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Is the EMU government bond market a playground for asymmetries? ☆

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ABSTRACT

We investigate the volatility dynamics of some major European Monetary Union sovereign bond markets. We provide an endogenous identification in terms of two Markov switching regimes for market volatility and analyze the impact of capital and trade flows together with policy actions on the persistence of volatility swings.
The empirical findings indicate that, with some notable exceptions, capital and trade flows measures were a matter of minor importance for European Monetary Union sovereign bond markets included in our set. On the contrary, central banks' liquidity provision indicators had important but asymmetrical effects on the persistence of the European Monetary Union's bond market volatility swings. Although we do not straightly reject the increased market integration hypothesis, these asymmetries suggest that certain domestic factors still weigh heavily in times of stress for market sentiment.

1. Introduction

Government bond markets play a major role in the transmission mechanism of monetary policy in the European Economic and Monetary Union (hereafter EMU). The common currency became the vehicle for exercising effective and appropriate policies on many levels and avoiding the consequences of asymmetrical shocks. Over the first years of Eurozone life, the previous literature provided evidence that the common currency has led to government bond yields' integration due to the elimination of asymmetric shocks and better liquidity conditions, despite deteriorating macroeconomic fundamentals (see for example Abad, Chuliá, & Gómez-Puig, 2010; Christiansen, 2007; Codogno, Favero, & Missale, 2003; Favero, Pagano, & Von Thadden, 2010; Geyer, Kossmeier, & Pichler, 2004; Kim, Moshirian, & Wu, 2006; Pagano & von Thadden, 2004; Schuknecht, Von Hagen, & Wolswijk, 2009).

Overall, these studies conclude that the harmonization of EMU macroeconomic policies, together with the liquidity risk and the global risk, plays an important role in affecting bond spread fluctuations. The presence of global risk factors should capture portfolio allocation from an international diversification perspective; domestic factors would become less significant over time and government bond spreads would reflect increased market integration, and much less so macroeconomic or liquidity conditions (see for instance, Longstaff, Jun, Lasse, & Singleton, 2011), as mentioned above.

Although we do not straightly reject the increased market integration hypothesis, we provide evidence that would instead reveal an asymmetric market response to the same concerns and same policy actions, especially in times of high uncertainty. We therefore assume that certain domestic factors are responsible for these asymmetries. In fact, because Euro-area members gave up monetary policy and national currency, they had to survive negative macroeconomic and financial

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shocks by relying on other policies. Moreover, retaining national responsibility for fiscal policy and financial regulation did not make things easier.

We take an empirical approach and look at volatility swings in some major European sovereign bond markets. We use a Markov switching model suitable for capturing non-linearities in the data and providing an endogenous characterization of two separate regimes observed for market volatility. The identification of the regimes overlaps with the key events that took the center stage in European financial markets, starting with the first Greek bailout in May 2010. We then investigate how market concerns and fears regarding imbalances caused by capital and trade flows and how different policy actions have affected the persistence of volatility swings.

Our findings indicate that measures of net foreign assets' positions were a matter of concern only in the case of Greece, given that the country was relying on external capital inflows to finance its deep-rooted current account deficit. Trade balance developments had a favourable impact on the market volatility only in Germany. However, central banks' liquidity provision measures affected the persistence of market volatility swings favourably in Spain and Ireland but negatively in Greece and Portugal. As government cash and debt management heavily depends on country-specific regulations and traditional arrangements with the central monetary authorities, we regard this as one of those domestic factors affecting market volatility dynamics. Much as in Lane (2012) and other related studies concerning the European sovereign crisis, we support the idea that higher coordination is needed to mitigate the impact of country-specific factors, regulations or institutional arrangements.

We consider that our analysis has strong implications for international investors' optimal portfolios decisions. Reallocation between individual EMU countries' assets should be evaluated according to the asymmetries outlined in this study and the probability of lying within one market regime or another.

The structure of the paper is as follows. Section 2 discusses the proposed methodology, Section 3 presents the data, while Section 4 shows the empirical analysis and discusses the main findings. Finally, Section 5 summarizes the conclusions.

2. Methodology

The Markov switching model was first considered by Hamilton (1990) and Kim (1994). The data generating process (hereafter DGP) of time series may display fat tails or point to multimodal distributions. Structural and persistent shocks and different causality and dependency relations with other indicators could potentially explain these non-linearities. The different dynamics are the "states" or "regimes" and they specify the model equation as:

$$y_t = \beta(S_t)x_t + \sigma(S_t)\varepsilon_t \tag{2.1}$$

where $\varepsilon_t \sim N(0,1)$ is a normal distributed sequence of innovations (i.i.d.) and the parameters β and σ depend on the state S_t, an unobservable variable that follows a first-order Markov process:

$$\Pr ob(S_t = j/S_{t-1} = i) = P_{ij}, \quad i, j \in [1, k] \tag{2.2}$$

where k is the number of states.

The P_{ij} probabilities, which should be interpreted as the probability of switching from state i to state j, are collected in a symmetric matrix $P_{(k\times k)} = [P_{ij}]$ where each row sums to unity.

The properties of the dependent variable are jointly determined by the characteristics of the innovations ε_t and the state variable S_t. In particular, the Markovian state variable yields random and frequent changes in model dynamics, matching the observed non-linearities in the data, while its transition probabilities determine the persistence of each regime.

The time-varying transition probabilities are specified as a function of an exogenous variable z_t, using the cumulative normal distribution function as illustrated below. For a two state Markov switching model (i.e. $k = 2$), the expressions for the transition probabilities follow:

$$P_{(2\times 2),t} = \begin{bmatrix} P_{11,t} & 1 - P_{11,t} \\ 1 - P_{22,t} & P_{22,t} \end{bmatrix} \tag{2.3}$$

$$P_{jj,t} = N(z_t\theta_{jj}), \quad j = 1, 2 \tag{2.4}$$

where N is the cumulative normal density function, z_t is the exogenous variable and θ_{jj} are parameters that need to be estimated.

Given that the derivative of P_{jj} with respect to the exogenous variable z in (2.4) is a function of θ_{jj}, one can assess the direction and the statistical significance of the influence of z_t on y_t. The time-varying specification could be tested using a simple LR test against the restricted one involving constant transition probabilities as in Hamilton's original model. The value of the unobservable variable S_t in this case must be uncorrelated with the value of z_t but this can be achieved by using the lagged values of variable z. The estimated transition probabilities give a much more realistic characterization of the "states" in this case, being conditioned on the current set of information, and not on the entire information set.

We use the empirical approach described above to investigate the volatility patterns observed in some major EMU sovereign bond markets, by following a two-step approach. In the first step, we depart from theory and derive an empirical testable specification for the main model equation, using constant transition probabilities as shown in (2.1) and (2.2). In a