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Another look about the evolution of the risk premium: a VAR-GARCH-M model

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Abstract

In this paper we model the Spanish interest rate in the period 1979–1998, estimating the time-varying risk premium for France, Germany and Spain and allowing for relationships among them. For this purpose, we select a VAR(1)-GARCH(1,1)-M(1) from among competing models. Results clearly support the existence of a time-varying risk premium for Spain that depends on the German volatility.

JEL classifications: C13; C32; E43

Keywords: Multivariate GARCH; Interest rate modelling

1. Introduction

In this paper we are interested in modelling the behaviour of the Spanish interest rate in the context of the European Monetary Union from an international perspective. To do this we shall consider a multivariate framework to analyse the convergence process in the period 1979–1998. In addition, we wish to check for

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evidence regarding the importance of the risk premium (which implies the consideration of a Generalised Autoregressive Conditional Heteroscedastic (GARCH) in mean (GARCH-M) specification, first provided by Engle et al. (1987)). This suggests that a suitable approach is to use a multivariate GARCH-M model.

Kraft and Engle (1983), Engle et al. (1984), and Bollerslev et al. (1988) were the first to discuss multiple equation models with a multivariate ARCH structure. Baba et al. (1991), Harmon (1988), and Engle and Kroner (1995) introduced the theoretical framework for simultaneous equation models where the disturbances follow a GARCH behaviour. More recently, Calzolari and Fiorentini (1994) have considered some cases of non-linear simultaneous equations together with conditional heteroscedasticity, while Polasek and Kozumi (1996) proposed the VAR-VARCH (Vector-AR-Vector-ARCH) structure. All these papers consider the effects of modelling conditional heteroscedasticity in multivariate models.

The plan of our paper is as follows. In the Section 2, we will analyse the joint evolution of the risk premia in France, Germany and Spain selecting a VAR(1)-GARCH(1,1)-M(1) from among competing models. Two periods are considered: from January 1979 to December 1988 and from January 1989 to December 1998 (monthly data in both cases). This division allows us to reveal the fact that in both periods there is clear evidence that Spain has experienced the existence of a time-varying risk premium that depends on the volatility of the German yield. However, only in the second period do we find some evidence that Germany has a risk premium that depends on its own yield. Finally Section 3 concludes.

2. The evolution of the risk premia: a multivariate-GARCH approach

2.1. Some history about the evolution towards the European Monetary Union

In modelling the Spanish interest rate together with the risk premium, the existence of global convergence renders a univariate approach inadequate to deal with this problem, and it makes clear the necessity of considering the influence of other countries that have had an important role in explaining the evolution of the Spanish series. We will consider in our analysis two main periods: from January 1979 to December 1988, and from January 1989 to December 1998, and we choose three countries to study: France, Germany and Spain. In order to justify the selection of this time period and the three countries, we will begin this section by reviewing some of the important facts and dates in the creation of the European Monetary Union.

The idea of monetary co-operation in Europe dates back many years and a good example of some of the early discussion was The Hague meeting in December 1969. But it was not until December 1978, that the European Council agreed to define the basic characteristics of a European Monetary system, and in March 1979, in Paris, it was authorised definitively. It began to work on the 15th March 1980, and its main aim was to stabilise the exchange rates of European countries