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Sovereign bond yield spreads: A time-varying coefficient approach☆,☆☆

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A B S T R A C T

We study the determinants of sovereign bond yield spreads across 10 EMU countries between Q1/1999 and Q1/2010. We apply a semiparametric time-varying coefficient model to identify, to what extent an observed change in the yield spread is due to a shift in macroeconomic fundamentals or due to altering risk pricing. We find that at the beginning of EMU, the government debt level and the general investors' risk aversion had a significant impact on interest differentials. In the subsequent years, however, financial markets paid less attention to the fiscal position of a country and the safe haven status of Germany diminished in importance. By the end of 2006, two years before the fall of Lehman Brothers, financial markets began to grant Germany safe haven status again. One year later, when financial turmoil began, the market reaction to fiscal loosening increased considerably. The altering in risk pricing over time period confirms the need of time-varying coefficient models in this context.

1. Introduction

After the start of the European Monetary Union (EMU), financial markets barely differentiated between sovereign borrowers. Sovereign bond yield spreads across EMU member states relative to

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☆☆ This paper is an extended version of an analysis that is part of the Ph.D. thesis by Burcu Erdogan.

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Germany converged and were generally smaller than fifty basis points. However, with the 2007/2008 global financial crisis, government bond yield spreads began to increase considerably, reaching values around 250 basis points for Greece and Ireland in Q4/2008. Understanding the driving forces of EMU sovereign yield differentials is an important issue for policymakers and economists.

The general consensus in the existing literature is that bond yield differentials are significantly affected by both international and country-specific risk factors such as liquidity or default risk premia.[1] Recent evidence shows that the sharp increase of government bond yield spreads during the financial crisis can not purely be attributed to changes in macroeconomic fundamentals, but also to the fact that the general pricing of risk has increased over time, in the sense that financial markets reacted more strongly to different risk variables than they did before. Thus, the relationship between the variables proxying default and liquidity risk and government bond yield spreads may be time-varying. Most studies analyzing the determinants of bond yield spreads rely on simple linear regression models, which assume a constant relationship between the explanatory variables and bond yield spreads. These linear models, however, are not an appropriate approach to accurately model these non-linear dynamics.

We contribute to the literature by estimating time-varying coefficients in an additive non-parametric fixed-effects panel model framework. Estimating time-varying coefficients allows us to identify to what extent an observed change in the yield spread is due to a shift in macroeconomic fundamentals such as a country's fiscal position and to what extent it reflects a change in markets' pricing of these fundamentals expressed by a shift in the model coefficients. Further, we are able to endogenously identify the timing and patterns of any changes in the model coefficients. In this form of semi-parametric models, a separate non-parametric regression function is fitted to each explanatory variable. An appealing feature of this approach is that additivity of the individual predicting variables is the only assumption on the functional form of the model and hence no further assumptions about the specific functional form for the path of coefficients are imposed on the data. This is a major advantage compared to parametric approaches and is especially relevant for our data set, where the bond yield spreads show no clear convergence or divergence path over the entire time span of the data sample.

Our model is based on Sun et al. (2009), who develop a semiparametric fixed effects panel data model with varying coefficients using a local linear regression approach. Their methodology has the nice feature that the fixed effects are removed by applying a one-step estimation approach based on kernel weights without the need of back-fitting techniques. We adapt their model into a smooth time-varying coefficient model.

We find that the impact of fiscal policy variables and general investors' risk aversion on sovereign yield spreads is not constant over time, which confirms the need of time-varying coefficient models in this context. At the beginning of EMU in 1999, the debt level of a country and the general investors' risk aversion significantly explained interest differentials. In the subsequent years, however, the safe haven status of Germany diminished, while sovereign debt differentials continued to play an important role in explaining yield differentials. By the end of 2006, two years before the fall of Lehman Brothers, financial markets began to grant Germany a safe haven status again, which signals that financial markets started worrying about risk long before the start of the financial crisis. With the financial crisis, also the market reaction to fiscal loosening increased considerably. This indicates that financial markets have, at present, an important role in imposing fiscal discipline on governments and constitute an effective supplement to the Stability and Growth Pact (SGP).

The rest of the paper is organized as follows. Section 2 gives an overview about the related literature. Section 3 discusses the methodology that we apply for our estimations. Section 4 details the data and presents some descriptive analysis. Section 5 reports the main results and Section 6 concludes.

2. Literature review

Analyzing the determinants of sovereign yield spreads in the euro area is attracting a lot of interest in the literature. A number of studies find that part of the interest differentials across EMU countries are

[1] Note, that exchange rate risk have been eliminated in EMU.