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Volatility spillovers and dynamic correlation in European bond markets

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Abstract

This paper examines the dynamic linkages among the European bond markets. We model the price and volatility spillovers from the US bond market and the aggregate Euro area bond market to twelve individual European bond markets using an EGARCH model that allows for a dynamic correlation structure. Our results suggest that significant volatility spillovers exist from both the aggregate Euro area bond market and the US bond market to the individual European markets. Moreover, the introduction of the Euro has strengthened the volatility spillover effects and the cross-correlations for most European bond markets.
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1. Introduction

The liberalization of capital flows facilitated by recent developments in trading technologies and improved transmission of news has resulted to increased integration between international financial markets. Understanding the behavior and sources of international financial markets linkages is important for diversifying internationally, pricing securities

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and making asset allocation decisions. The objective of this study is to investigate the market factors influencing European bond markets. More specifically, we measure how and to what extent the volatility of a European bond market is affected by local shocks, regional shocks and world shocks. In addition to exploring the volatility transmission mechanism, the dynamic correlation between the European bond markets is investigated. In contrast to previous studies on volatility spillovers, we focus on international bond markets and we allow for a time-varying correlation structure.

The issue of interdependence among international financial markets has received significant attention in the finance literature. A number of studies have focused on stock market interdependence in terms of price and volatility spillovers (e.g. Eun and Shim, 1989; Hamao et al., 1990; Koutmos and Booth, 1995). Of particular interest is the impact of world factors to national stock markets. For example, Bekaert and Harvey (1997) study the nature of volatility in emerging stock markets and find that volatility in emerging markets is less influenced by world factors. Ng (2000) studies the influence of world and regional factors in the Pacific-Basin region. She finds that both world and regional factors influence the Pacific-Basin stock markets although the influence of world factors is more intense.

This study focuses on the magnitude and the changing nature of price and volatility spillovers in the European bond markets. Most previous studies focus on the major US, Canadian, Japanese and UK stock markets. A limited number of studies have examined the volatility links between European stock markets. Eun and Shim (1989) examine the transmission mechanism of returns from US to some European markets, while Espitia and Santamaria (1994) study the return transmission mechanism across European markets using a VAR methodology. Booth et al. (1997) find weak evidence of price and volatility spillovers among four Scandinavian stock markets. Kanas (1998) uses an exponential GARCH model to investigate the volatility transmission mechanism across the three largest European stock markets, London, Frankfurt and Paris.

The recent developments within the European Monetary Union (EMU) have resulted to increased stock market interdependence among EMU countries and, consequently, question the dominance of the world financial markets in the Euro area. Fratzscher (2002) investigates shock spillovers from US to European equity markets. He finds that the transmission of shocks from the Euro area has become more important compared to shocks from the US market. The aim of our study is to investigate how local, regional and world market factors affect the European bond markets by measuring how and to what extent the volatility of a European market is affected by shocks in the same country, in the aggregate Euro area bond market and, finally, outside Europe (US).

The contribution of this study is threefold. While most of the previous studies have focused on the interaction between a single pair of countries, we investigate the influence of two major market factors, regional and world, to both Euro and non-Euro area national bond markets within the European region. Secondly, this study focuses on the relationships between bond markets that, relative to equity markets, are less-studied in the literature (see Ilmanen, 1995; Clare and Lekkos, 2000; Driessen et al., 2003). Thirdly, most approaches for modeling volatility spillovers assume conditional time-invariant correlations in order to simplify the estimation procedure (see Booth et al., 1997; Laopodis, 2002; Miyakoshi, 2003). However, several studies (e.g. Erb et al., 1994; Longin and Solnik, 1995, amongst others) provide evidence that support the time-variability of correlation. This study builds upon the

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