Systemic Sovereign Risk: Macroeconomic Implications in the Euro Area

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1. What this paper is about

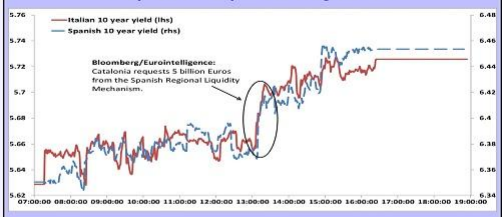
Issue: High sovereign borrowing costs motivated substantial policy response: Austerity, Bailouts, Monetary Interventions.

Question: How fluctuations in sovereign borrowing costs impact the economy?

Problem: Simultaneity.

Approach: Combination of high frequency and narrative identification.

Graphical Example: 28th August 2012



What I do:

- Build a narrative of events in the crisis: impact of foreign events on local yields.
- Measurement error ⇒ proxy SVAR; adapted for panel setup.

2. What are we identifying?

Using high frequency reactions deal with some criticisms of the narrative approach:

- events are endogenous; predictable; badly scaled.

But we can never be sure why the market reacts:

- simultaneous events; real/financial linkages; learning.

Some stories of the crisis: Multiplicity/Self-fulfilling beliefs; Cross-country insurance; Convertibility; Common Creditors

Stories are not mutually exclusive but my approach can encompass them.

Not going to: explain the size/sign of the transmission or investigate determinants.

3. Constructing the proxy

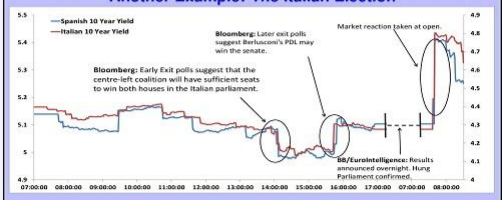
What Happened: Need a non-subjective methodology to filter crisis into a narrative series of events.

- News summaries (Beetsma et al (2013)): EuroIntelligence and Bloomberg.
  - Event must be country-specific (IT,ES,PT,IE,GR,CY).
  - Must be timeable, looking for announcements.
  - Not: editorial, relate to private companies, unsourced/rumour, data.

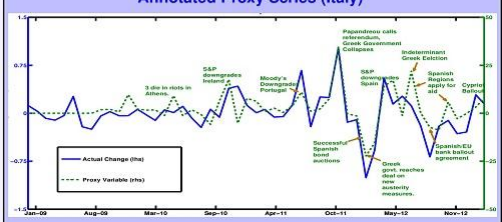
Gauging the reaction: event time via a news-wire.

- Look at change in bond yields in 20 min window around event time.
- **Important:** Remove overlapping events.
- Outside trading hours: only include if it is the "headline" story in the summary.

Another Example: The Italian Election



Annotated Proxy Series (Italy)



4. Methodology:Proxy SVAR identification

Reduced form model (monthly frequency):

$$Y_t = C(L)Y_{t-1} + u_t,\ u_t \sim N(0, \Sigma_u)$$

An *A*-type structural form can be expressed as:

$$Au_t = e_t;\ E(e_t e_t') = I_N$$

Partitioned identification: $e_t = (\varepsilon_{1t}', \varepsilon_{2t}')'$. Assume we have a proxy m_t. Key identifying assumptions:

Relevance: $Cov(m_t, \varepsilon_{1t}) = \phi$ **Exogeneity:** $Cov(m_t, \varepsilon_{2t}) = \mathbf{0}_{N-1}$

SVAR assumption: there exists a row vector $a_1 u_t = \varepsilon_{1t} \Rightarrow$

$$m_t = \phi\varepsilon_{1t} + \omega_t = \phi a_1 u_t + \omega_t = \Upsilon' u_t + \omega_t$$

Strip out ϕ using a unit variance assumption.

4.1 Adding a Panel Setting

Consider a country specific proxy SVAR (c is a country index):

$$Y_{c,t} = B_c(L)Y_{c,t-1} + u_{c,t},\ u_{c,t} \sim N(0, \Sigma_{c,u}),\ m_{c,t} = \Upsilon_c u_t + \omega_t$$

Idea behind the priors in the panel VAR: countries are similar but different. Formalised with exchangeable priors:

$$\beta_c \sim N(\bar{\beta}, \Lambda_{1c}),\ \Sigma_{u,c} \sim \mathcal{IW}(\bar{S}, \kappa),\ \Upsilon_c \sim N(\bar{\Upsilon}, \Lambda_{2c})$$

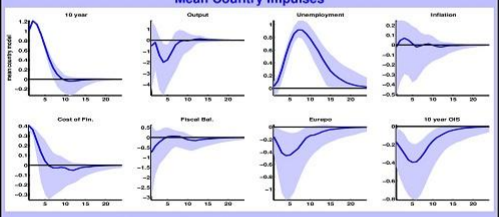
$\beta_c = vec(B_c)$, and $\bar{\beta}, \bar{S}, \bar{\Upsilon}, \Lambda_{1c}$ and Λ_{1c} are estimated hyperparameters. Decompose the variance:

$$\Lambda_{1c} = \lambda_1 L_{1c},\ \Lambda_{2c} = \lambda_2 L_{2c}$$

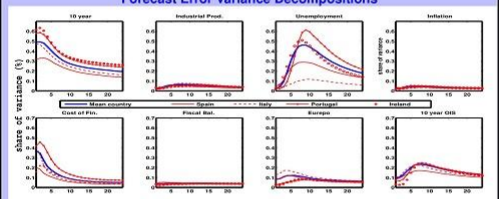
The λ's determine the degree of shrinkage with $\lambda_1, \lambda_2 \sim IG(-1, 0)$

5. Results

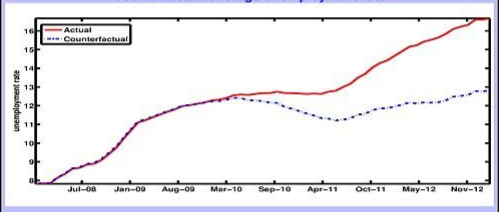
Mean Country Impulses



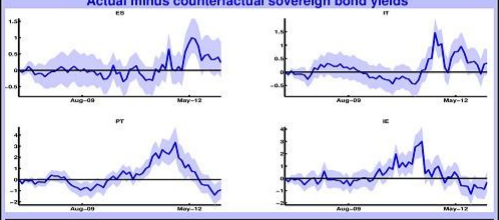
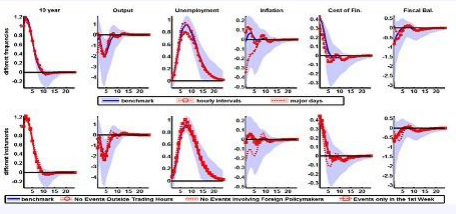
Forecast Error Variance Decompositions



Counterfactual average unemployment rate



Actual minus counterfactual sovereign bond yields



5.1 Sensitivity analysis - alternative proxy definitions