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# Bond markets co-movement dynamics and macroeconomic factors: Evidence from emerging and frontier markets<sup>☆</sup>

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### ABSTRACT

This paper examines the co-movement dynamics of ten emerging and four frontier government bond markets with the US market and the impact of macroeconomic factors and global bond market uncertainty on the time-varying co-movement. We find that macroeconomic factors play important role in explaining time variations in the bond return co-movement. Specifically, domestic macroeconomic factors have higher relative importance than global factors, with domestic monetary policy and domestic inflationary environment identified as the most influential factors. The global bond market uncertainty, based on an implied volatility measure, has explanatory power in driving co-movement dynamics in emerging and frontier bond markets.

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## 1. Introduction

This paper focuses on the co-movement dynamics of emerging and frontier government bond markets with the US market and driving forces behind the time-varying co-movement. The issue of co-movement dynamics among international bond markets is of great importance in asset allocation management and investors' diversification strategies. Most of the literature on the international co-movement across

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government bond markets has concentrated on the developed bond markets (e.g. Barr and Priestley, 2004; Kumar and Okimoto, 2011; Yang, 2005), while the studies on emerging bond markets are relatively thin (Bunda et al., 2009; Vo, 2009).<sup>1</sup> The examination of emerging bond markets warrants attention given the increasing demand for emerging market assets by international investors searching alternative asset classes able to provide diversification benefits and high returns.<sup>2</sup> Emerging markets' bonds have become a viable investment vehicle in the recent years, considering the following facts: (i) emerging markets have a tendency to grow rapidly; (ii) emerging markets' bonds have been the second largest source of financing to emerging markets since the beginning of the 1990s; and (iii) market liquidity and transparency in emerging bond markets have been enhanced in recent decade (see, e.g. Bunda et al., 2009; McGuire and Schrijvers, 2003, 2006).

The purpose of this study is two-fold. First, we investigate the dynamics of the government bond return co-movement of ten emerging and four frontier markets with the US market over the period 2000–2011 by applying the Dynamic Condition Correlation (DCC) GARCH framework.<sup>3</sup> The bivariate (individual emerging and frontier bond market versus the US bond market) DCC–GARCH modeling enables assessment of time-varying co-movement among investigated markets. Second, acknowledging the importance of understanding the driving forces behind the time-varying co-movement between international bond markets, we investigate whether global and domestic macroeconomic factors and global bond market uncertainty play important roles in explaining these time variations. The macro factors in our empirical framework include the business cycle fluctuations, the inflation environment, and monetary policy stance; which is in line with previous studies on the relationship between asset returns and macroeconomic fundamentals (Ilmanen, 2003; Li, 2004; Yang et al., 2009).

In addition to macroeconomic fundamentals, the literature also provides evidence that perceived market risk or uncertainty has an important impact on the co-movement dynamics of asset returns. For instance, in the literature on the co-movement between stocks and bonds, implied volatility from stock index options is used as a measure of stock market uncertainty (Andersson et al., 2008; Connolly et al., 2005, 2007; Kim et al., 2006b). The aforementioned studies provide evidence that stock market uncertainty, as measured by implied volatility, affects time variations in the co-movement of stock and government bond returns. Our study builds upon the proposed use of implied volatility measures as proxies for market uncertainty. Extending the work of Connolly et al. (2005), we apply a bond market uncertainty measure to examine the impact of global bond market uncertainty on time variations in international bond market co-movement. Specifically, we use the Merrill Lynch Option Volatility Estimate MOVE Index (a widely-followed measure of government bond volatility derived from option prices on US Treasury bonds) as a proxy for global bond market uncertainty.

Our study contributes to the literature in three ways. First, while most of the previous studies on international bond market co-movement have focused on the correlation dynamics between international markets, we examine the driving forces behind the time-variation of the bond return correlations. In particular, we investigate the role of both global and domestic macroeconomic fundamentals in explaining variations in bond return co-movement. Our research is closely related to Hunter and Simon (2005), who find that the co-movement between the US and other major bond markets (the UK, Germany, and Japan) returns is driven by changing macroeconomic conditions. Specifically, they identify monetary policy and the business cycle conditions as important factors in explaining time-varying correlations. Our study differs from Hunter and Simon (2005) by focusing on different roles of global and domestic macroeconomic factors, especially in the context of emerging bond markets.

<sup>1</sup> Lucey and Steeley (2006) provide good overview of the literature on international bond market integration and co-movement, pointing out that the research on government bond markets is relatively limited, despite its importance for monetary and fiscal policy, portfolio allocation and commercial banking.

<sup>2</sup> The average returns on emerging markets bonds exceeded the return on the Standard & Poor's 500 index from 1991 to the summer of 1997 (Erb et al., 1999). However, a very sharp increase in the returns on emerging markets bonds in early 1990s was followed by a downswing caused by the Russian bond default in 1998 and Argentina's debt default in late 2001. Despite negative contagion effects from those defaults, the emerging bond markets did not collapse, but instead continued to grow after 2002 following fast economic growth and strengthened sovereign debt ratings.

<sup>3</sup> The breakdown of markets as emerging vs. frontier is based on the Standard & Poor's (S&P) classification. The frontier markets represent a special subset of emerging markets, encompassing markets characterized by thin trading activity, a short history, higher risk levels than developed markets, and lower correlation with other markets.

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