-Jan-73	6.92	20.09	-13.54	12.56	8.11	7.61	7.40
<u>North America</u>								
Canada	03-Jan-73	5.47	16.83	-12.65	9.42	2.53	0.92	3.81
US	03-Jan-73	4.98	17.03	-18.72	11.53	43.92	65.53	33.07
<u>Developed markets Asia Pacific</u>								
Australia	03-Jan-73	6.92	21.78	-26.17	8.76	1.45	1.15	2.68
Hong Kong	03-Jan-73	10.80	28.75	-22.46	16.83	1.49	0.78	3.84
Japan	03-Jan-73	3.79	20.26	-15.97	12.21	22.05	14.70	9.95
New Zealand	01-Feb-88	6.18	20.44	-9.87	9.73	0.12	0.07	0.09
Singapore	03-Jan-73	5.30	23.08	-23.13	13.76	0.50	0.30	1.09
<u>G51 index</u>	03-Jan-73	4.46	12.97	-9.33	9.28			

*Table A.III.* Summary Statistics of Quarterly Comovement Measures for Developed Market Regions

Quarterly average cross-country correlations and global market integration measures are calculated from Q1 1973 to Q2 2009 for the three developed market regions.  $\rho(1)$  and  $\rho(2)$  report autocorrelation coefficients for one and two lags.  $t_{ADF}$  gives the  $t$ -statistic of the Augmented Dickey Fuller test for a unit root, including an intercept and a time trend, where the optimal number of lags is based on the Bayesian Information Criterion.

	mean	median	stdev	min	max	skew	kurt	$\rho(1)$	$\rho(2)$	$t_{ADF}$
<u>Correlation</u>										
DevEur	0.41	0.39	0.18	0.12	0.84	0.48	2.49	0.65	0.62	(-4.95)
NorthAm	0.63	0.65	0.14	0.23	0.90	-0.71	3.04	0.35	0.33	(-5.14)
AsiaPac	0.34	0.33	0.18	0.06	0.81	0.53	2.47	0.56	0.55	(-5.43)
<u>Integration</u>										
DevEur	0.27	0.22	0.19	0.00	0.78	0.88	3.07	0.69	0.67	(-4.25)
NorthAm	0.52	0.56	0.21	0.05	0.86	-0.55	2.35	0.58	0.59	(-3.48)
AsiaPac	0.24	0.20	0.16	0.00	0.70	0.80	3.16	0.52	0.53	(-5.34)

Table A.III. The Vogelsang (1998) Test for Linear Time Trends in Emerging Market Comovements

The table reports estimated trend coefficients in percentages per year (trend) and the 5% and 10% test statistics ( $t_{5\%}$  and  $t_{10\%}$ ) based on the Vogelsang (1998) test. For two-sided tests, the 5% and 10% critical values are  $\pm 2.152$  and  $\pm 1.720$  respectively. \*\* and \* denote significance at the 5% and 10% levels. Panel A reports results for the full sample period over which each region is available, i.e. Q3 1991 for the Eastern European markets, Q2 2001 for the Middle East/Africa region, Q2 1987 for emerging markets Asian markets and Q4 1989 for Latin America. Panel B reports results for the periods before and/ or after break dates, where breaks are estimated based on the Harvey et al. (2009) procedure (see Table II in the paper).

Panel A: Vogelsang test for trends over the full sample period						
	Correlation			Integration		
	trend	$t_{5\%}$	$t_{10\%}$	trend	$t_{5\%}$	$t_{10\%}$
EastEur	1.58%	(1.281)	(1.574)	1.24%	(0.362)	(0.570)
ME Afr	0.47%	(0.268)	(0.348)	0.54%	(0.236)	(0.305)
emAsia	1.44%**	(2.770)	(3.024)	1.03%	(0.992)	(1.220)
LatinAm	1.13%	(1.003)	(1.158)	1.30%*	(1.922)	(2.215)

Panel B: Vogelsang test for trends before and/or after break dates						
	$T_{break}$	period	trend	$t_{5\%}$	$t_{10\%}$	No.obs
<u>Correlation</u>						
EastEur	Q4 1999	before	1.79%	(0.980)	(1.220)	34
		after	4.30%**	(2.394)	(2.795)	38
ME Afr	Q1 2002	after	1.23%*	(1.912)	(2.064)	29
<u>Integration</u>						
EastEur	Q1 2002	before	0.76%	(1.070)	(1.211)	43
		after	6.93%**	(8.886)	(9.098)	29
ME Afr	Q4 2001	after	1.64%**	(3.002)	(3.211)	30
emAsia	Q1 2001	before	0.43%	(1.026)	(1.082)	56
		after	5.45%**	(7.767)	(8.157)	33
LatinAm	Q1 2002	before	1.83%**	(2.188)	(2.487)	50
		after	5.47%**	(6.465)	(6.580)	29

Table A.IV. Trends in Correlations in the Asia Pacific region: Comparison to Bekaert et al. (2009)

The table is based on three measures of average correlations between Asia Pacific countries:  $\rho_{a,t}$  (i.e., the main measure used in this paper), and an equally weighted (EW) and a value weighted (VW) average of pairwise realized cross-country correlations as in Bekaert et al. (2009). Value weights are determined by the market capitalizations of the countries at the beginning of the period. The measures are calculated quarterly based on daily returns (columns 2,3), semi-annually based on daily returns (columns 4,5) and semi-annually based on weekly returns (columns 6,7). Adjustments are made for first- and second-order serial correlation in daily stock returns using Newey-West (1987). The 5% and 10% critical values of the Bunzel and Vogelsang (2005) trend test with the Daniell kernel are  $\pm 2.052$  and  $\pm 1.710$  respectively. \*\* and \* denote significance at the 5% and 10% levels.

	Q corr, daily Ret		SA corr, daily Ret		SA corr, weekly Ret	
	trend	$t_{5\%}$	trend	$t_{5\%}$	trend	$t_{5\%}$
Sample period 1991-2009						
$\rho_{a,t}$	2.36%**	(5.370)	2.46%**	(2.517)	2.53%**	(4.958)
avg corr EW	2.23%**	(4.235)	2.31%**	(2.373)	2.33%**	(4.147)
avg corr VW	2.82%**	(5.444)	2.93%	(0.851)	3.09%**	(4.689)
BHZ sample period 1980-2005						
$\rho_{a,t}$	0.82%**	(2.467)	0.82%*	(1.753)	0.69%	(1.093)
avg corr EW	0.84%**	(2.105)	0.77%*	(1.597)	0.63%	(1.392)
avg corr VW	0.90%*	(1.777)	0.81%	(0.795)	0.61%	(0.714)

Table A.V. Summary Statistics of Macro-Economic Variables for Emerging and Developed Market Regions

This table reports summary statistics of quarterly macro-economic variables for three emerging and three developed market regions. The sample period starts in Q3 1991 or as soon as the variable becomes available and ends in Q2 2009. The variables include trade over GDP, equity market capitalization over GDP, the growth in per capita real GDP, measures of regional and global industry misalignment, the percentage of countries within the region that is officially liberalized, a measure of equity market openness, average pairwise correlations between currency returns within the region (“curr. pairw.”) and average correlations between country-level currency returns and value-weighted global currency returns (“curr. glob.”). The variables are constructed per country and are then averaged over all available countries within the region. GDP and trade data are from Eurostat, OECD, Reuters and a few national departments of statistics. Industry misalignment measures are based on market values of ten local (Datastream level-3) industry indices. Liberalization dates are mostly from Bekaert and Harvey (2000). The equity market openness variable is based on global and investable indices from Standard and Poor’s Emerging Markets Data Base and is available until Q4 2004. Exchange rates are from MSCI and Datastream. The liberalization and equity market openness variables are not available for developed market regions. Pairwise currency return correlations are not available for North America, as the US dollar is the base currency. The table reports the mean, median, minimum, maximum, standard deviation and the first- and second-order autocorrelation coefficients, denoted by  $\rho(1)$  and  $\rho(2)$ .

		mean	median	stdev	min	max	$\rho(1)$	$\rho(2)$
trade/ GDP	EastEur	0.74	0.78	0.13	0.52	0.96	0.94	0.87
	emAsia	0.82	0.81	0.09	0.68	1.08	0.86	0.68
	LatinAm	0.35	0.34	0.06	0.22	0.47	0.93	0.86
	devEur	0.61	0.64	0.09	0.43	0.74	0.93	0.82
	NorthAm	0.40	0.40	0.04	0.29	0.47	0.88	0.76
	AsiaPac	1.33	1.26	0.20	1.10	2.04	0.80	0.80
Mcap/ GDP	EastEur	0.91	0.73	0.42	0.26	1.90	0.94	0.81
	emAsia	1.89	1.84	0.46	1.16	2.93	0.90	0.77
	LatinAm	1.15	1.01	0.40	0.58	2.09	0.93	0.87
	devEur	2.44	2.60	1.05	0.76	4.44	0.96	0.90
	NorthAm	3.21	3.56	1.08	1.40	5.05	0.96	0.90
	AsiaPac	4.99	4.63	1.83	2.38	10.04	0.88	0.82
GDP growth	EastEur	0.81%	1.05%	1.12%	-3.85%	2.43%	18.13%	11.66%
	emAsia	0.83%	1.13%	1.32%	-5.33%	2.99%	32.24%	3.41%
	LatinAm	0.53%	0.62%	1.38%	-3.33%	5.18%	18.94%	14.23%
	devEur	0.44%	0.58%	0.67%	-2.00%	1.81%	48.00%	37.81%
	NorthAm	0.41%	0.57%	0.70%	-1.48%	1.71%	11.74%	-1.36%
	AsiaPac	0.55%	0.73%	1.00%	-2.59%	3.02%	21.70%	7.67%
indreg.	EastEur	0.22	0.22	0.05	0.13	0.32	0.92	0.80
	emAsia	0.09	0.09	0.01	0.07	0.13	0.87	0.70
	LatinAm	0.12	0.11	0.03	0.08	0.18	0.95	0.90
	devEur	0.11	0.10	0.02	0.08	0.15	0.95	0.88
	NorthAm	0.03	0.03	0.01	0.01	0.05	0.95	0.88
	AsiaPac	0.07	0.06	0.01	0.05	0.09	0.92	0.86

Table A.V - continued

		mean	median	stdev	min	max	$\rho(1)$	$\rho(2)$
indglob.	EastEur	0.11	0.11	0.05	0.03	0.22	0.94	0.83
	emAsia	0.03	0.03	0.01	0.02	0.07	0.76	0.60
	LatinAm	0.09	0.09	0.05	0.03	0.23	0.91	0.79
	devEur	0.01	0.01	0.00	0.00	0.02	0.95	0.86
	NorthAm	0.01	0.01	0.01	0.01	0.03	0.90	0.75
	AsiaPac	0.02	0.02	0.00	0.01	0.02	0.85	0.62
% lib.	EastEur	0.81	0.89	0.19	0.50	1.00	0.90	0.80
	emAsia	0.75	0.75	0.04	0.57	0.86	0.60	0.19
	LatinAm	0.87	0.86	0.06	0.67	1.00	0.63	0.27
eq. open.	EastEur	0.72	0.77	0.17	0.18	0.88	0.75	0.55
	emAsia	0.47	0.46	0.16	0.16	0.80	0.90	0.83
	LatinAm	0.84	0.90	0.12	0.53	0.96	0.91	0.83
curr. pairw.	EastEur	0.40	0.40	0.20	-0.02	0.71	0.75	0.68
	emAsia	0.15	0.11	0.13	-0.04	0.45	0.74	0.63
	LatinAm	0.08	0.08	0.10	-0.20	0.32	0.52	0.59
	devEur	0.87	0.90	0.07	0.66	0.97	0.73	0.63
	NorthAm	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
	AsiaPac	0.26	0.22	0.16	0.00	0.65	0.64	0.54
curr. glob.	EastEur	0.51	0.52	0.21	0.06	0.81	0.80	0.73
	emAsia	0.21	0.17	0.15	-0.01	0.57	0.64	0.43
	LatinAm	0.06	0.05	0.14	-0.27	0.40	0.32	0.28
	devEur	0.84	0.87	0.10	0.38	0.96	0.71	0.68
	NorthAm	0.22	0.19	0.34	-0.53	0.81	0.66	0.57
	AsiaPac	0.45	0.45	0.15	0.19	0.78	0.66	0.56



*Table A.VI.* Pooled Cross-Sectional Time-Series Regressions: Macro-Economic Variables and Global Equity Market Comovements

This table reports the results of pooled cross-sectional time series regressions using all available data for emerging and developed markets. Due to their limited availability, the liberalization and equity market openness variables are included only in univariate regressions, for the cross-section of emerging market regions only. Also, the Middle East/ Africa region is included only in univariate regressions with liberalization or equity market openness as independent variables. Panel B excludes the Eastern European region because the null hypothesis of a unit root cannot be rejected for this series. The two business cycle variables are included in one regression jointly. The regressions include a constant and a linear time trend and are estimated using OLS, correcting for autoregression in the residuals. Standard errors are robust for contemporaneous correlation in the residuals and heteroskedasticity over the cross-section. \*\*\*, \*\*, and \* indicate significance at the 1, 5 and 10 percent levels.

	Univariate regressions				Multivariate regressions			
	no fixed effects		fixed effects		no fixed effects		fixed effects	
	coeff.	<i>t</i> -stat.	coeff.	<i>t</i> -stat.	coeff.	<i>t</i> -stat.	coeff.	<i>t</i> -stat.
<u>Correlation</u>								
trade/ GDP	0.06	(0.72)	0.25**	(2.52)	-0.07	(-1.03)	0.28***	(2.76)
Mcap/ GDP	-0.02	(-1.17)	-0.02	(-1.39)	0.02	(1.12)	-0.01	(-0.59)
GDP growth	-0.62	(-1.17)	-0.65	(-1.21)	-0.10	(-0.19)	0.02	(0.04)
indreg.	-1.16***	(-3.92)	-0.58*	(-1.87)	-1.34***	(-3.18)	-1.42***	(-3.20)
indglob.	-0.77**	(-2.17)	-0.47	(-1.38)	0.22	(0.42)	0.63	(1.19)
% lib.	-0.03	(-0.26)	0.02	(0.19)				
eq. open.	0.10	(1.22)	0.43***	(3.59)				
wrld. div.yld.	19.60**	(2.18)	22.79***	(3.27)	30.82***	(3.41)	25.80***	(3.53)
NBER dummy	0.03	(1.13)	0.03	(1.24)	0.02	(0.94)	0.03	(1.22)
<u>Integration</u>								
trade/ GDP	0.09	(1.04)	0.18*	(1.70)	-0.18***	(-2.79)	0.16	(1.54)
Mcap/ GDP	-0.02	(-1.19)	-0.02	(-1.28)	0.04***	(2.75)	0.01	(0.86)
GDP growth	-1.11**	(-1.96)	-1.02*	(-1.81)	-0.52	(-0.94)	-0.28	(-0.51)
indglob.	-0.52	(-0.88)	-0.67	(-1.18)	-1.71**	(-1.99)	-0.91	(-1.01)
% lib.	-0.07	(-0.44)	-0.10	(-0.68)				
eq. open.	0.10*	(1.73)	0.18	(1.08)				
wrld. div.yld.	24.01**	(2.52)	28.77***	(3.64)	37.13***	(3.87)	31.47***	(3.78)
NBER dummy	0.04*	(1.82)	0.04*	(1.81)	0.04	(1.36)	0.04	(1.62)

Table A. VII. Analysis for the Sample Period When All Countries Within an Emerging Region are Available

The table reports results for the sample period when the country composition for each emerging region remains the same. The sample starts when all countries are available for the particular region. The Middle East/ Africa region is excluded due to limited data availability. Panel A reports the Bunzel and Vogelsang (2005) trend tests for the comovement measures. The second column reports the start dates per region. Panel B reports the results of time series regressions of the quarterly comovement measures on a set of macro-economic variables. Panel C reports the estimated trend coefficients (in percentages per year) for the macro-economic variables. The analyses in Panels B and C start when all countries are available for the comovement measures (see column 2 of Panel A) or thereafter, as soon as the relevant macro-economic data is available. Panels B and C exclude the capital market openness variable for Eastern Europe, as the number of available observations is too small. They also exclude the liberalization variable for the emerging Asian and Latin American markets, as the series are constant over the relevant sub sample periods. \*\*\*, \*\*, and \* indicate significance at the 1, 5 and 10 percent levels.

Panel A: Trend tests											
Correlation				Integration							
	start date	trend	t <sub>5%</sub>	t <sub>10%</sub>	trend	t <sub>5%</sub>	t <sub>10%</sub>				
EastEur	Q1 2001	5.68% <sup>**</sup>	(8.393)	(9.284)	5.82% <sup>**</sup>	(4.510)	(5.525)				
emAsia	Q4 1993	2.18% <sup>**</sup>	(3.249)	(3.755)	2.34% <sup>**</sup>	(2.205)	(2.987)				
LatinAm	Q4 1994	0.65%	(0.277)	(0.422)	1.83% <sup>*</sup>	(1.667)	(2.129)				
Panel B: Time series regressions											
	spec.	trade/ GDP	Mcap/ GDP	GDP growth	indreg.	indglob.	% lib.	eq. open.			R <sup>2</sup>
Correlation											
EastEur	1)	0.15 (1.07)	0.19 <sup>***</sup> (4.58)	3.36 <sup>***</sup> (3.77)	-0.85 <sup>**</sup> (-2.09)						78.29%
	2)	0.14 (1.04)	0.16 <sup>***</sup> (3.33)	3.31 <sup>***</sup> (3.68)		-0.93 <sup>*</sup> (-1.85)					77.74%
	3)						1.92 <sup>***</sup> (4.44)				30.77%
emAsia	1)	1.07 <sup>***</sup> (3.80)	0.04 (0.68)	1.23 (1.17)	1.21 (0.85)						44.48%
	2)	0.99 <sup>***</sup> (4.38)	0.00 (0.04)	1.21 (1.12)		-1.63 (-0.60)					44.37%
	3)							0.19 (1.39)			2.78%
LatinAm	1)	-0.61 (-0.60)	0.20 <sup>*</sup> (1.84)	-0.43 (-0.32)	0.45 (0.36)						8.41%
	2)	-0.85 (-1.30)	0.29 <sup>***</sup> (2.97)	0.10 (0.07)		1.65 (1.30)					10.89%
	3)							0.09 (0.40)			-2.17%

Table A. VII - continued

		Panel B - continued								
	spec.	trade/ GDP	Mcap/ GDP	GDP growth	indreg.	indglob.	% lib.	eq. open.	$R^2$	
<u>Integration</u>										
emAsia	1)	1.02*** (5.61)	0.08* (1.84)	1.16 (1.49)		0.28 (0.15)			56.71%	
	2)							0.20* (1.67)	8.04%	
LatinAm	1)	0.04 (0.09)	0.30*** (4.00)	0.71 (0.78)		2.33*** (2.78)			40.16%	
	2)							0.39*** (3.13)	6.84%	

		Panel C: Trends in macro-economic variables (in %)							
	trade/ GDP	Mcap/ GDP	GDP growth	indreg.	indglob.	% lib.	eq. open.		
EastEur	1.16	10.26	-0.11	-0.02	-0.62	1.41	n.a.		
emAsia	0.74	0.04	0.00	-0.10	-0.02	n.a.	3.87**		
LatinAm	1.26*	7.83	0.04	-0.54	-0.53	n.a.	1.78		

*Table A.VIII.* Trends over the Period when 50% of All Countries Within Each Emerging Region is Available

This table reports the results of tests for trends in correlations and integration keeping the sample composition the same over time. For each emerging market region, the sample starts when 50% of the countries in that region are available. We then recalculate the comovement measures for the remainder of the sample period based on those countries only. The table reports trend coefficients (in percentage per year) and 5% and 10%  $t$ -statistics. The 5% and 10% critical values of the Bunzel and Vogelsang (2005) trend test with the Daniell kernel are  $\pm 2.052$  and  $\pm 1.710$  respectively. \*\* and \* denote significance at the 5% and 10% levels.

	start date	Correlation			Integration		
		trend	$t_{5\%}$	$t_{10\%}$	trend	$t_{5\%}$	$t_{10\%}$
EastEur	Q4 1994	3.62%*	(1.939)	(2.748)	3.44%*	(1.810)	(2.652)
ME Afr	Q3 2002	2.00%*	(1.708)	(2.009)	2.28%*	(1.951)	(2.296)
emAsia	Q3 1988	2.13%**	(6.726)	(7.003)	1.66%**	(3.586)	(4.316)
LatinAm	Q2 1992	1.11%*	(1.864)	(2.196)	1.66%**	(3.670)	(4.136)

*Table A.IX.* Simulation Analysis - Impact of Number of Countries on Comovement Measures

The table reports the results of a simulation exercise that analyzes the impact of the number of countries within a region on the trend in its comovement measures. The simulations are performed as follows. Each simulation randomly selects  $N$  countries. Quarterly cross-country correlation and integration measures are then constructed based on the actual returns for the selected countries over the Q1 2001 to Q2 2009 period, when all developed and all emerging countries have daily return data available (excluding the Middle East / Africa region). Finally, the Bunzel and Vogelsang (2005) test for time trends is performed. For each  $N$ , the table reports the average annual trend coefficients, based on 1,000 simulations. The table also reports the fraction of simulations that results in a significant (at least at the 10% level) positive trend coefficient, a significant negative trend coefficient and an insignificant trend estimate. The number of countries varies from 2 to 17.

$N$	avg. trend p.a.	Correlation			Integration			
		sign. pos.	sign. neg.	insign.	avg. trend p.a.	sign. pos.	sign. neg.	insign.
2	4.42%	0.72	0	0.28	4.89%	0.88	0	0.12
3	4.66%	0.89	0	0.11	5.04%	0.96	0	0.04
4	4.65%	0.94	0	0.06	5.04%	0.98	0	0.02
5	4.75%	0.97	0	0.03	5.16%	0.99	0	0.01
6	4.76%	0.97	0	0.03	5.18%	0.99	0	0.01
7	4.80%	0.99	0	0.01	5.23%	0.99	0	0.01
8	4.80%	0.99	0	0.01	5.24%	1.00	0	0.01
9	4.84%	0.99	0	0.01	5.28%	1.00	0	0.00
10	4.89%	1.00	0	0.00	5.35%	1.00	0	0
11	4.87%	1.00	0	0.00	5.33%	1.00	0	0.00
12	4.89%	1.00	0	0.00	5.36%	1.00	0	0
13	4.92%	1.00	0	0.00	5.39%	1.00	0	0
14	4.95%	1.00	0	0	5.42%	1.00	0	0
15	4.89%	1.00	0	0	5.37%	1.00	0	0
16	4.89%	1.00	0	0	5.35%	1.00	0	0
17	4.95%	1.00	0	0	5.42%	1.00	0	0

Table A.X. Including Currency Return Correlations to Help Explain Emerging and Developed Market Comovements

Panels A and B report results of time series regressions of quarterly correlation (Panel A) and integration (Panel B) estimates on various macro-economic variables, including two measures of currency comovements. The regressions are performed separately for each of the three emerging and three developed market regions. The first currency correlation measure (“curr. pairw.”) is based on the average pairwise correlation between currency returns of all countries within a region, based on daily exchange rate changes within the quarter. The base currency is always the US dollar. Therefore, this measure is not available for North America. The second measure (“curr. glob.”) is calculated as follows. For each country within the region we calculate the correlation between its currency returns and value-weighted global currency returns. Then, we average these correlations over all countries within the region. The average pairwise currency correlation measure is used as an explanatory variable in regressions on cross-country correlations only. The global currency correlation variable is also used in the regressions on integration. To avoid multicollinearity issues in Panel A, the two currency variables are not included in the same regression. We include average pairwise currency correlations together with regional industry misalignment and we include global currency correlations together with global industry misalignment. In addition, all regressions include the previously used variables: trade/ GDP, Mcap/ GDP and GDP growth. Also, the regressions include an intercept and controls for the business cycle, which for brevity are not included in the table. Panel B excludes Eastern Europe, because the null hypothesis of a unit root cannot be rejected for its integration series. Panel C reports estimated trend coefficients (as a percentage per year) for the currency comovement variables, as well as 5% and 10%  $t$ -statistics, based on the Bunzel and Vogelsang (2005) tests. \*\*\*, \*\*, and \* indicate significance at the 1, 5 and 10 percent levels. The sample period runs from Q3 1991 to Q2 2009.

Panel A: Dependent variable: Correlations										
	Spec.	trade/ GDP	Mcap/ GDP	GDP growth	indreg.	curr. pairw.	indglob.	curr. glob.	$R^2$	
EastEur	(1)	-0.36 (-1.18)	0.16*** (3.47)	0.59 (0.56)	0.15 (0.33)	0.33*** (3.20)			66.97%	
	(2)	-0.28 (-0.99)	0.17*** (3.22)	0.81 (0.72)			-0.19 (-0.43)	0.32** (2.58)	66.04%	
emAsia	(1)	0.53** (2.49)	0.06 (1.49)	0.84 (1.09)	0.95 (0.90)	0.70*** (5.42)			61.38%	
	(2)	0.82*** (3.68)	0.03 (0.55)	1.02 (1.02)			-1.10 (-0.51)	0.34*** (2.67)	55.49%	
LatinAm	(1)	-0.75 (-1.13)	0.18** (2.11)	-0.37 (-0.25)	1.01 (1.13)	0.77*** (4.33)			20.80%	
	(2)	-0.53 (-1.16)	0.25*** (2.89)	-0.24 (-0.15)			1.53 (1.13)	0.09 (0.68)	10.85%	
devEur	(1)	0.21 (0.67)	0.02 (0.70)	-0.06 (-0.03)	-4.14*** (-3.82)	0.50* (1.68)			67.66%	
	(2)	0.20 (0.53)	0.12*** (4.91)	0.81 (0.37)			-15.40*** (-4.77)	0.33 (1.21)	66.33%	

Table A.X - continued

Panel A - continued										
	Spec.	trade/ GDP	Mcap/ GDP	GDP growth	indreg.	curr. pairw.	indglob.	curr. glob.	$R^2$	
NorthAm	(1)	1.18 (1.13)	0.01 (0.25)	2.45 (1.00)			-2.91 (-0.52)	-0.09 (-1.26)	12.00%	
AsiaPac	(1)	-0.34 (-1.46)	0.07*** (3.20)	-2.65** (-2.30)	-3.45** (-2.12)	0.23* (1.97)			56.83%	
	(2)	-0.32 (-1.54)	0.08*** (4.63)	-3.71*** (-2.81)			-2.99 (-0.78)	0.31** (2.33)	54.10%	
Panel B: Dependent variable: Integration										
	Spec.	trade/ GDP	Mcap/ GDP	GDP growth	indreg.	curr. pairw.	indglob.	curr. glob.	$R^2$	
emAsia	(1)	0.68*** (4.28)	0.07** (2.00)	0.77 (1.03)			0.54 (0.35)	0.33*** (3.00)	65.74%	
LatinAm	(1)	0.26 (0.76)	0.26*** (4.13)	0.54 (0.58)			2.18*** (2.69)	0.20** (1.99)	45.35%	
devEur	(1)	0.23 (0.59)	0.17*** (6.01)	-0.35 (-0.16)			-19.32*** (-5.34)	0.23 (1.03)	71.54%	
NorthAm	(1)	1.55 (1.33)	0.06 (1.38)	3.42 (1.11)			-7.53 (-1.03)	-0.05 (-0.67)	41.73%	
AsiaPac	(1)	-0.17 (-1.28)	0.05*** (4.53)	-3.07** (-2.05)			-4.30 (-1.59)	0.23** (2.40)	55.55%	
Panel C: Trends in currency comovements										
	trend	curr. pairw.	trend	curr. glob.						
EastEur	2.53%	$t_{5\%}$ (0.276)	$t_{10\%}$ (0.618)	$t_{5\%}$ (4.229)	$t_{10\%}$ (5.627)					
emAsia	1.91%**	(4.126)	(5.084)	(1.374)	(1.932)					
LatinAm	1.52%**	(9.248)	(9.849)	(2.706)	(3.033)					
devEur	0.90%*	(1.267)	(1.869)	(2.421)	(3.118)					
NorthAm	n.a.	n.a.	n.a.	(3.658)	(4.581)					
AsiaPac	1.04%	(0.312)	(0.535)	(0.543)	(0.878)					

*Table A.XI.* Emerging Market Integration Based on Alternative Global Factor Specifications

The table reports tests for trends in quarterly integration of emerging equity markets into the world market, based on two alternative specifications of the global factor. Panel A uses the value-weighted index of the 15 (developed) countries that are available as of 1973, using constant weights. Weights are based on the average relative market capitalizations over the sample period starting when the first emerging market region becomes available (i.e., emerging Asian markets) in Q2 1987. Panel B is based on the global index that has the same industry weights as the region of interest (not available for the Middle East/ Africa). \*\* and \* denote significance at the 5% and 10% levels. The sample starts in Q3 1991 for the Eastern European markets, Q2 2001 for the Middle East/Africa region, Q2 1987 for emerging markets Asian markets and Q4 1989 for Latin America.

Panel A: Global factor - G15 constant weights			
	trend	$t_{5\%}$	$t_{10\%}$
EastEur	1.72%	(0.419)	(0.859)
MEAfr	0.65%	(0.232)	(0.350)
emAsia	1.40%**	(2.919)	(3.737)
LatinAm	1.51%**	(2.757)	(3.430)

Panel B: Global factor - Industry adjusted			
	trend	$t_{5\%}$	$t_{10\%}$
EastEur	1.94%	(0.544)	(1.064)
MEAfr	n.a.	n.a.	n.a.
emAsia	1.46%**	(2.766)	(3.552)
LatinAm	1.64%**	(2.431)	(3.159)



*Table A.XII.* Emerging Market Integration Based on Country-Specific Factor Exposures and Multiple Global Factors

The table reports tests for trends in emerging market comovements using four alternative quarterly comovement measures. Panel A reports the results based on average realized pairwise cross-country correlations and based on an alternative integration measure where we allow each country to have a different exposure to the value-weighted world index return. Panel B concerns integration measures with multiple global factors: 10 global industry returns and the first three principal components of the 15 country returns that are available as of 1973. We calculate these three integration measures by regressing each country return on a constant and the relevant global factor(s), using all daily returns within each quarter. We measure country-specific integration as one minus the variance of the regression residual divided by the total country return variance. Then, we take an average over all countries within each region. All variances are corrected for first and second order serial correlation using Newey-West (1987). \*\* and \* denote significance at the 5% and 10% levels.  $\text{corr}(\rho_{a,t})$  ( $\text{corr}(I_{a,t})$ ) gives the correlation between the quarterly average realized cross-country correlation (alternative integration) estimates and the primary correlation (integration) measure used in the paper,  $\rho_{a,t}$  ( $I_{a,t}$ ). The sample starts in Q3 1991 for the Eastern European markets, Q2 2001 for the Middle East/Africa region, Q2 1987 for emerging markets Asian markets and Q4 1989 for Latin America.

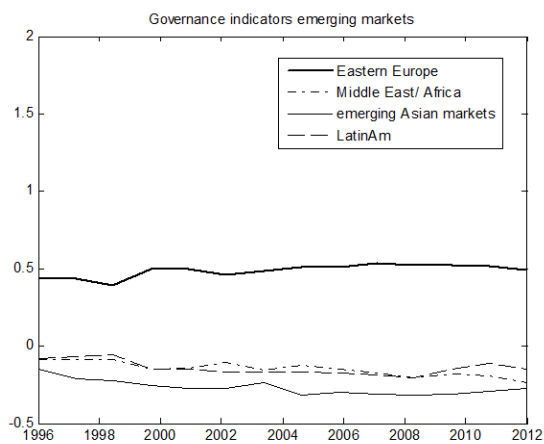
Panel A: Country-specific factor exposures and idiosyncratic variances						
	Average realized pairwise correlations			Average country-specific integration		
	trend	$t_{5\%}$	$\text{corr}(\rho_{a,t})$	trend	$t_{5\%}$	$\text{corr}(I_{a,t})$
EastEur	2.31%**	(3.574)	0.91	1.95%	(0.951)	0.97
ME Afr	1.10%	(0.445)	0.86	1.52%	(0.676)	0.85
emAsia	2.02%**	(4.381)	0.97	1.47%**	(2.518)	0.99
LatinAm	1.56%*	(1.400)	0.93	1.83%**	(3.198)	0.95

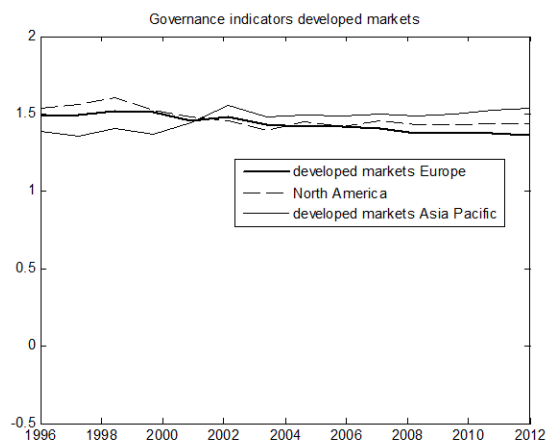
Panel B: Average country-specific integration with multiple global factors						
	10 global industry factors			3 global factors based on PCA		
	trend	$t_{5\%}$	$\text{corr}(I_{a,t})$	trend	$t_{5\%}$	$\text{corr}(I_{a,t})$
EastEur	1.66%*	(2.013)	0.87	2.02%*	(1.531)	0.92
ME Afr	1.10%	(0.771)	0.55	0.34%	(0.060)	0.52
emAsia	1.07%**	(3.084)	0.87	1.82%**	(2.796)	0.90
LatinAm	1.28%**	(2.543)	0.85	1.55%**	(2.594)	0.88

Figure A.1. Annual Governance Measures for Emerging and Developed Regions

The plots give annual governance indicators, averaged over all countries within each emerging (Panel A) and developed (Panel B) region from 1996 to 2012. The governance indicators are from the Worldbank and are based on the average score on six dimensions, including control of corruption, government effectiveness, political stability and absence of violence/ terrorism, regulatory quality, rule of law, and voice and accountability.



Panel A: emerging markets



Panel B: developed markets