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The time-varying integration of euro area government bond markets

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ABSTRACT

We derive a model in which a standard international capital asset pricing model (ICAPM) for government bonds is nested within an ICAPM with impediments to invest in the local government bond markets. Excess returns or risk premiums are then driven by a country-specific or idiosyncratic stochastic factor on top of the common factor which has a time-varying idiosyncratic impact on the premiums. With this model we investigate the financial integration of government bond markets over time through two channels. First, we allow for gradual convergence from the full ICAPM with impediments to the standard model through the vanishing of the idiosyncratic factors. Second, we allow for gradual equalization of the country-specific impacts of the common factor. State space methods are used to estimate the model with weekly government bond risk premiums for Belgium, France, Italy, Germany, and the Netherlands over the period 1995–2009. Our results suggest, first, that the idiosyncratic factors were almost eliminated by 2006 in all countries but Italy but then reappeared due to the financial crisis that started in 2007. Second, the country-specific exposures to the common international risk factor have converged across countries, with no setback during the crisis.

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1. Introduction

This paper investigates the integration of the government bond markets of five euro area countries (Belgium, France, Italy, Germany, and the Netherlands) during the period 1995–2009. The existing literature suggests that the correlation of government bond returns between different euro area countries has increased, especially since the start of the European Monetary Union (EMU): government bond returns are driven less by country-specific or local idiosyncratic factors and more by common international factors. Financial market integration is an important area of research for different reasons: integration creates a level playing field for financial market participants, it enhances convergence in the transmission process of monetary policy, while it could promote financial stability by creating more opportunities for risk diversification. However, it may also increase spillover effects and contagion risks. It is therefore crucial to accurately measure the degree of financial market integration, and to identify reasons for markets being less-than-fully integrated.

Two related strands of the literature investigate the integration of international government bond markets.

The first strand of the literature focuses on the presence of a common international risk factor in international government bond yield differentials, i.e. the spreads between local yields to maturity versus the yields to maturity of some benchmark country (most often Germany). An early contribution that emphasizes the presence of local and global factors

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in government bond spreads of high yielders like Italy versus Germany is Favero et al. (1997). Codogno et al. (2003) relate US risk factors (corporate and banking risk) to country-specific default risk for a number of countries (Belgium, France, Italy, and the Netherlands). They conclude that the impact of international risk factors is higher in countries with a higher government debt. Bernoth et al. (2004) examine yield spreads of European Union (EU) countries versus Germany and the United States. They conclude that international risk factors captured by US corporate risk affect spreads, but evidence on the interaction of global risk with local fundamentals or liquidity indicators is mixed. Dungey et al. (2000) do not use a proxy for international risk but explicitly filter the common factor out of the government bond spreads through the use of factor analysis. They find a common factor in the long-term bond yield differentials of Australia, Japan, Germany, Canada, and the UK versus the USA. Geyer et al. (2004) filter out a common component in the bond spreads of Austria, Belgium, Italy, and Spain versus Germany. They find a significant impact of international risk proxies on the spreads but they find little impact of country-specific factors like liquidity variables or macroeconomic variables. Schulz and Wolff (2008) investigate government bond yield convergence and argue that government bond market integration already started in the early to mid 1990s both in euro area countries and in the USA and the UK. Gomez-Puig (2009) investigates the relative impact of common risk factors and country-specific risk factors on the yield spreads of EU countries versus Germany in the seven years after the introduction of the euro. She finds that spreads in euro area countries are mainly driven by idiosyncratic risk factors while in EU countries outside the euro area spreads are mostly driven by a common factor implying that monetary autonomy makes countries more vulnerable to international risk factors. Favero et al. (2010) develop a model in which yield spreads depend on local liquidity factors, international risk factors, and on the interaction between both. They conduct estimations for a sample of euro area countries over the period 2002–2003 and find evidence in support of their model. Schuknecht et al. (2010) are among the first to investigate the impact of the financial crisis that started in 2007 on the yield spreads of EU countries versus Germany and the United States. They find that the larger spreads observed during the crisis are the result of a larger penalty imposed by the financial markets on fiscal imbalances and of higher international risk aversion, i.e. a higher common risk factor in the spreads.

The second strand of the literature investigates the presence of a common factor in excess bond returns or bond risk premiums (i.e. the realized one-period holding return of a long-term government bond in excess of the return of a one-period bond in the same country). Ilmanen (1995) finds that the excess bond returns of the USA, Canada, Japan, Germany, France, and the UK are highly correlated over the period 1978–1993. Cappiello et al. (2006) find a high correlation between the returns of government bonds of different countries and argue that the introduction of the euro has lead to near perfect correlation among bond returns within euro area countries. Barr and Priestley (2004) look at the USA, UK, Japan, Germany, and Canada and find that one quarter of excess government bond returns is related to local market risk while the remainder is due to global bond market risk. They find no time variation in the level of integration over the period 1986–1996. Abad et al. (2009) investigate whether the introduction of the euro has affected the degree of integration of EU government bond markets during the period 1999–2008. They find that euro area countries are only partially integrated due to remaining differences in country-specific liquidity and credit risk. They also find that euro area countries are affected more by regional euro area risk factors while EU countries outside the euro area are affected more by global risk factors.

In this paper we add to the second strand of the literature. We examine the financial integration of government bond markets, including possible reversals during the recent crisis period, by investigating bond risk premiums. Following Baele et al. (2004) we define full financial integration as the situation where bond risk premiums are solely and equally affected by common risk factors.[1] This definition has two implications. First, financial integration is the process that eliminates the country-specific factors in the bond risk premiums. These idiosyncratic factors reflect the premiums demanded by investors to compensate them for the country-specific investment impediments encountered on the local bond markets. The main impediments that can be encountered are liquidity risk (see Acharya and Pedersen, 2005) and, as we argue in this paper, country-specific credit risk. The former impediment depends on the characteristics of the local bonds and the local bond markets while the latter depends on local economic fundamentals (e.g. the government debt). Second, financial integration is the process that equalizes the country-specific impacts of the common international risk factor on bond risk premiums across countries. The literature suggests that the impact of international risk factors on the pricing of local government bonds can be related to the liquidity of the local bond markets (e.g. Favero et al., 2010) or to local economic fundamentals (e.g. Codogno et al., 2003).

The contribution of this paper to the literature is both theoretical and methodological.

Theoretically, we start from an international capital asset pricing model (ICAPM) as presented for instance by Harvey (1991) where a representative global investor invests in the bond markets of different countries. Acharya and Pedersen (2005) show that the pricing equations of a CAPM derived in a frictionless economy but expressed in net returns, i.e. returns minus some arbitrary idiosyncratic premium, are equivalent to those derived from a CAPM where frictions are explicitly incorporated. Thus we can allow for impediments to invest in government bonds of the local bond markets simply by rewriting an ICAPM for net returns. The standard ICAPM is obtained if the idiosyncratic premiums equal zero.

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[1] Alternative definitions of financial market integration are of course possible. The definition that we use implies that default risk premiums associated with different countries are the same if markets are fully integrated. As an anonymous referee notes, an alternative characterization of full integration might be a situation where country-specific default risk premiums exist but are perceived equally and are responded to equally by investors everywhere.