Discussion of "The Center and the Periphery…" by G. Kaminsky + C. Reinhart

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My Plan

- K+R contribution to the contagion literature
- An alternative approach: multivariate extreme value analysis - some results
- Why are the results so different?
- Present article 2 or 3 papers…focus here on "strong form" spillovers…most relevant for crises

What Is Systemic Risk?

Systemic risks are for financial market participants what Nessie, the monster of Loch Ness, is for the Scots (and not only for them): Everyone knows and is aware of the danger. Everyone can accurately describe the threat. Nessie, like systemic risk, is omnipresent, but nobody knows when and where it might strike. There is no proof that anyone has really encountered it, but there is no doubt that it exists.

(Sheldon and Maurer, Swiss Journal of Economics, 134(2), 1998, p. 685)

Conditional Co-Crash Probability

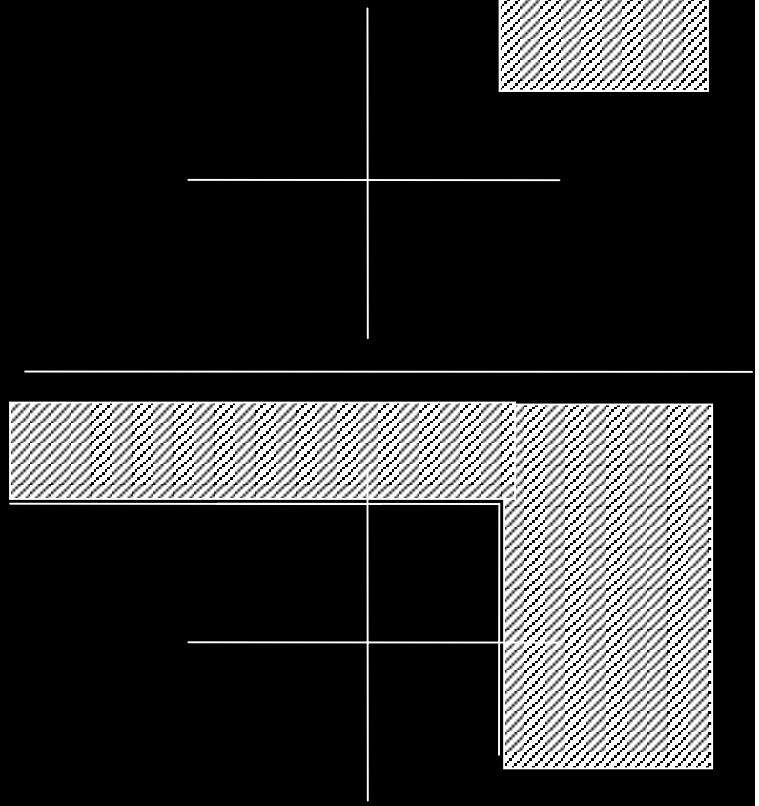
Probability that # = 2 markets crash, given that at least # = 1 crashes

$$P(A/B) = \frac{P(AB)}{P(B)}$$

$$P\{\#=2 \mid \#\geq 1\} = \frac{P\{X > x,\ Y > y\}}{1 - P\{X \leq x, Y \leq y\}}$$

$$= \frac{P\{X > x\} + P\{Y > y\}}{1 - P\{X \leq x, Y \leq t\}} - 1$$

=



Estimation of Marginals

Suppose tails vary regularly at infinity (Frêchet class)

$$\lim_{t\to\infty}\frac{F(-tx)}{F(-t)} = x^{-\alpha}$$

tail index α, Hill estimator (use $X_i < -s$)

$$\hat{\frac{1}{\alpha}} = \frac{1}{M}\sum_{i=1}^{M}\log\frac{X_i}{s}$$

crash probability estimator (at VaR crash level)

$$\hat{p}_{VaR} = \frac{M}{n}\left(\frac{VaR}{s}\right)^{-\hat{\alpha}}$$

Bivariate Estimation

Need estimate of dependence function for $w \to 0$

$$\frac{1}{w}\left[1 - p\left\{X \le Q_1(wp_1), Y \le Q_2\left(\hat{wp}_2\right)\right\}\right]$$

Estimate

$$\frac{n}{k}\left[1 - p\left\{X \le Q_1\left(\frac{\hat{kp}_1}{n}\right), Y \le Q_2\left(\frac{\hat{kp}_2}{n}\right)\right\}\right]$$

by counting points in the area:

$$(X_i, Y_i) \mid X_i > Q_1\left(\frac{\hat{kp}_1}{n}\right) \text{ and/or } Y_i > Q_2\left(\frac{\hat{kp}_2}{n}\right)$$

Table 3. Cross-border extreme linkages within bond and stock markets

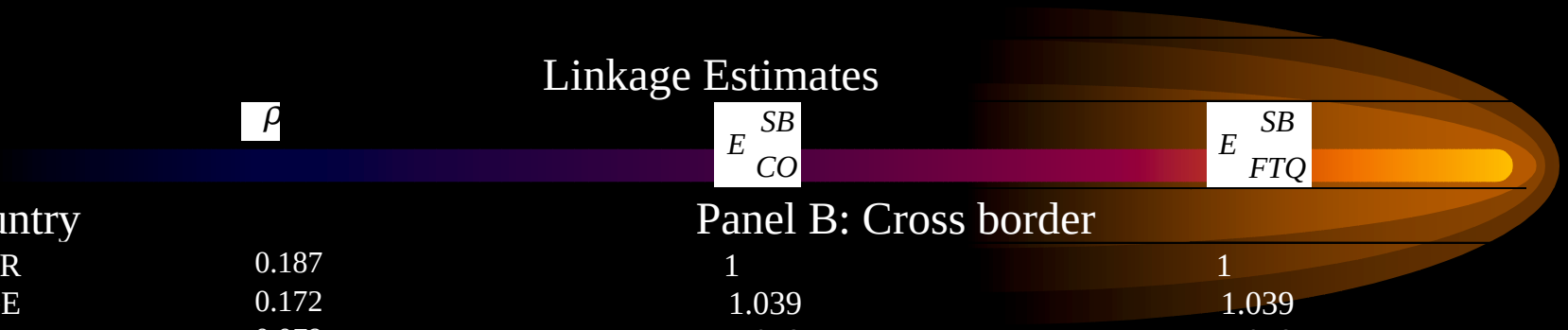
Pairs	Stocks ρ	Stocks E_{CO}^{SS}	Bonds ρ	Bonds E_{CO}^{BB}
GE-FR	0.686	1.263	0.600	1.164
GE-UK	0.575	1.130	0.438	1.109
GE-US	0.470	1.148	0.291	1.090
GE-JP	0.314	1.216	0.198	1.051
FR-UK	0.589	1.208	0.491	1.085
FR-US	0.497	1.201	0.363	1.049
FR-JP	0.322	1.142	0.129	1.023
UK-US	0.546	1.118	0.425	1.100
UK-JP	0.361	1.057	0.184	1.104
US-JP	0.328	1.119	0.164	1.080

$$E_{CO}^{SS} := \frac{P\{S_1 < -s_1\} + P\{S_2 < -s_2\}}{P\{S_1 < -s_1 \text{ or } S_2 < -s_2\}} \quad > \quad E_{CO}^{BB} := \frac{P\{B_1 < -b_1\} + P\{B_2 < -b_2\}}{P\{B_1 < -b_1 \text{ or } B_2 < -b_2\}}$$

$$(s_1, s_2) = (20\%, 20\%) \qquad (b_1, b_2) = (8\%, 8\%)$$

Source: Hartmann, Straetmans and de Vries, Asset market linkages in crisis periods, ECB WP #71, July 2001.

Table 3 b. International extreme cross-asset linkages: contagion versus flight-to-quality effects



Country		Panel B: Cross border	
GE-FR	0.187	1	1
FR-GE	0.172	1.039	1.039
GE-UK	0.079	1.078	1.059
UK-GE	0.083	1.053	1.052
GE-US	0.015	1.035	1.079
US-GE	0.122	1.060	1.057
GE-JP	-0.056	1.096	1.068
JP-GE	-0.000	1.014	1.031
FR-UK	0.165	1.052	1.080
UK-FR	0.102	1.068	1.051
FR-US	0.101	1.080	1.077
US-FR	0.097	1.028	1.030
FR-JP	-0.007	1.041	1.083
JP-FR	0.021	1.038	1.036
UK-US	-0.055	1.025	1.083
US-UK	0.141	1.038	1.052
UK-JP	-0.015	1.016	1.080
JP-UK	0.042	1.049	1.032
US-JP	0.068	1.069	1.080
JP-US	-0.011	1.050	1.033

Source: Hartmann, Straetmans and de Vries, Asset market linkages in crisis periods, ECB WP #71, July 2001.

Table 4c: Extreme linkages between industrial country and emerging market currencies

Exchange rate pairs	k	ρ	E_{CO} [+20%]	E_{CO} [+30%]
DEM/USD, Chile	150	0.010	1.008	1.007
DEM/USD, Colombia	150	-0.006	1.007	1.009
DEM/USD, Venezuela	150	-0.018	1.008	1.007
DEM/USD, Indonesia	125	0.019	1.009	1.008
DEM/USD, Malaysia	250	0.154	1.007	1.005
DEM/USD, Thailand	70	0.133	1.018	1.015
JPY/USD, Chile	70	0.048	1.036	1.025
JPY/USD, Colombia	80	0.026	1.020	1.023
JPY/USD, Venezuela	100	-0.016	1.013	1.015
JPY/USD, Indonesia	150	0.124	1.016	1.011
JPY/USD, Malaysia	150	0.168	1.034	1.024
JPY/USD, Thailand	100	0.206	1.008	1.013

Source: Hartmann, Straetmans and de Vries, A global persp. on extreme curr. linkages, forthc. Hunter et al., MIT Press

Why Are Linkages so Strong?

- 97-99 period special? “Globalisation” long term
- Small sample of “extremes”?
- Large but “non-extreme” returns more linked?
- Daily data more linked, time zone problems?
- Results dominated by small countries? Not GDP/capitalisation weighted?
- Crashes mixed up with booms?
- Logit assumes constant variance vs. GARCH?
- Stock markets more linked than other markets!