# Sovereign Spreads in EMU: The Time-Varying role of fundamentals and market distrust

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# Outline

# Goal

## Main Goal of the research.

- The aim of this paper is to explain sovereign spreads evolution for the case of some peripheral European Monetary Union (EMU) countries:
  - Greece, Portugal, Ireland, Italy and Spain (so-called PIIGS) .
    - For these countries, and particularly after the 2007 financial crisis, hangs the shadow of *default*, with a sharp increase of their sovereign debt spreads.
    - ¿What is the role of fiscal indebtness?
    - ¿How worsening fundamentals affect governments solvency?
    - ¿Is rational market distrust?

# Methodology

- Recent literature suggests the existence of a time-varying response, where the evolution of fundamental variables affect to sovereign spreads through a varying influence on market perception about future developments.

- We estimate a Kalman Filter model, extending previous work in three directions
  1. By modifying JD Hamilton GAUSS code to fit a time-varying multi-parameter model,
  2. By adapting the transition equation to include control variables,
  3. Extending the KF single-country model to a panel data context.

# Empirical evicence

## Earlier studies

- Codogno, Favero, & Missale (2003):
  - Euro member countries, who would be sharing thus a large systemic component and indicating consequently a large degree of financial integration between the euro-area
- Gómez-Puig (2009) and Favero and Missale (2012)
  - showed an increase of the idiosyncratic risk component in the spread movements, becoming stronger than the systemic one
- Balassone, Franco and Giordano (2004)
  - Sovereign Spreads depend on fiscal variables (Gross Debt Ratio to GDP)

# Empirical evicence

## Recent evidence

- Hallerberg and Wolff (2008)
    - Yield spreads are also influenced by liquidity risk
- Bernoth & Wolff (2008)
    - find evidence linking sovereign debt spreads to creative accounting measures.
- Bernoth and Erdogan (2012)
    - Find evidence favouring the existence of a time-varying relationship.
- Afonso, Arghyrou and Kontonikas (2014)
    - Three distinct time periods, the third starts after the global financial crisis turned into a sovereign debt crisis.

# Spreads, Credibility and Reputation

- Giavazzi & Pagano (1988)
  - Joining the European Monetary System was understood as a way of changing the set of incentives faced by weak-perceived governments (mainly those in charge at Southern-Europe countries) . Signalling commitment to keep their exchange-rate fixed, governments would enhance their reputation and hence credibility of their announced policies.
- Drazen & Masson (1994)
  - They state that if a policy is perceived to be carried out (credibility), depends not only on the policymaker's preferences (reputation), but also on the state of the economy (this is particularly relevant when worsening fundamentals are characterized by persistence)

# State Transition Equation

$$\underset{(r\times 1)}{\xi_{t+1}} = \underset{(r\times r)}{\mathbf{F}} \times \underset{(r\times 1)}{\xi_t} + \underset{(r\times s)}{\mathbf{A}} \times \underset{(s\times 1)}{Z_t} + \underset{(r\times 1)}{u_t}$$

- Unobservable vector
- Autoregressive parameters matrix
- Parameters for control variables
- $u_t \sim N(0, Q)$
- $E(u_{t+1}, u^{'}_{t+1}) = \mathrm{Q}$

# Measurement Equation

$$\underset{(n\times 1)}{y_t} = \underset{(n\times k)}{\mathbf{B}'} \times \underset{(k\times 1)}{x_t} + \underset{(n\times r)}{\mathbf{H}'} \times \underset{(r\times 1)}{\xi_t} + \underset{(n\times 1)}{w_t}$$

- Dependent variables vector
- Vector of regressors
- Unobservable vector
- $w_t \sim N(0, R)$
- $E(w_t, w_t^{'}) = \mathrm{R}$

# Time-varying parameter model

$$\underset{(n\times 1)}{y_t} = \underset{(n\times k)}{\mathbf{B}'} \times \underset{(k\times 1)}{x_t} + \underset{(n\times r)}{\mathbf{H}'(x_t)} \times \underset{(r\times 1)}{\xi_t} + \underset{(n\times 1)}{w_t}$$

- H Vector not fixed

Aditional Assumptions:

- $H^{'}(x_{it}) = x_{it}$
- $\xi_t = (\beta_{it} - \bar{\beta}_i)$
- $\bar{\beta}_i = \bar{\beta}$
- Optional restrictions for autoregressive parameters matrix and gaussian errors matrices of both measurement and transition equations

# Our Model

$$Spread_{it} = \bar{\beta}_0 + \bar{\beta}_1 GD_{it} + \bar{\beta}_2 BAAS_t + \bar{\beta}_3 UR_{it} + \bar{\beta}_4 LIQ_{it} +$$
$$\beta_{0t} + \beta_{1it} GD_{it} + \beta_{2it} BAAS_t + \beta_{3it} UR_{it} + \beta_{4it} LIQ_{it} + w_{it}$$

State equation:

$$\xi_{it} = (\beta_{0it}, \beta_{1it}, \beta_{2it}, \beta_{3it}, \beta_{4it})$$

Transition:

$$\xi_{i,t+1} \doteq \alpha \xi_{it} + \mu CYAS_{it} + v_{i,t+1}$$

$$E(v_t, v_t^{'}) = Q$$

# Summary

1. We employ a Kalman Filter approach to model determinant of Sovereign Spreads evolution for PIIGS countries since joining the EURO.
2. Our Structural Model allows to estimate a time-varying response to determinants of Sovereign Spreads.
3. OCA variables drive evolution of market expectations.

| | All Countries |
|---|---|
| Intercept | -0.586* |
| | (0.350) |
| GrossDebttoGDP | 0.019* |
| | (0.011) |
| BUSASpread | 0.099** |
| | (0.040) |
| Unemployment | 0.150*** |
| | (0.033) |
| GrossDebtSize | -0.080** |
| | (0.040) |
| Observations | 168 |
| Countries | 5 |
| Log likelihood | 75.583 |

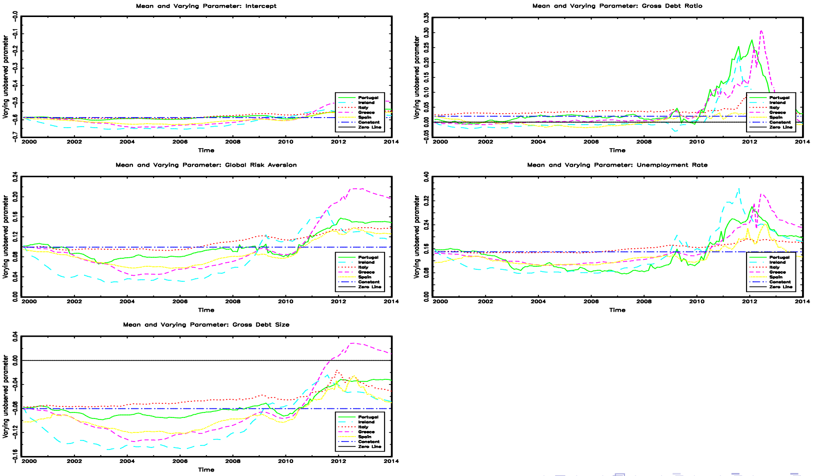
Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

| | All Countries |
|---|---|
| State | 0.960*** |
| | (0.008) |
| Cycle | -0.0006*** |
| | (0.0001) |

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

# Fixed and Time-Varying Parameters Estimation



# Discussion

1. **PIIGS sovereign debt spreads depend on fundamentals**
   - GrossDebt, Market Risk Aversion, Unemployment and Liquidity
2. There is a non-negligible impact of **changes in market perception**, which is estimated through an unobservable vector measuring the a varying-component for parameters
3. This unobservable vector leads to the existence of a **time-varying relationship** among regressors and spreads.
4. **Misalignment from Optimum Currency Area criteria** (current account, cyclical asymmetry)
   - seems to influence the evolution of the unobservable vector
5. Our Panel TVP model parameters estimation allows for significance of
   - A ***steady-state* mean panel coefficients**, but also for
   - the *varying-parameter* (deviation from the mean)

# Future Work

- Enrich the Kalman filter model to different specifications in a panel context.
- Disentangle country-specific behavior from common factors with the inclusion of an additional common unobservable vector.
- Test for the impact on spreads of the changes of strategies adopted by EU and ECB.
- Refine our structural model mixing fixed and varying parameters.