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Determinants of sovereign yield spreads in the Eurozone: A Bayesian approach

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We analyze the determinants of sovereign yields spreads of EMU member states applying Bayesian Model Averaging (BMA) to annual panel data from 1999 to 2009. BMA is well-suited in cases of small samples and high model uncertainty. This seems to be the case in modeling sovereign yield spreads in the Eurozone since the literature reports heterogeneous results with respect to significant explanatory variables. We are testing a number of variables reported to be significant in the literature and find that the most likely country specific drivers of yield spreads are fiscal variables such as budget balance and government debt, as well as external sector variables, such as terms of trade, trade balance and openness. Global financing conditions, indicated by the US interest rate, and market sentiments, indicated by corporate bond spreads, are likely to influence sovereign yield spreads.

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1. Introduction

The paper aims to provide answers to the question of what drives sovereign yield spreads of EMU countries' government bonds, which is an important issue in the current political debate about the further development and even the survival of the Euro and the Eurozone. We analyze potential determinants of sovereign yield spreads of EMU member states (to German bond yields) observed on secondary bond markets. These yield spreads result from several reasons. Apart from default risk, the yield spreads are influenced by liquidity risk and market sentiments toward investments in risky bonds. We examine the relation between spreads and several variables related to these causes using

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Bayesian Model Averaging (BMA). We particularly focus on the default risk component and test a variety of variables related to this issue, however, we also control for the other issues. Identifying the determinants of sovereign yield spreads is an important research question because it helps to understand which factors determine countries' capital costs. For example, we can analyze whether interest rates paid for borrowing capital depend on countries' fiscal discipline, (certain drivers of the) competitiveness of the economy, global financing conditions or even market sentiments.

A broad and interesting literature exists that deals with determinants of sovereign bond yield spreads. However, the results of these studies are rather heterogeneous, i.e. different papers report different variables as the main drivers of spreads.¹ This may be due to differences in econometric models, country samples, observation periods and variables considered. Edwards (1986), Eichengreen and Mody (1998), Kamin and von Kleist (1999), and Min (1998), e.g., consider *primary* (market) spreads of several *developing countries*, i.e. spreads observed when bonds are issued. Arora and Cerisola (2001) perform individual regressions for time series of *secondary market spreads* of observed countries, whereas Cantor and Packer (1996) consider cross-section data. Examples of papers that employ panel data on developing countries' secondary market yield spreads are: Baldacci et al. (2008), Dailami et al. (2005), Hilscher and Nosbusch (2010), and Rowland and Torres (2004).

While the studies mentioned so far exemplify the bulk literature where the determinants of yield spreads for developing countries are estimated, several papers consider the spreads for *developed countries*. Bernoth et al. (2006) provide a detailed literature review of OECD countries in general and Gale and Orszag (2002) of the US in particular. Examples for other papers dealing with the US are Gale and Orszag (2004), Laubach (2003), and Poterba and Rueben (1999). OECD countries are considered, e.g., in Alesina et al. (1992), and Ardagna et al. (2004).

A number of papers analyze yield spreads of *EU government bonds*. They report some similar but also some very different results. Bernoth et al. (2006) report debt to GDP, deficit to GDP, debt service to revenues, US corporate bond spreads, a EMU dummy, the short-term US rate, as well as liquidity and maturity of the issue as significant. Schuknecht et al. (2009) identify debt to GDP, fiscal balance to GDP, US corporate bond spreads, region dummies, liquidity and maturity of the issue and the short-term US rate as significant determinants of sovereign yield spreads. Schuknecht et al. (2009) confirm these results, but in addition, they find crises and turmoil dummies to be significant. Whereas these papers consider spreads observed for single bond issues, others, such as Codogno et al. (2003), Lemmen and Goodhart (1999), and Manganelli and Wolswijk (2007), use data for a benchmark curve that is related to a fixed maturity, usually a time to maturity of 10 years is considered. Lemmen and Goodhart (1999) report the debt to GDP ratio, capacity to acquire taxes, inflation, and inflation variability to be significant spread drivers. Codogno et al. (2003) only find debt to GDP ratio, US swap spread and US corporate bond spreads significant. Manganelli and Wolswijk (2007) only report ratings and short-term interest rates as significant spread drivers. The literature reviewed so far provides interesting insights into drivers of yield spreads. However, the results are rather heterogeneous, not only for different samples, but even for rather similar samples, such as the Eurozone countries, which a comparison of results from Lemmen and Goodhart (1999) with those of Bernoth et al. (2006), for example, shows. To some extent, these differences may be a result of different observation periods.² Another reason could be, however, that papers in the literature also differ considerably with respect to tested variables.

The fact that there is no consensus about the key determinants of sovereign yield spreads may be seen as indication for high uncertainty about the "true" empirical model. One appropriate approach to deal with this model uncertainty is Bayesian Model Averaging (BMA). It explicitly accounts for the high model uncertainty by considering (approximately) the entire model space, i.e. any possible combination of regressors out of a given set of potential determinants. In classical statistics, by contrast, the

¹ The considered sample and results with respect to significant determinants of the papers discussed here are presented in detail in Table A-1 and A-2 in the appendix.

² In fact, an interesting new strand of the literature analyzes changes in the influence of explaining variables over time. Bernoth and Erdogan (2010) provide an overview on this literature and tackle the issue by applying a semi-parametric time-varying coefficient model.

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