Journal of Banking & Finance 35 (2011) 142–154

Contents lists available at ScienceDirect

Journal of Banking & Finance

journal homepage: www.elsevier.com/locate/jbf

Dynamics of international integration of government securities' markets

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ARTICLE INFO

Article history:
Received 16 October 2009
Accepted 18 July 2010
Available online 22 July 2010

JEL classification:
C32
E43
G15

Keywords:
Smooth transition model
Copula
Time-varying correlations
Financial integration

ABSTRACT

This paper investigates the dynamics of international government bond market integration in six of the G7 economies over two decades leading up to the global crisis. It examines whether such integration had been significant; the extent to which integration at the short and long end of the yield curve differed; the nature of such integration; and the extent of the decoupling of the long rates from short rates. These issues are investigated using the rigorous smooth-transition copula-GARCH model framework. The results show that integration at the long end of the yield curve had been increasing, had become pronounced, and was significantly greater than at the short end. Decoupling between the short and long end of the yield curve was notable, with important implications for the efficacy of monetary policy in the period before the crisis.

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1. Introduction

A large number of explanations have been advanced to explain the global financial and economic crisis that began in the summer of 2007 and gathered pace in the aftermath of the Lehman collapse in September 2008.[1] While factors relating to weakness and lapses in the financial sector regulatory and supervisory framework and inappropriate incentives for financial market participants have been often singled out as the most serious proximate elements, a number of observers have also emphasized underlying elements related to the availability of credit, the stance of monetary policy and a regime shift that appears to have occurred with regard to the impact of monetary policy on the term structure of interest rates. This paper focuses on the narrow issue of the decoupling of short-term policy rates from longer-term bond yields, and the evolution of sovereign bond market integration. This contributes to an understanding of the underlying causes of the crisis, but it is also of interest in its own right and has important implications for issues relating to the efficacy of monetary policy and portfolio diversification.

The paper can also be seen as part of the large and growing literature on financial globalization and the international integration of national financial markets (for the latest survey, see Kose et al., 2009). There have been a number of studies focusing on the integration of national equity markets, but a smaller, albeit increasing, number of papers examining integration of fixed income markets, particularly of government bond markets (see Laopodis, 2003; Beliu, 2005; Breger and Stovel, 2005; Kim et al., 2006; Clarida, 2007; Davies, 2007; Lamedica and Reno, 2007; Abad et al., 2010; Panchenko and Wu, 2009). The latter set of studies generally focuses on integration at the long end of the yield curve, and has been primarily motivated by concerns about diversification benefits. Their broad conclusion is that government bond markets have become more integrated in recent years, but that there are still significant benefits to diversification.

This paper contributes to the latter literature by examining specific issues related to the process of bond market integration, in particular for the major industrial countries, and argues that it is richer and more complicated than most of the existing studies indicate. The reason why the process of integration may be more complex is in part due to the fact of increasing globalization itself, combined with financial market innovation. The ongoing structural changes in the world economy, including in the underlying economic and financial market conditions, raise this complexity further. For instance, following from a suggestion by a number of observers that the home bias in bonds (as well as equities) has diminished,[2] it is not unreasonable to hypothesize that there may

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[1] There is already a voluminous literature in this area: for a summary of the key factors, see for instance, IMF (2009).

[2] See, for instance, Greenspan (2007).

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doi:10.1016/j.jbankfin.2010.07.019

well be different degrees of integration at the short and long end of the government yield curve.

At the short end, the degree of integration is dictated by the fact that monetary policy still holds sway on short-term interest rates and returns. If the business cycles across countries are synchronous and also lead to some synchronicity for policy, returns at the short end may be expected to be highly correlated. Where business cycles diverge, so do such returns. It could still be the case that, abstracting from the state of the cycle, the degree of correlation over this segment has increased over time. But presumably divergent cyclical conditions would continue to matter.

More importantly, this may have little bearing on the correlations at the long end of the curve. If long bond yields are being driven by global investor preferences, global savings and investment, international risk appetite, etc., then despite the term structure considerations, there could be significant sustained divergences between returns at the short and long end. For instance, suppose cyclical conditions between the Euro area and the US diverge, and monetary policy in the former is being tightened while in the latter it is being eased (as was the case until well after the beginnings of the crisis in the summer of 2007). The returns at the short end would diverge, but this may have little or no impact on returns at the long end which may primarily be dictated by global savings-investment balance and capital flows. In this context, it is worth noting the assessment by Greenspan (2007), just before the crisis, that "in retrospect, global economic forces, which have been building for decades, appear to have gained effective control of the pricing of longer debt maturities. Simple correlations between short- and long-term interest rates in the US remain significant, but have been declining for over a half-century. Asset prices more generally are gradually being decoupled from short-term interest rates."

The goal of this paper is to investigate rigorously the dynamics of international government bond market integration in the largest G7 economies (excluding Japan for reasons noted below) over the last two decades and focus on a number of different aspects. In particular, the paper addresses the following questions for the two-decade period leading up to the onset of the crisis: (i) has sovereign bond market integration been increasing? (ii) to what extent did the integration at the short and long end differ? (iii) how did the integration evolve? (iv) did long-term rates decouple from short-term rates?

The paper investigates these issues using the relatively novel but rigorous six-variate smooth-transition copula-GARCH (STCG) model. The smooth transition model per se gives us a convenient method to capture dominant long-run trends of correlations in bond yields. In addition, the copula framework allows us to model and estimate marginal and copula models separately, increasing tractability to estimate a model of the magnitude used in this paper. The smooth-transition copula-GARCH framework essentially enables us to analyze the dynamics of correlations in the bond markets in a highly flexible and tractable way.

We apply the STCG model to the short- and long-term yield for G6 countries, namely Canada (CA), France (FR), Germany (GE), Italy (IT), the UK, and the US. It is, however, unrealistic to estimate the model including 12 variables even if we use the copula approach. We therefore consider four subgroups based on the country and type of yields. Two groupings of countries are based on the recent studies by Doyle and Faust (2005) and Stock and Watson (2005). They analyze the international business cycle dynamics and argue the emergence of two groups, namely the English-speaking (ES) group including CA, the UK, and the US, and the Euro-zone (EZ) countries consisting of FR, GE, and IT. Thus, we estimate the six-variate STCG model for the following four subgroups: (i) short- and long-term yields for the ES countries, (ii) short- and long-term yields for the EZ countries, (iii) short-term yields for G6 countries, and (iv) long-term yields for G6 countries. This allows a detailed investigation of the market integration dynamics of the yield curve for the G6 countries.

Our empirical results indicate a striking difference in the correlation dynamics between changes in the short- and long-term yield, and between the ES and EZ countries. For the ES countries, short-term rates are correlated only weakly in the period leading up to the crisis. The average correlation among these countries was about 0.16 in the early 1990s, and has shown no significant increase over the past nearly two decades for CA–UK and UK–US pairs. Although the correlation for the CA–US pair increased significantly, its magnitude is still relatively low compared to the correlations between long-term yields. On the other hand, the long-term rates were moderately correlated (with average correlation 0.52) at the beginning of the 1990s. Strikingly, the long-yield correlation increased significantly and almost linearly throughout the sample period for all country pairs. The average correlation reached 0.84 by 2007, suggesting a very high degree of market integration in these countries' long yields.

For the Euro countries, the basic results are similar. Correlations between short-term yields for FR–IT and GE–IT pairs have been low over the entire sample period; even though for the FR–GE pair the correlation increases in the second subperiod (2001–2007) compared to the first (1994–2000), it remains surprisingly low. In a noticeable contrast, European long-term rates experienced a more striking increase in integration (from 1996 to 1998). The degree of integration between the short- and long-term yield curves varies noticeably: the average correlation among the European short-term rates was 0.20 in 1995 and 0.24 in 2007, while the corresponding values for long-term rates were 0.59 and 0.98, respectively. This difference between the market integration in European short- and long-term bond markets is similar to that in the ES countries, but given the European Monetary Union (EMU), is surprising for the former set of countries.

Our analysis also indicates clear-cut results for decoupling between the short- and long-term yields for the UK, US, FR, and IT. In addition, we show that the correlation between the short- and long-term yields for GE has been very small for the entire sample period. A wide array of tests supports the robustness of the results.

The results suggest that the evolution of interest rates at the short end of the curve up to the onset of the crisis continued to reflect domestic monetary policy as well as domestic economic and financial market conditions, with limited spillovers, while at the long end of the curve, the importance of global conditions and global investor preferences had been paramount. This leads to some clear implications for the term structure of interest rates in the government securities' markets.

The remainder of the paper is organized as follows: Section 2 briefly discusses a range of economic and financial issues related to the convergence hypothesis, and summarizes the results of existing studies; Section 3 introduces the econometric model and the estimation strategy, while Section 4 provides the empirical results; Section 5 concludes.

2. Financial market and economic issues in government securities' markets

2.1. Factors underlying convergence

The factors underlying the convergence in bond yields (nominal and real) have received increasing attention in recent years. As Clarida (2007) argues succinctly, a key element had been a decline in "home bias," reducing the preference of investors for domestic bonds and leading to increased international diversification. This change in preferences in turn is considered to reflect a variety of

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