

Bank/sovereign risk spillovers in the European debt crisis
by
V. De Bruyckere, M. Gerhardt, G. Schepens
and R. V. Vennet

Discussion by W. Lemke (ECB)

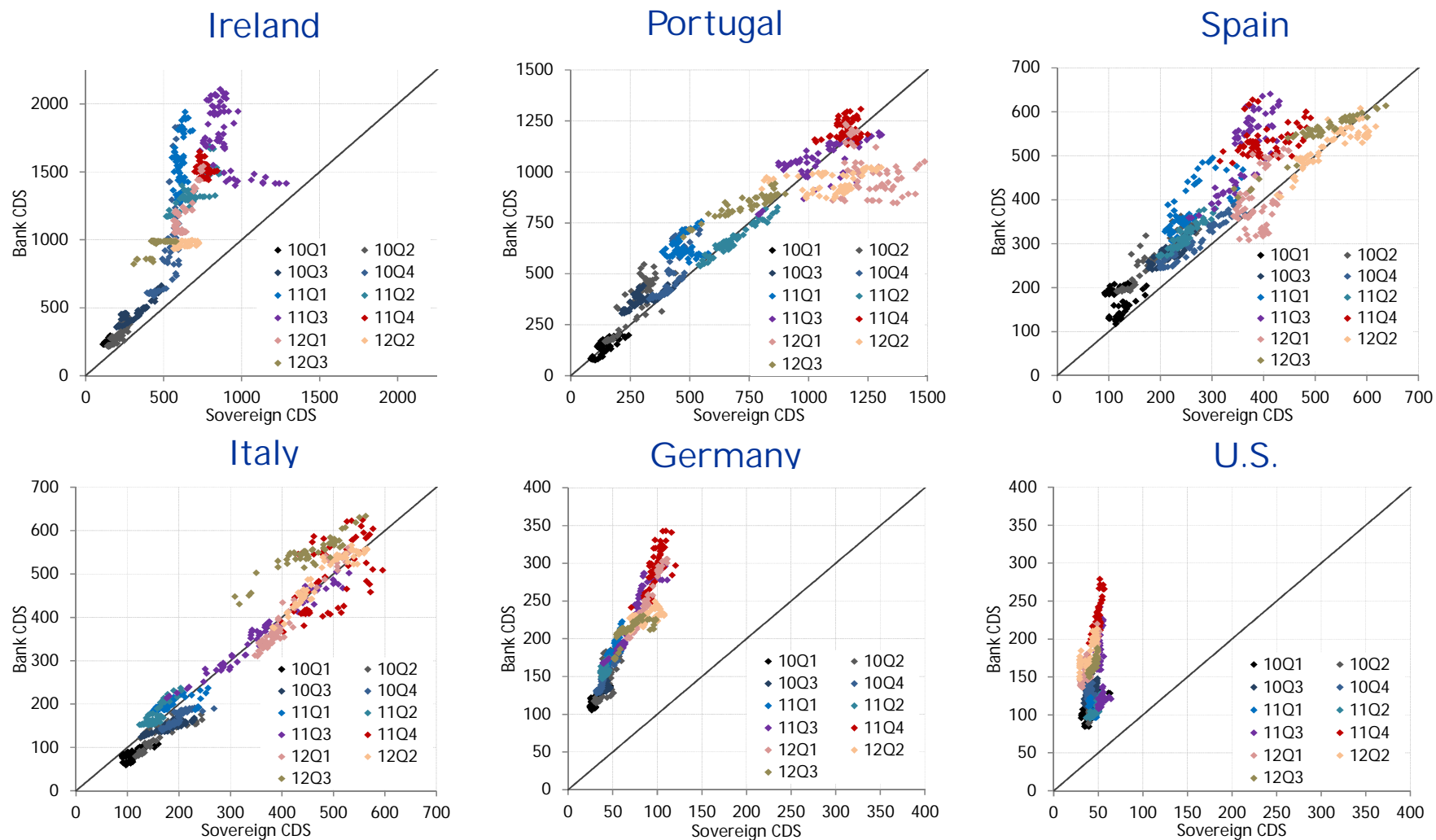
NBB International Conference "Endogenous Financial Risk"
11-12 October 2012
Brussels

The views in this presentation are those of the presenter and do not necessarily represent the views of the ECB or the Eurosystem

Objective and methodology

- **Objective:**
Measure and explain contagion between euro area bank and sovereign risk during 2006-2011
- **Concept of contagion** (between, say, bank i and sovereign j):
Excess correlation of $\Delta\text{CDS}(i)$ and $\Delta\text{CDS}(j)$ after controlling for common factors
- **Measuring contagion:**
Regress ΔCDS on 4 observed risk factors, allow for yearly change in loadings, get correlation of residuals (quarterly basis)
- **Explaining contagion:**
Regress contagion measure on country and bank characteristics

Further motivation: loop between bank and sovereign risks



Source: Speech by ECB EB member B. Coeuré "Challenges to the single monetary policy and the ECB's response" Paris, 20 Sep 2012. Based on ECB calculations. Last observation: 12 September 2012

Findings

- Degree and variation of contagion:
 - Significant evidence of bank-sovereign contagion
 - Particularly strong in 2009
 - Most distinct between bank and home country
- Drivers of contagion:
 - Banks' Tier 1 capital ratio (-)
 - Banks' reliance on short-term funding (+)
 - Sovereigns' Debt-GDP ratio (+)
 - Banks' home bias in sovereign bond holdings (+)
 - Sovereign CDS level (+)

Assessment and discussion

- **Summary assessment:**
 - Clear objective, highly relevant topic
 - Clear exposition, transparent on techniques, good to read
 - (Policy-)relevant results
- **Focus of my discussion:**
 - Measuring contagion

Measuring contagion and possible biases

- (Bi-directional) measure of contagion in BGSV:
 - Excess correlation of bank and sovereign CDS
 - Example: Bank (X), Sovereign (Y), common factors (Z):
 - Regress X and Y on Z
 $X_t = \beta_X' Z_t + \varepsilon_{X,t}$ and $Y_t = \beta_Y' Z_t + \varepsilon_{Y,t}$
 - SUR system, but no system estimate required.
 - Get residuals $e_{X,t} = X_t - b_X' Z_t$ and $e_{Y,t} = Y_t - b_Y' Z_t$
 - Contagion measure = $\text{corr}(e_X, e_Y)$
- Contagion measure model-dependent. Possible biases:
 - Model (variable) selection for common-factor part
 - Time variation in loadings β_X and β_Y
 - Both issues intertwined

Measuring contagion: variable selection

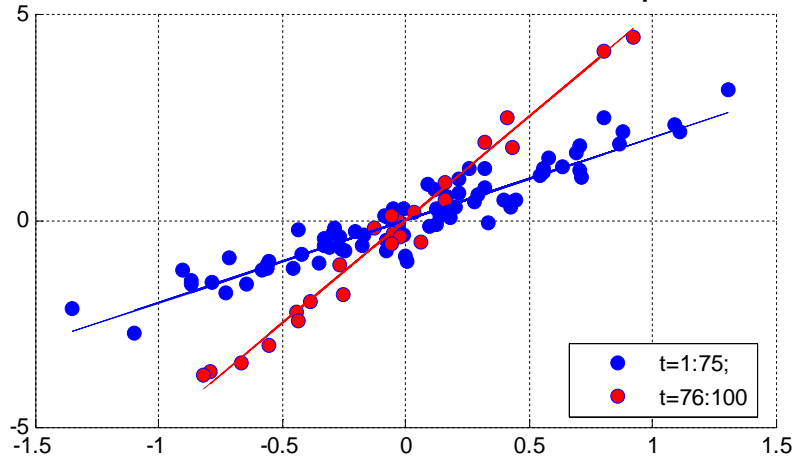
- **Omitting variables in 'common factor' specification?**
 - BGSV careful in motivating observable variable choice
 - ... but may still miss (latent) common factors
 - Note: regressor choice restricted by CDS frequency
 - Example:
 - CDS represent – heuristically – 'quantity of risk' and 'price of risk', the latter depending on risk aversion
 - VSTOXX used in BGSV could be a proxy for risk aversion, but most likely capturing only part of it
- **Possible check**
 - May gauge 'upper bound' on correlations explained by common factors by using Principal Components analysis

Measuring contagion: time variation in parameters

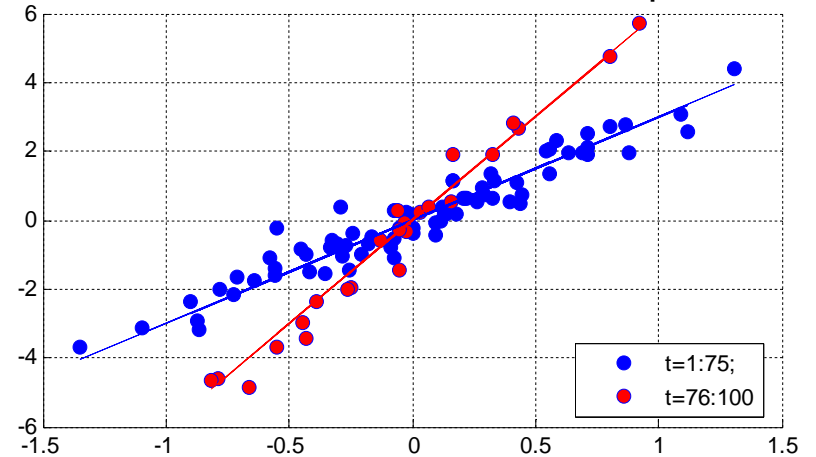
- Taking care of time-varying loadings?
 - BGSV estimate their regression models on yearly windows
 - Problem if break within year window
- Small MC simulation for illustration
 - 2 years (ca 100 weeks), loading break middle of 2nd year:
 - $X_t = 2 Z_t + \varepsilon_{X,t}$ and $Y_t = 3 Z_t + \varepsilon_{Y,t}$, $t = 1:75$
 - $X_t = 5 Z_t + \varepsilon_{X,t}$ and $Y_t = 6 Z_t + \varepsilon_{Y,t}$, $t = 76:100$
 - Other parameters constant, $\text{corr}(\varepsilon_{X,t}, \varepsilon_{Y,t}) = 0.2$
 - Estimate regression models as in BGSV on yearly basis, i.e. for $t = 1:50$ and for $t = 51:100$
 - Unbiased estimated of residual correlation for 1st year,
 - but mean estimate for $\text{corr}(\varepsilon_{X,t}, \varepsilon_{Y,t})$ is 0.82 for 2nd year!

Measuring contagion, MC example: Wrong timing of loading break...

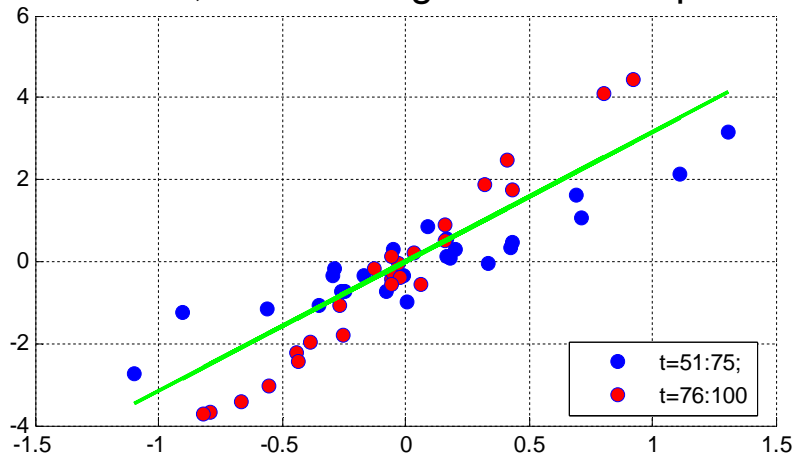
X vs Z, fits on correct subsamples



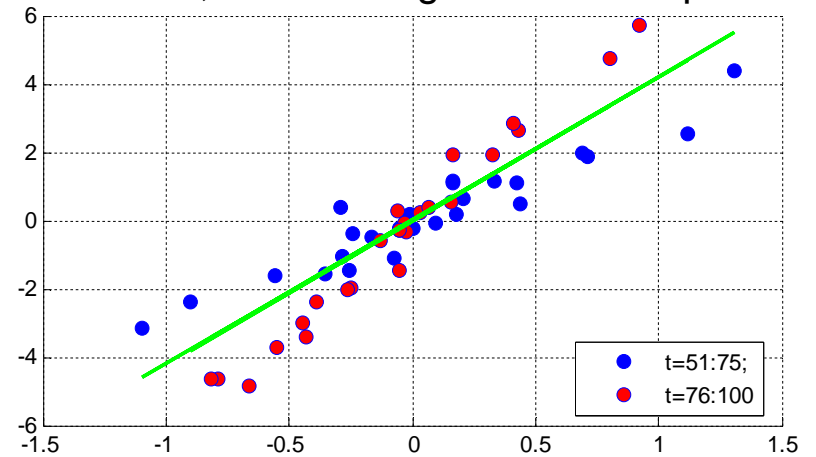
Y vs Z, fits on correct subsamples



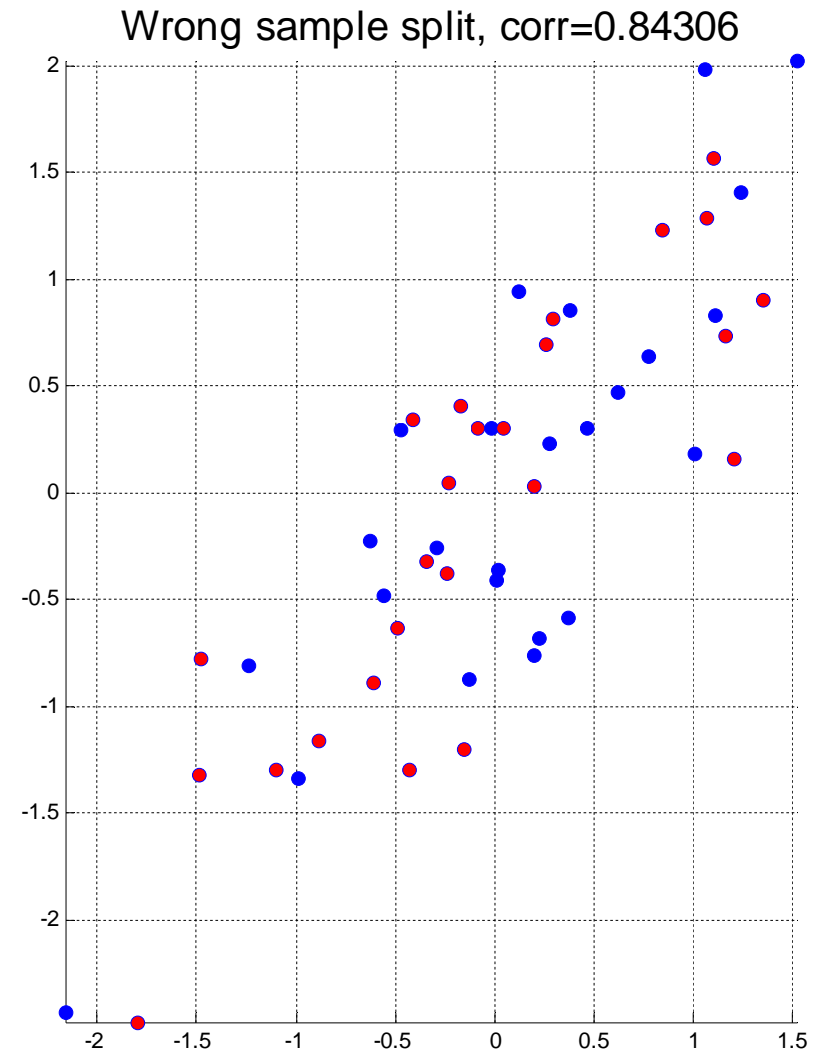
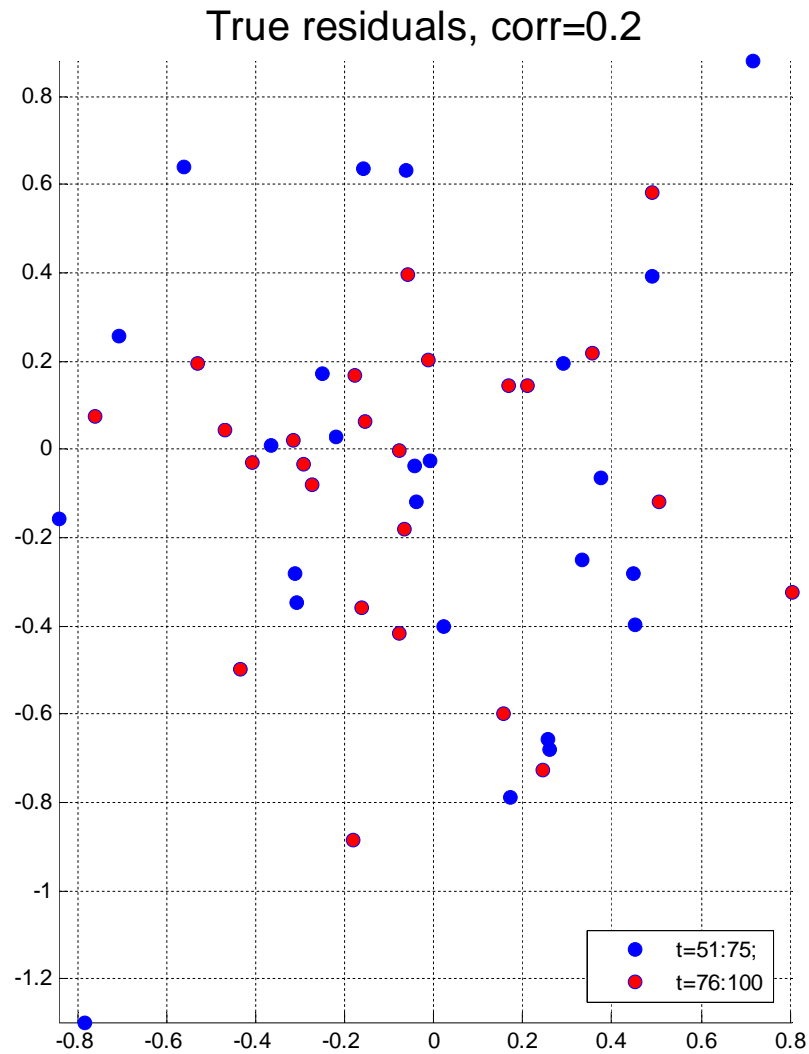
X vs Z, fit on wrong 2nd subsample



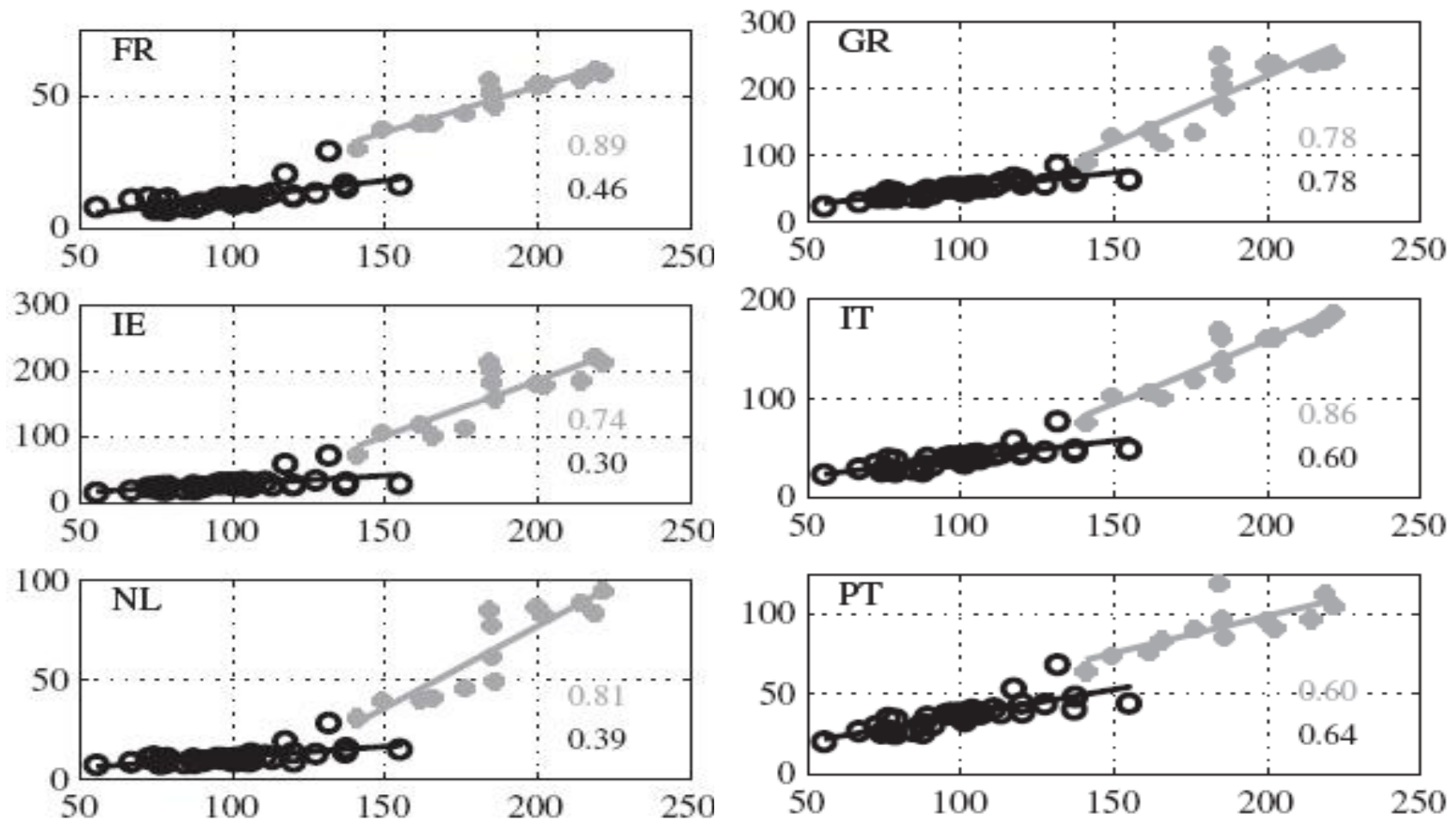
Y vs Z, fit on wrong 2nd subsample



Measuring contagion, MC example: ... can lead to strong over-estimation of contagion



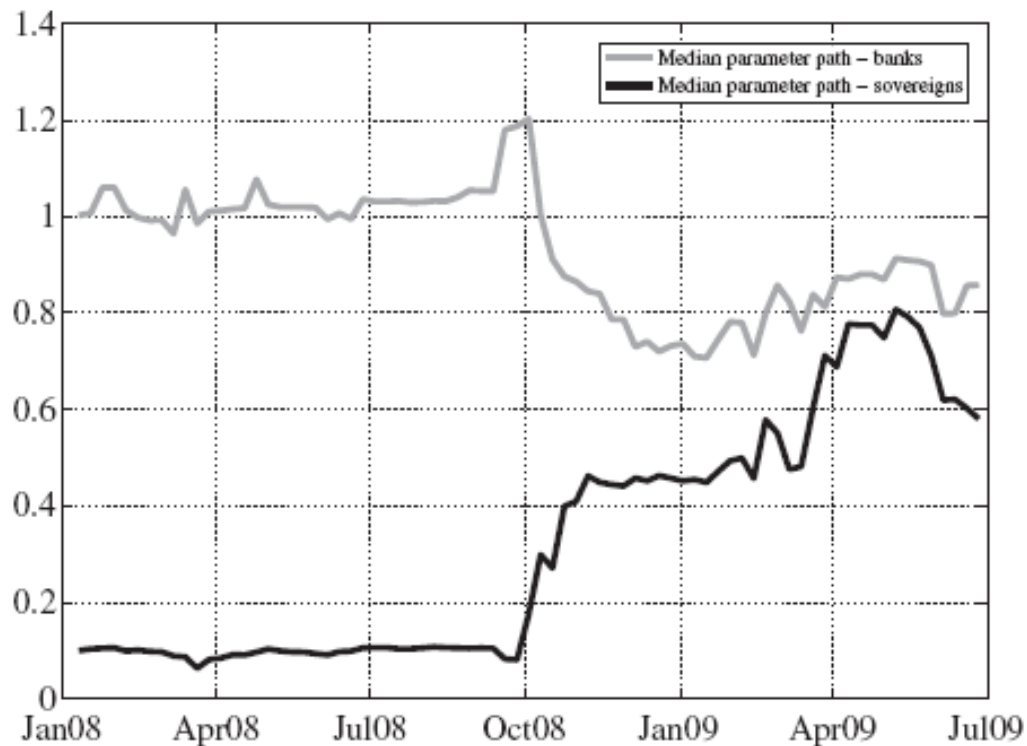
Break in loadings: empirical illustration



Black circles: data pairs (sov CDS, iTraxx non-fin) for 4 Jan 2008 to 10 Oct 2008; gray circles for 17 Oct 2008 to 16 Jan 2009. Source: Ejsing & Lemke (2011).

Possible remedies of accounting for breaks

- (More) careful look at residuals
- Break tests (with endogenous break time)?
- Time-varying parameter regression?



Some further comments

- **Generated-regressors problem** - as second-step analysis is based on the estimated correlations from the factor model
- **Estimate jointly?** Challenged by
 - Dimension - but may try bivariately per country, i.e. for the pair of sovereign and (median) bank CDS
 - Mixed-frequency issue – CDS weekly, while variables explaining time variation in residual correlation at low frequency
- What about **sovereign-sovereign spillovers** (natural “by-product” of analysis)?
- Structural **differences in results between the 5 non-euro and the 10 euro countries** (and their banks) in the sample?

Conclusion



"Sovereign risk and the banks - the safety-net frays. Governments used to worry about their banks. Now the reverse is also true"

Source: The Economist , 11 Feb 2010

- Highly relevant paper, well motivated
- Carefully conducted exercise, good to read
- Try to be more careful (robust) in measuring contagion