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

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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 indebtedness?
- How worsening fundamentals affect governments solvency?
- Is rational market distrust?
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 evidence

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

  - Sovereign Spreads depend on fiscal variables (Gross Debt Ratio to GDP)
Empirical evidence

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.
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

\[ \xi_{t+1} = F \times \xi_t + A \times Z_t + u_t \]

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

\[ y_t = B' \times x_t + H' \times \xi_t + w_t \]

- Dependent variables vector
- Vector of regressors
- Unobservable vector
- \( w_t \sim N(0, R) \)
- \( E(w_t, w_t') = R \)
Time-varying parameter model

\[ y_t = B' \times x_t + H'(x_t) \times \xi_t + w_t \]

- H Vector not fixed

Additional 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

\[
\text{Spread}_{it} = \tilde{\beta}_0 + \tilde{\beta}_1 GD_{it} + \tilde{\beta}_2 \text{BAAS}_t + \tilde{\beta}_3 \text{UR}_{it} + \tilde{\beta}_4 \text{LIQ}_{it} + \\
\beta_0t + \beta_1it GD_{it} + \beta_2it \text{BAAS}_t + \beta_3it \text{UR}_it + \beta_4it \text{LIQ}_it + w_{it}
\]

State equation:
\[
\xi_{it} = (\beta_{0it}, \beta_{1it}, \beta_{2it}, \beta_{3it}, \beta_{4it})
\]

Transition:
\[
\xi_{i,t+1} = \alpha \xi_{it} + \mu \text{CYAS}_{it} + v_{i,t+1}
\]

\[
E(v_t, v_t') = Q
\]
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

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<th>Variable</th>
<th>Estimate</th>
<th>Std. Error</th>
<th>p-Value</th>
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<td>Intercept</td>
<td>-0.586*</td>
<td>0.350</td>
<td>&lt;0.10</td>
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<tr>
<td>GrossDebttoGDP</td>
<td>0.019*</td>
<td>0.011</td>
<td>&lt;0.05</td>
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<tr>
<td>BUSASpread</td>
<td>0.099**</td>
<td>0.040</td>
<td>&lt;0.01</td>
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<tr>
<td>Unemployment</td>
<td>0.150***</td>
<td>0.033</td>
<td>&lt;0.01</td>
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<tr>
<td>GrossDebtSize</td>
<td>-0.080**</td>
<td>0.040</td>
<td>&lt;0.01</td>
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<tr>
<th>Summary</th>
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<td>Countries</td>
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<td>Log likelihood</td>
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* Standard errors in parentheses
  * p < 0.10, ** p < 0.05, *** p < 0.01
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<tr>
<td>State</td>
<td>0.960***</td>
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<td></td>
<td>(0.008)</td>
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<td>Cycle</td>
<td>-0.0006***</td>
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<td>(0.0001)</td>
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Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Fixed and Time-Varying Parameters Estimation

- State Equation Estimation: 2000:01-2013:12
- Parameter Estimations

Paniagua, Sapena, Tamarit

Sovereign Spreads in EMU
PIIGS sovereign debt spreads depend on fundamentals

- GrossDebt, Market Risk Aversion, Unemployment and Liquidity

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.

This unobservable vector leads to the existence of a time-varying relationship among regressors and spreads.

Misalignment from Optimum Currency Area criteria (current account, cyclical asymmetry)

- seems to influence the evolution of the unobservable vector

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.